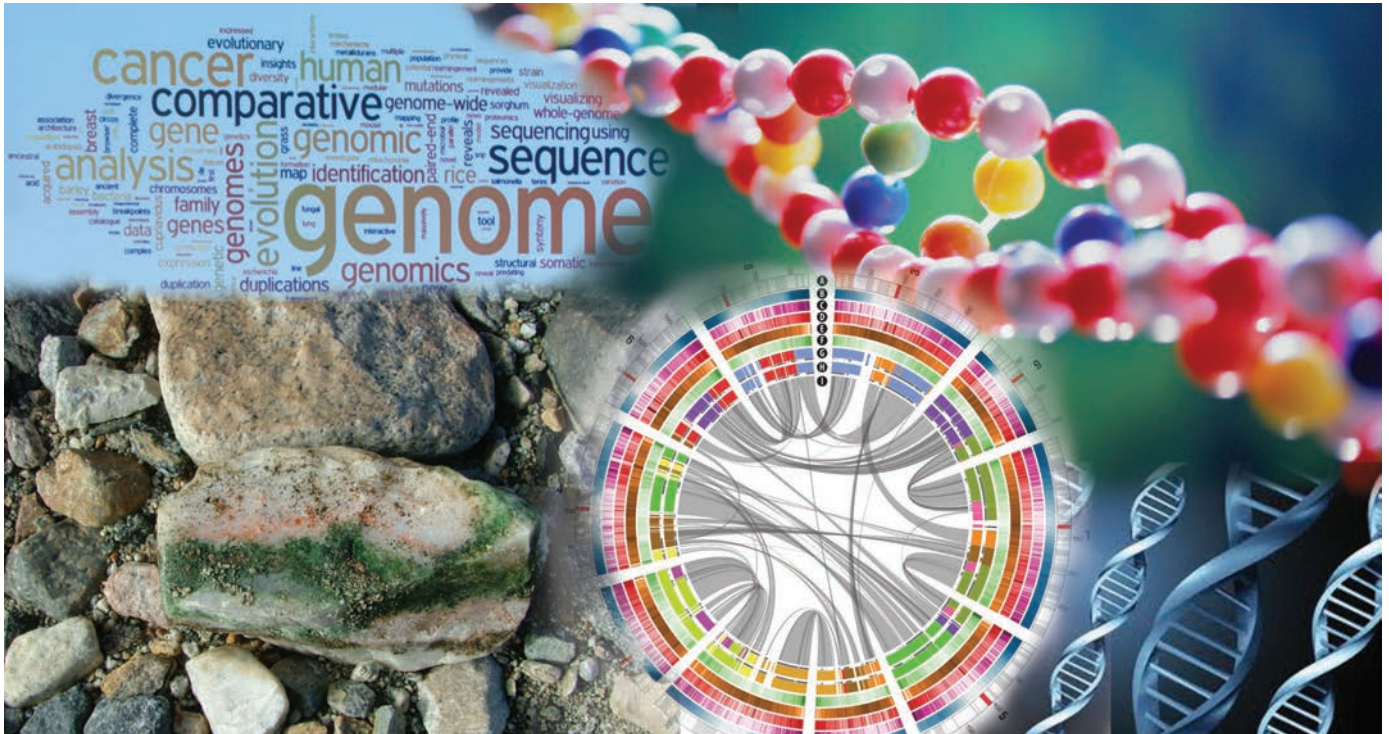


SQUARED² UP

Newsletter of the Faculty of Natural and Agricultural Sciences ■ Issue 3 ■ Dec 2012

UP at the forefront of genomics revolution



What was formerly science fiction is fast becoming reality at the University of Pretoria (UP) as more than 80 researchers explore how deeper genetic knowledge can be used for early detection of cancer, to fight disease-carrying organisms and to address some of the world's other pressing social, environmental and economic challenges.

The Institutional Research Theme (IRT) for Genomics at the University was officially launched on 23 October. It has a core membership of 28 academic staff and over 50 research staff across the faculties of Natural and Agricultural Sciences, Health Sciences

and Veterinary Sciences. Genomics is a rapidly evolving discipline in molecular biology that focuses on the genetic information (the DNA) contained within an organism.

A vast array of combinations of DNA bases give rise to the huge diversity of life on earth. The human genome, for example, has more than three billion pairs of DNA bases, providing the exact instructions required to create a particular individual with his or her own unique traits. "Two decades ago, it took a large group of scientists ten years and many millions of dollars to unravel the human genome. Today, with the revolutionary technology we have available at UP, the human

genome can be re-sequenced over a weekend," explains Prof Don Cowan, Director of the IRT for Genomics.

A deeper understanding of genomics is of considerable medical, economic and environmental importance, and around the world researchers are involved in genomic studies as diverse as detecting a person's genetic predisposition to disease, better matching organ donors with recipients in transplant programmes, growing disease- and drought-resistant crops and safely cleaning up toxic waste.

Continued on page 3



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Natural and Agricultural Sciences

Excellence in everything we do

The Faculty of Natural and Agricultural Sciences fully endorses the five strategic goals of the University as part of its future vision. In order to obtain these goals with its associated longer term targets, the Faculty needs to be focused, especially on excellence. One of these goals is to become a research intensive university in the next five years.

The Faculty, as one of the top faculties of sciences in the country, already contributes significantly to postgraduate research and will do even more with the launch of two Institutional Research Themes (IRTs). The IRT for Genomics was launched on 23 October (read more on page 1) and the launch of the Energy IRT took place on 13 September (page 3).

As always we are very proud of the outstanding achievements of our staff in the Faculty. Prof Pat Eriksson has been honoured by the Academy of Sciences for the Developing World for his fundamental contribution to the understanding of Precambrian sedimentation systems within a broader chronological and geodynamic framework (page 4). Prof Brenda Wingfield has been elected to the Council of the Academy of Science of South Africa for the 2012 to 2016 cycle (page 6). Dr Carina Visser from the Department of Animal and Wildlife Sciences was elected as Vice-President of the Board of Directors of the International Goat Association (page 7) and Prof Robert (Bob) Millar was recently inaugurated as a member of the Academy of Science of South Africa (page 4).

Our students are performing just as well: Cynthia Joan Henley-Smith, a PhD student in Medicinal Plant Science was recently awarded the Gen Foundation Grant for the advancement of her studies (page 13). Sindisiwe Nondaba, a first-year MSc student in biotechnology with specialisation in biochemistry, was awarded a fellowship from the Department of Science and Technology (page 10). Furthermore, two postgraduate students from the Department of Geology were recently awarded fellowships to attend the Colloquium of African Geology (page 12). Henry Thackeray, a final year BSc Mathematics student, has won the first ever South African Tertiary Mathematics Olympiad which took place this year (page 10).

It remains a key focus for the Faculty to ensure that our academic teaching programmes are relevant within the national and international context by providing a solid science foundation at the undergraduate level that will lead into proper specialisation at the postgraduate level. Therefore, a new initiative, the Science Teaching and Learning (SCITAL) Forum, was recently launched in the Faculty to bring together staff with a common and particular interest in teaching and learning (page 25).

Many conferences, launches and high-profile events took place in the Faculty the past few months. The Forestry and Agricultural Biotechnology Institute is not only home to the Centre for Tree Health Biotechnology, but also played host to the Annual Directors' Forum of the Centres of Excellence this year in November (page 21). The University's Hatchery at the Experimental Farm was officially opened in October (page 22) and a new genetic analyser for the DNA Sequencing Facility was launched in August (page 17). The Centre for Geoinformation Science celebrated the official launch of the first ICA/OSGeo Laboratory in Africa in October (page 23).

There are many more outstanding achievements by our staff, students and affiliates of which we are very proud. With this newsletter we aim to showcase some of it and we hope that you will enjoy this update on the latest developments in our Faculty. We wish you all well for the festive season that lies ahead and trust that you will come back refreshed in 2013.

Prof Anton Ströh

Dean: Faculty of Natural and Agricultural Sciences

Editor



Martie Meyer

Editorial Office:

Martie Meyer (Editor)
martie.meyer@up.ac.za
012 420 5498 (office)
012 420 5895 (fax)
Room 8-9,
Agricultural Sciences Building
Faculty of Natural and
Agricultural Sciences

Layout:

Rita Dave
Creative Studios (Hatfield)
Department for Education Innovation • 012 420 3932

Language editing:

Matilda Botha and UP Language Services

Please send your comments on the newsletter or suggestions/ ideas for articles to martie.meyer@up.ac.za



From left: Prof Eric Buch (Dean: Faculty of Health Sciences), Prof Robin Crewe (Vice-Principal), Prof Gerry Swan (Dean: Faculty of Veterinary Sciences), Prof Don Cowan (Director of the Genomics IRT), Prof Yves van de Peer (Ghent University, Belgium), Prof Cheryl de la Rey (Vice-Chancellor and Principal), Prof Stephanie Burton (Vice-Principal) and Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences).

At UP, the Genomics IRT is focused on four main areas: human health, the study of pathogenic organisms (infectious agents that cause diseases), the genome sequencing of a range of economically important tree species and environmental genomics.

“For example, in the field of human health members of the IRT are sequencing of the breast cancer exome (the coding portion of the genomic DNA) from South African women to build a greater understanding of genetic predisposition to cancer, as well as other factors that trigger the transformation of healthy cells into cancer cells,” says Prof Cowan.

“The University of Pretoria stands at the forefront of this revolution through the establishment of the Genomics IRT. The University’s strategic investments in state-of-the-art technology and in acquiring and retaining key academic and research staff provide a superb basis for collaborative projects across faculties and between institutions, and will strongly contribute to its rapidly growing national and international status.”

Research focus on energy

The University of Pretoria (UP) launched the Institutional Research Theme on Energy (IRT on Energy) on 13 September. This exciting new research initiative will coordinate research conducted in the faculties of Engineering, Built Environment and Information Technology and Natural and Agricultural Sciences. It will focus on topics that are relevant to South Africa’s future energy security.

A study by the University’s Institute for Technological Innovation in the Faculty of Engineering, Built Environment and Information Technology found that the University was the most prolific publisher of energy research in South Africa over the period 1997–2007. This led to the establishment of the University’s IRT on Energy.

The IRT on Energy was designed to recognise and foster excellence in research, and is aimed at enhancing multi- and trans-disciplinary research that cuts across faculties to strengthen the University’s reputation as one of South Africa’s leading research universities. The IRT will coordinate the research being done in a number of faculties and partner institutions, which focuses on topics that are relevant to South Africa’s future energy security. Such a focused and concerted research effort is necessary to ensure that the country succeeds in achieving the goals of government’s Integrated Resource Plan of 2010 (IRP2010).

In order to develop an appropriate strategy for the IRT on Energy, the IRP2010 was evaluated, together with other government energy policies and strategies. The main goal of the IRT on Energy is to concentrate on research related to electricity generation, transmission and distribution.

A number of selected research subthemes include energy production (with the emphasis on clean coal, nuclear and renewable energy), energy distribution (smart grids and energy storage), energy optimisation, advanced materials, energy policy and economics and ensuring a sustainable environment.



From left: Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences), Prof Tinus Pretorius (Director: IRT on Energy), Prof Cheryl de la Rey (Vice-Chancellor and Principal), Mr Malcolm Folkes (Senior Manager: Eskom) and Prof Roelf Sandenbergh (Dean: Faculty of Engineering, Built Environment and Information Technology).

Prof Pat Eriksson wins prestigious award



Prof Pat Eriksson

Prof Pat Eriksson, Head of the Department of Geology in the Faculty of Natural and Agricultural Sciences, has been honoured by TWAS (Academy of Sciences for the Developing World) for his fundamental contribution to the understanding of Precambrian sedimentation systems within a broader chronological and geodynamic framework. Prof Eriksson is one of the winners of the TWAS Awards for 2012, which were announced at the Academy's 23rd General Meeting in September in Tianjin, China.

TWAS is an autonomous international organisation based in Trieste, Italy. Its principal aim is to promote scientific capacity and excellence for sustainable development in the South.

The prizes were awarded in eight fields, namely Agricultural Sciences, Biology, Chemistry, Earth Sciences, Engineering Sciences, Mathematics, Medical Sciences and Physics.

Each TWAS Prize carries a cash award of

USD15 000. The winners will lecture about their research at the 24th General Meeting of TWAS in Argentina in 2013, where they will also receive a plaque and the prize money.

Prof Eriksson is the founder of two international working groups. He is a Fellow of the Geological Societies of both South Africa and Africa, a member of the New York Academy of Sciences, the Academy of Science of SA and a Fellow of the Royal Society of SA.

He has been a guest editor of 17 special journal issues, of which 16 were international. Prof Eriksson is Editor-in-Chief of the *Journal of African Earth Sciences* and is an associate editor of *Gondwana Research* and *Marine and Petroleum Geology*. During his career he has authored and co-authored over 200 papers in geological journals and books, and he has over 1380 citations in the ISI index to these works. He is a B1-rated NRF scientist and has received the Exceptional Achievers Award five times.

Academy of Science of South Africa inaugurates Prof Millar

Prof Robert (Bob) Millar was recently inaugurated as a member of the Academy of Science of South Africa (ASSAf). Prof Millar is the Director of the Mammal Research Institute in the Faculty of Natural and Agricultural Sciences and Director of the UCT/MRC Receptor Biology Group.

ASSAf is an organisation that aims to generate evidence-based solutions to national problems. New members are elected each year by its existing members. ASSAf members voluntarily give their time and expertise in the service of society and are drawn from a broad spectrum of disciplines.

Prior to his appointment at the University of Pretoria Prof Millar was the Director of the prestigious MRC Human Reproductive Sciences Unit at the University of Edinburgh, UK for twelve years, during which he secured over R900 million in research funding and over one million rand for a biotech company.

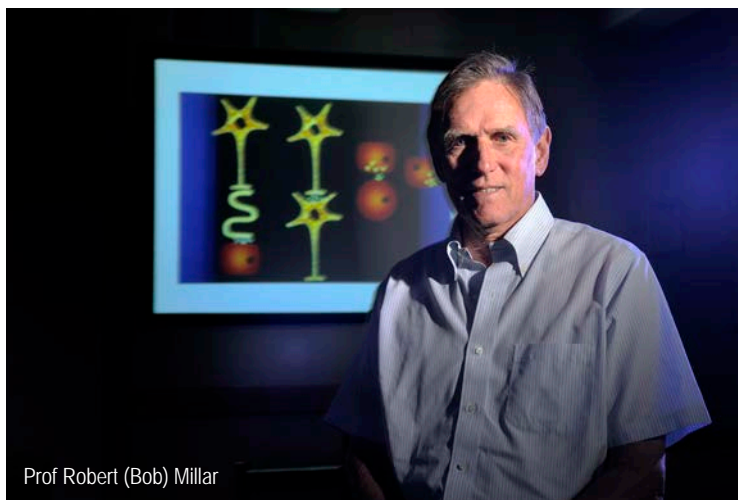
Prof Millar has published 380 articles and 20 patents; he has an H-index of 54. His research spans an eclectic spectrum including comparative reproductive biology and physiology, modular biology of receptor function, drug development and "first in man" clinical research. Not only

highest amongst all scientific journals, having an impact factor of 47. He also has an A-rating from the National Research Foundation.

Prof Christof Heyns, Professor of Human Rights Law and Co-director of the Institute for International and Comparative Law in Africa was inaugurated at the same occasion and a medal of excellence was awarded to Prof Kobus Eloff, Head of the Phytomedicine Programme in the Faculty of Veterinary Science.

The Chief Executive Officer of ASSAf, Prof Roseanne Diab, welcomed and congratulated the newly appointed members from the University of Pretoria: "Membership of the Academy is a great honour, and the inclusion of these new members bears testimony to their

scholarship and contributions to scientific endeavours in our country. We look forward to their contribution to the growth and development of the Academy."



Prof Robert (Bob) Millar

has he published over 350 papers which have received over 10 000 citations, but he also recently published two articles in the prestigious *New England Journal of Medicine* which is ranked



Prof John Taylor

Prof John Taylor elected as Fellow of the ICC

Prof John Taylor from the Department of Food Science has recently been elected as a Fellow of the Academy of the International Association for Cereal Science and Technology (ICC). He also received a B1 NRF re-rating.

The ICC is an independent, internationally recognised organisation of experts specialising in the milling of wheat and other cereals, bread making, and the production of other cereal-based foods from around the world. In more recent times the ICC has expanded its focus to address issues that contribute to improved food quality, food safety and food security for the health and well-being of all people.

After working at the CSIR for 12 years, mainly researching sorghum in brewing, Prof Taylor joined UP's Food Science Department in 1992 as a cereal scientist and food chemist. He is an internationally respected specialist on the science and processing technologies of the indigenous African cereals sorghum and the millets.

He is a full Professor in the Department of Food Science and is Research Theme Leader for Functional Biomolecules and Foods in the Institute for Food, Nutrition and Well-being at the University of Pretoria. He undertakes research into the quality and processing of African cereal grains, especially sorghum and millets, in four interrelating areas: Grain quality, with specific emphasis on nutritional quality, malting and brewing, gluten-free baked goods and protein-based biomaterials.

He has been supervisor and co-supervisor of more than 70 MSc and PhD graduates as well as postdoctorals from across sub-Saharan Africa, many of whom now hold senior positions in academia, industry and government in Africa and across the world.

Prof Taylor is author and co-author of some 130 papers in peer-reviewed scientific journals, 16 book chapters, many technical reports to industry, and has co-edited a monograph on Pseudocereals and Less Common Cereals. He is an Editor of the *Journal of Cereal Science* (Elsevier) and a member of the Editorial Boards of the journals *Quality Assurance* and *Safety of Crops and Foods* (Wiley Blackwell) and *Food Biosciences* (Elsevier).

He served as President of the International Association for Cereal Science and Technology (ICC) from 2009 to 2010 and is currently Immediate Past-President and Chair of the Governing Committee.

He is the recipient of several awards, including: Member of the Academy of Science of South Africa, AACC International's Excellence in Teaching Award, Fellow of AACC International, Fellow of the International Academy of Food Science and Technology and recipient of the University of Pretoria's Chancellor's Award for Research.

Prof Brenda Wingfield elected to ASSAf Council



Prof Brenda Wingfield

Prof Brenda Wingfield, Deputy Dean of the Faculty of Natural and Agricultural Sciences and a researcher of international calibre, has been elected to the Council of the Academy of Science of South Africa (ASSAf) for the 2012 to 2016 cycle. The election took place in September 2012.

The Academy of Science of South Africa (ASSAf) is an independent, statutory body of eminent South African scholars and scientists. ASSAf

is the official national Academy of Science of South Africa and represents the country in the international community of science academies.

Prof Wingfield has published more than 240 peer-reviewed articles. She is one of the Research Leaders of the Department of Science and Technology (DST)/NRF Centre of Excellence in Tree Health Biotechnology, Chairperson of the National Science and Technology Forum (NSTF) and previous Vice-Chairperson of the Board of Trustees of PlantBio, one of the national biotechnology innovation centres.

She was the winner of the Department of Water Affairs and Forestry's Women in Water, Sanitation, and Forestry Research Award in 2007, the DST's Distinguished Women in Science Award in 2008 and the African Union's Women in Science Regional (Southern) Award in 2009. Prior to this award, she was recognised four times as an Exceptional Academic Achiever. She has a B rating from the NRF. She has also been awarded the Chancellor's Award for Research for 2012.

Prof Wingfield's research interests include fungal population genetics and fungal phylogenetics. In addition to her internationally recognised research programme on the molecular phylogeny and taxonomy of tree pathogenic fungi, she is now developing a fungal genomics programme. Her research team has just published

their first genomics paper, "First fungal genome sequence from Africa: Consequences scientific and regional". Her research team has already sequenced an additional ten fungal genomes. This veritable "tsunami" of sequence data is contributing significantly to the research which is being accomplished at the University of Pretoria.

Dr Carina Visser elected as Vice-President of IGA

Dr Carina Visser from the Department of Animal and Wildlife Sciences in the Faculty of Natural and Agricultural Sciences was elected as Vice-President of the Board of Directors of the International Goat Association (IGA) during the XI International Conference on Goats in Las Palmas, Gran Canaria in September 2012. Dr Visser succeeds Prof Ned Donkin in this position, who also attended the Conference. Prof Donkin works for the Department of Animal and Wildlife Sciences, too.

Goat production is an important livestock sector in South Africa; however, goats are also recognised internationally, especially for the contribution they make to the livelihoods of resource-poor communities. Goat production systems face various challenges, including the increase of poverty in developing countries, the effects of climatic change and the global energy crisis. To address these challenges, interaction between scientists from different disciplines becomes crucial.

The conference included scientific sessions on goat nutrition, reproduction, health, management and genetics as well as round table discussions and special seminars on the role of goats in the fight against poverty. Dr Visser was invited as the main speaker in the session on “Genetic improvement of goat-produced fibres” and presented an overview of selection strategies in the Angora goat industry. Prof Donkin offered an oral presentation as well as posters on recent research with the UP Milk Goat Project and was involved in several round-table discussions and IGA Board meetings. Delegates visited milk goat farms in Gran Canaria and had the opportunity to interact with farmers and their animals.

The University of Pretoria has had a long-standing relationship with the International Goat Association (www.iga-goatworld.com).



Dr Carina Visser with indigenous milk goats (Capra Majorera) in the Canary Islands



Prof Rudi van Aarde and Dr Robert Guldemond from UP's Conservation Ecology Research Unit (CERU) have won several awards from the *SA Publication Forum for their 2012 publication *Dune Forest Restoration – a visual journey*.

The publication received a Merit Award for Excellence in Design as well as a Merit Award for Excellence in Communication. It was also announced as runner-up for Best once-off publication and runner-up for Best Publication Cover.

Prof van Aarde and Dr Guldemond lead a long term monitoring and research programme at RBM, managed by Rio Tinto, in South Africa. RBM mines sand dunes where some remnants of sub-tropical coastal dune forests occur. High standards of rehabilitation have always been a top priority for the company and restoration began in 1977, when mining began on mostly bare, degraded coastal dunes.

A clear objective was to restore dune forests on a third of the mined dunes. Prof van Aarde and his team have been conducting research and monitoring since 1991, which is still on-going. They focus on time- and age-related changes in a number of ecological variables that centre on trees, millipedes, rodents and birds. The results to date have been outstanding.

Publication awards for new book from CERU



The regeneration of a dune forest relies on natural processes that drive succession. These processes are kick-started by stabilising topsoil on reshaped sand dunes through seeding of fast growing annual plants to provide ground; soon after the typical pioneer species of the region, *Acacia karroo* or Sweet Thorn establishes and, finally, this is followed by the appearance of species typical of dune forest. Over time native fauna also re-established and recolonised these regenerating new growth forests. They wrote: 'The extraordinary diversity of species living in the new growth forest in RBM's mining lease areas is a testament to the company's long-term ecological restoration program. In these areas, trees form a dense canopy and provide shade and shelter for lush growths of shrubs, herbs, ferns and some grasses. Brightly coloured flowers, snails, insects, millipedes, frogs, chameleons, snakes, tortoises and birds live here. Mammals other than shrews and rodents are rare, but red duikers, bush babies and the occasional leopard do occur. Jointly these plants and animals form a dune forest similar to other indigenous forests along the coast.' The Richards Bay experience is an object lesson – particularly the benefits that flow from rehabilitation and the value of long term monitoring and research. As Prof van Aarde's and Dr Guldemon's work demonstrate, understanding the re-establishing of a complex ecosystem is a journey. It takes time, commitment and experience.

* The SA Publication Forum is committed to improving and promoting corporate publications in South Africa. The main activities of the forum are the annual Corporate Publication Competition and training opportunities in the form of training courses, workshops and seminars. Close on 150 publications, electronic newsletters and DVDs were entered this year. Publications were judged in terms of writing, communication, design and photography in different categories.



UP student wins first ever South African Tertiary Mathematics Olympiad

Henry Thackeray, a final year BSc Mathematics student in the Faculty of Natural and Agricultural Sciences at UP, has won the first ever South African Tertiary Mathematics Olympiad (SATMO 2012).

The Olympiad was written on 6 October by a total of 151 undergraduate students from universities across the country. In total four students from the University of Pretoria were ranked in the top 25 achievers nationally, which places the University of Pretoria third in terms of the number of students who are ranked in the top 25 achievers. The other three top achievers from UP are Anton Vlasov, a second-year BSc student in Actuarial and Financial Mathematics, Theo Ferreira, a first-year BSc student in Actuarial and Financial Mathematics and Tinaye Muzanya, who is a final year BSc student in Actuarial and Financial Mathematics. Henry Thackeray's achievement is especially remarkable. With a score of 90%, Henry beat the others by far, the closest score country wide being 65%.

Mathematics Olympiads consist of questions which test mathematical problem solving skills and usually require ingenuity more than knowledge to solve. The paper consisted of twenty questions for which students had 90 minutes to answer.



Henry Thackeray

Some examples of the type of question found in Mathematics Olympiads are the following:

- Six political leaders must have their photographs taken sitting in a row. Helen and Patricia insist on sitting next to each other. Jacob and Julius refuse to sit next to each other. Tokyo and Trevor don't mind where they sit. In how many ways can they be seated?
- A clock's minute hand has length 4 and its hour hand length 3. What is the distance between the tips at the moment when this distance is increasing most rapidly?

DST Fellowship for master's student

Sindisiwe Nondaba, a first-year MSc student under the supervision of Prof Debra Meyer (Head of the Department of Biochemistry in the Faculty of Natural and Agricultural Sciences), was recently awarded a fellowship from the Department of Science and Technology (DST).

She is one of only six master's students who received this fellowship, which is awarded to students currently involved in full-time study or research. These awards recognise outstanding ability and potential in research and aim to enhance the research experience and output of women, as well as encourage more young women to complete research degrees.

Sindisiwe's field of study is biotechnology with specialisation in biochemistry. She is conducting research in the area of HIV/Aids, mainly on HIV-1 subtype C, because it is the dominant subtype in South Africa and accounts for most of the global HIV-1 epidemic. Her project entails investigating host and virus-derived synthetic peptides to ascertain their potential as therapeutic tools.

The HIV research group has a unique approach to HIV/Aids research and education, involving multidisciplinary collaborations and the use of a combination of biochemistry, analytical chemistry and physics to get more reproducible data.

Preliminary data produced by Sindisiwe suggests an association between disease progression and the presence of antibodies elicited to the aforementioned synthetic peptides, early in infection. Her work has also shown that the peptides are not toxic to cells.

Although it is still early, she has already made progress towards achieving the objectives of her study. It is possible that data from this project may necessitate that we consider re-evaluating and expanding current HIV diagnostic and prognostic technology in favour of methodologies that provide more information on disease status.

Following completion of an MSc, Sindisiwe wishes to pursue a doctorate in biotechnology and aspires to be one of the top female scientists in this country.



Sindisiwe Nondaba

The Head of the Department of Food Science, Prof Elna Buys, delivered her inaugural address on 9 October 2012. The topic was "Food microbiology and safety management – opportunities and constraints".

In her address she stated that "due to increased food borne outbreaks world-wide food safety management systems have been implemented to facilitate safe food production and processing. The implementation of food safety management systems has changed food safety assurance from a reactive to a proactive system. These systems also have the goal to facilitate international trade. This increases our reliance on food processors for safe food. However, it is impossible to eliminate all risks. The food microbiology principles of these food safety management systems should be based on sound science, which is not always the case."

Prof Buys also argued: "Considering this, it brings about the need for advanced education of food scientists in food microbiology and safety. Essential is the understanding of research trends and findings in the occurrence and incidence, growth and survival of foodborne pathogens at different environments or in foods, toxin production and the pathogenicity of well-known and emerging pathogens, and also the effect of environmental stresses. Discussions on the micro-flora of food should include traditional foods, spoilage of new food systems, e.g. low-calorie foods, extended shelf life foods and fortified products. Since the identification of pathogenic or toxigenic strains employs sophisticated techniques, principles of immunology and molecular biology are essential."

Prof Elna Buys is a C2-rated scientist with the National Research Foundation and was appointed as Head of the Department of Food Science from 1 February 2012.

Prof Buys completed her PhD in Microbiology through the University of the Witwatersrand and started her career at the University of Pretoria at the end of 2001. Prior to this, she was a Senior Researcher at the Agricultural Research Council (ARC).

She has been appointed to the technical committee of the South African Dairy Standards Agency (appointments by invitation only). She is currently supervising and co-supervising four master's students, two PhD students, one postdoctoral and one DTech degree student. Prof Buys has published more than 40 journal articles and four books.

Prof Elna Buys delivers inaugural address



Previous Heads of the Department with Prof Buys. From left: Prof John Taylor (1992 – 2001), Prof Elna Buys (2012), Prof Amanda Minnaar (2001 – 2012) and Prof Samuel Lombard (1980 – 1992).



From left: Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences), Prof Elna Buys and Prof Cheryl de la Rey (Vice-Chancellor and Principal).

Actuarial students awarded best Honours research project in SA

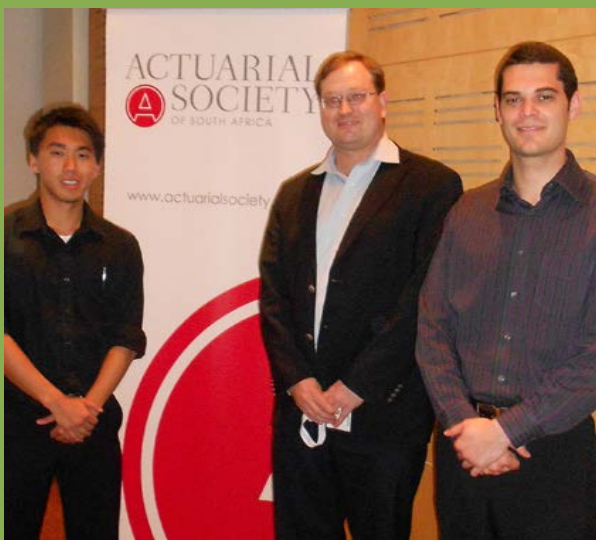
The Department of Insurance and Actuarial Science is extremely proud of two of their alumni from last year. Fuxun Xia and Wayron Lewis won the prize for the best Honours research project in South Africa in 2011. The research projects are judged by the Research Committee of the Actuarial Society of South Africa.

Not only were they rewarded financially, but they were invited to present their research as a paper at the annual Actuarial Convention which took place in Cape Town on 16 and 17 October 2012.

Their paper, which is titled "Dealing in Junk: Money makers or money takers?" was well received by their audience. Although the high-yield market in South Africa is still in its infancy, junk bonds are a potentially viable new asset class for individuals and institutions alike.

They made a study of historical default rates of firms issuing high-yield bonds in the USA. A multivariate logistic regression analysis was undertaken and resulted in the development of five models which incorporate financial ratios and variables to predict default by such firms. They found that firms with relatively lower total assets, earnings before interest and tax and cash flows from operating activities are more prone to default on their debt obligations. Their research also examined the effect on default rates by macroeconomic factors in conjunction with financial ratios and variables previously used. The conclusion was that macroeconomic factors are dominant in determining default over the long term.

They also focused on the smaller South African high-yield debt market and its relevance in the context of this study.



From left: Fuxun Xia, Dr Conrad Beyers and Wayron Lewis.



Olutola O Jolayemi



Samson M Masango

Fellowships to postgraduate Geology students

Two postgraduate students of the Department of Geology were recently awarded fellowships to attend the Colloquium of African Geology (CAG). The CAG is a biennial international meeting of earth scientists organised under the auspices of the Geological Society of Africa (GSAf). In 2013 the 24th CAG will take place in the capital of Ethiopia, Addis Ababa. Financial assistance for students to attend this is on a strictly competitive basis. Olutola O Jolayemi, a PhD student, supervised by Dr Nils Lenhardt and Dr James Roberts, received a full fellowship, sponsored by the British Geological Survey. A partial fellowship, sponsored by the conference committee of the 24th CAG was awarded to Samson M Masango, an MSc student in the Department. Dr Nils Lenhardt is also his supervisor.

Koos van der Merwe/AFMA student of the year award 2011/2012

An Maria Jozefa Jacques from the Department of Animal and Wildlife Sciences was awarded the prize for the most outstanding final year student in Animal Nutrition during 2011/2012. She received the Koos van der Merwe/AFMA Student of the Year Award.

The award consists of a certificate and a cash amount of R13 000, sponsored by the Animal Feed Manufacturers' Association (AFMA). The award was presented to Ms Jacques on 3 October 2012, at AFMA's Annual Symposium in the Diamond Auditorium, CSIR International Convention Centre, Pretoria.



An Maria Jozefa Jacques

PhD student in Medicinal Plant Science receives Gen Foundation grant

Cynthia Joan Henley-Smith, a PhD student in Medicinal Plant Science in the Faculty of Natural and Agricultural Sciences was recently awarded the Gen Foundation Grant for the advancement of her studies (in September 2012).



Cynthia Joan Henley-Smith

The Gen Foundation is a charitable trust which principally provides grants to students/researchers in biological, chemical, botanical, and food sciences. Exceptional candidates in language, music, and art may also be considered.

Since 1998, awards have been granted to over 80 people studying or researching within these fields. Applications are submitted yearly, in writing before 31 March to the Gen Foundation, United Kingdom. Please see their website for more information: www.genfoundation.org.uk

The amount of each grant is based on the merits of each application, and is set at the Trustees' discretion. Previous grants have ranged between £500 and £5 000.

Acting Deputy Dean appointed in Faculty

Prof Marietjie Potgieter has been appointed as the Acting Deputy Dean for Teaching and Learning in the Faculty of Natural and Agricultural Sciences from 1 January 2013 until 30 June 2013.

Prof Potgieter is an associate professor in the Chemistry Department and she has also been a member of the Teaching and Learning Committee as well as a member of the Admissions Committee since April 2010.

Prof Potgieter received a commendation award from the Higher Education, Learning and Teaching Association of

Southern Africa (HELTASA) for teaching excellence in 2010. She is also one of the founding members of a new initiative in the Faculty, the Science Teaching and Learning (SCITAL) Forum. The aim of SCITAL is to bring together staff with a common and particular interest in teaching and learning.

She follows in the footsteps of the previous Deputy Dean, Prof Johan Engelbrecht, who has been seconded as Acting Vice-Principal: Teaching and Learning and Student Affairs.



Prof Marietjie Potgieter

Emeritus Professor turns 80



Prof Robbertse and his wife at the birthday celebrations on the Hatfield Experimental Farm.

On 9 October 2012, well-known plant physiologist Prof Hannes Robbertse celebrated his 80th birthday together with staff and students from the Department of Plant Production and Soil Science. Apart from actively teaching, Prof Robbertse is also still extensively involved in the Department, assisting staff and postgraduate students with his wealth of knowledge and experience. It is truly an honour and a privilege to have someone of his stature still making an invaluable contribution to the plant science community. After almost two decades of service in the Department of Plant Production and Soil Science we would like to extend our sincerest birthday wishes and thank him for his constant enthusiasm and willingness to help.

Experimental Farm says goodbye to Andreas after 47 years



Long-service awards in 2010. Mr Andreas Maponja (middle), together with Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences (left) and Dr Simon Kotzé (Faculty Manager: Natural and Agricultural Sciences).

Almost half a century... One cannot ask for a more loyal employee.

Mr Andreas Maponja retired this year after having been in the service of the University of Pretoria for 47 years. As a young man of 18, he started work at the Large Stock Unit of the Hatfield Experimental Farm and worked at the same unit until his retirement in 2012.

Mr Maponja began his career as a milking-machine operator and also looked after the raising of calves. He was appointed as team leader in 1998.

Andreas is well-known among researchers and BSc students. He assisted with second-year practicals, where students learn how to milk cows with the milking machine, as well as with third-year practicals during the examinations for artificial inseminations.

We wish Andreas good health and prosperity in Malja, Limpopo, where he is now settled together with his wife, Sara.

Read more in the next issue about all the interesting features regarding the University's Experimental Farm in the heart of the city.



From left: Mr Roelf Coertze (Manager: Experimental Farm), Mr Andreas Maponja and his wife, Sara.

UP student wins fellowship to study Women's Empowerment Index



The International Food Policy Research Institute (IFPRI) and its partners recently announced that Christopher Manyamba from the University of Pretoria has been awarded a PhD dissertation research fellowship on the Women's Empowerment in Agriculture Index (WEAI). The first of its kind to directly capture women's empowerment and inclusion levels in the agricultural sector, the purpose of the Index is to understand why women in developing countries face persistent obstacles and economic constraints to inclusion in the agriculture sector even though they play a critical role in agricultural growth.

The Index is a partnership among IFPRI, the US Government's Feed the Future initiative of the United States Agency for International Development (USAID) and the Oxford Poverty and Human Development Initiative (OPHI) of Oxford University.

The threefold goal of the fellowship is to strengthen understanding and evidence of the WEAI; expand understanding of WEAI dynamics through complementary qualitative and ethnographic work and support promising researchers interested in gender and agriculture.

Christopher Manyamba is busy with his PhD in the Department of Agricultural Economics, Rural Development and Agricultural Extension in the Faculty of Natural and Agricultural Sciences with Prof Sheryl Hendriks (Director of the Institute for Food, Nutrition and well-being) as his supervisor. The title of his dissertation is "The Relationship between Women's Empowerment in Agriculture and Household Food Insecurity: Implications on Agriculture Policy and Objectives."



Welwitschia plants dotted across an arid plant



The exposed radial root system of a Welwitschia landscape



The removal process

A rare opportunity to study the microbial communities of *Welwitschia* root systems

Welwitschia mirabilis is an uncommon plant found in the western hyper-arid desert regions of Namibia and southern Angola. The plant, which was first discovered in 1859, has always fascinated scientists because of its primitive nature, its uncertain taxonomic affiliation and its propensity to grow only in very low rainfall deserts. Researchers based at the Gobabeb Research and Training Centre in western Namibia have extensively studied the botany and physiology of *Welwitschia*, but little is known of the endophytic or rhizospheric microbiology of the species. Given its isolated growth behaviour, and the sparse vegetation in the regions where it flourishes, it is suggested that the root systems of *Welwitschia* may support unique populations of microorganisms.

The Namibian mining company Namib Uranium has received official approval from the Namibian government to transplant three *Welwitschia* plants as part of the development of a roading system to support their mining operations. In the latter part of 2011, Prof Cowan (now the Director of the UP Centre for Microbial Ecology and Genomics (CMEG) and of the Genomics IRT Genomics) was asked to join a network of interested scientists who would like to access *Welwitschia* root samples if, and when, the transplantation process was undertaken.

Notice was received in mid-August that Namib Uranium was ready to start the transplantation process. Two CMEG researchers, Dr Angel Valverde and Dr Pieter De Maayer, flew to Walvis Bay armed with sterile gloves, tubes, scalpels and other tools for sample collection.

Over a two day period in early September, Angel and Pieter were successful in obtaining a large number of root samples, rhizospheric and rhizoplastic soils samples and control soils from the trenches. Interestingly, whereas many of the early articles and monographs on *Welwitschia* growth show the plants to have extended tap root structures penetrating many meters into the soil, the root systems of the *Welwitschias* targeted for removal showed vertical penetration for less than 1m. The presence of a concrete-hard calcrete layer at around 1m depth caused the root systems to disperse radially and laterally.

The root samples are now stored safely in Namibia, awaiting the arrival of the export permits. Once the samples are received in Pretoria, metagenomic DNA extracts from the root tissues and from associated soils will be used for microbial community fingerprinted studies using TRFLP analysis of 16S and ITS PCR amplicons. The rest, we hope, will be history!

Acoustics revisited

It may be thought that the science of acoustics is well-established and a closed book. When Prof Niko Sauer, Extraordinary Professor in the Department of Mathematics, wanted to read about it, this impression turned out to be wrong.

The classical theory was fraught with misconceptions and vague assumptions. As a result he set out on a new journey into the unknown and developed a different approach that led to a different set of governing equations and, more importantly, an inequality that states mathematically the well-known principle that a given body of gas cannot be compressed to zero volume.

Analysis of the equations, constrained by the inequality, revealed amongst other things that the theory at the root of acoustic engineering cannot even hope to approximate the situations needed to be addressed. Initially symmetric sonic disturbances, for example, become unsymmetrical and may eventually go over into shock-phenomena. As a result it became clear that the concept of sound speed everyone talks about is nothing more than a myth. In the aftermath it is suggested that talking about "sound waves" may be scientifically inappropriate.

It was in 1857 that Stephen Earnshaw, then at Cambridge, postulated that acoustic disturbances could be propagated at a rate higher than the speed of sound. He illustrated this by contemplating the effect of a solid piston being pushed into an air-filled cylinder. This situation was studied by Sauer in a follow-up paper that showed that Earnshaw was actually correct. The ensuing shock disturbance was appropriately called "Earnshaw's bore".

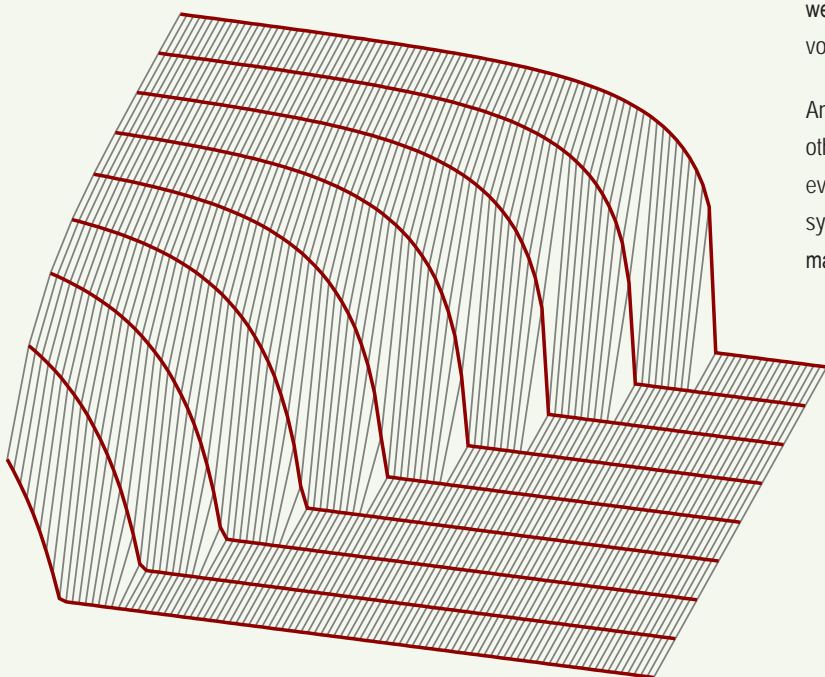


Illustration: Earnshaw's bore as calculated from the new theory

Research

Conceptualising Food Law as informed by African imperatives

While the role of law in shaping the global food system is well developed in countries such as the United States and in the European Union, food law has yet to be recognised as a distinct legal domain in South Africa and indeed on the African continent. Despite this lack of recognition, food law issues have never been more pertinent, with concern over food safety and consumer protection driving a growing number of African countries to implement food law reforms in line with international trends.

These developments include a tightening of the regulatory frameworks for food safety and labelling. Together with these developments, the function of food law is expanding to cover a broad spectrum of objectives and interests. Therefore, the objective of the Food Law seminar in



From left: Prof Anton Kok (Deputy Dean: UP Faculty of Law), Mrs Cerkia Bramley, (Researcher: International Development Law Unit) and Prof Bernd van der Meulen (Professor of Law and Governance, Wageningen University, the Netherlands).

September, hosted by the University of Pretoria, was to engage a range of stakeholders to explore the major interests at stake and contemporary issues in regulating the agro-food system. This

discussion, assisting in conceptualising food law as informed by African imperatives, served as a platform for the launch of Food Law under the Institute of Food, Nutrition and Well-being.

DNA Sequencing Facility acquires new genetic analyser

A new genetic analyser for the DNA Sequencing Facility, a core service laboratory of the Faculty of Natural and Agricultural Sciences, was officially launched in August 2012 by Prof Stephanie Burton, Vice Principal: Research and Postgraduate Education of the University of Pretoria and Ms Stephanie Harris, representing the National Research Foundation (NRF).

capacity of the laboratory by thirty percent.”

She also added that “data generated by this technology is used in a large variety of applications in different research fields. Sequencing data is used in Molecular Biology, Biochemistry and Biotechnology to identify and characterise genes. In systematics, DNA



From left: Prof Stephanie Burton, Ms Renate Zipfel, Ms Stephanie Harris and Prof Anton Ströh.

This instrument is co-funded by the University of Pretoria and the NRF in the form of a grant awarded to Prof Paulette Bloomer, Head of the Department of Genetics, as part of the Research Infrastructure Support Programmes: National Equipment Programme 2011/12. The event was attended by the Dean of the Faculty of Natural and Agricultural Sciences, Prof Anton Ströh, the Deputy Dean for Research and Postgraduate Studies, Prof Brenda Wingfield, faculty members who lend their support to the grant application, members of the Research Support office and other support staff of the University of Pretoria, as well as representatives of the NRF and LTC Tech South Africa.

According to Mrs Renate Zipfel, Manager: Sequencing Facility, “this new ABI3500xl genetic analyser replaces an existing instrument that has reached the end of its life after a service of ten years. The instrument offers updated technology for Sanger DNA sequencing and fragment analysis. It also increases the sample processing

sequencing data support species descriptions, phylogenetic and phylogeographic analysis, population genetics, invasion biology, behavioural ecology and conservation genetics studies. For diagnostic purposes the data is used for the identification of viruses, bacteria, fungi and invasives. Fragment analysis data is used for genome mapping, parentage analysis, population genetics, animal and plant breeding programmes and biomarker detection.”

More than thirty research groups within the departments of Animal and Wildlife Science, Biochemistry, Genetics, Microbiology and Plant Pathology, Plant Production and Soil Science, Plant Sciences, Zoology and Entomology and FABI make extensive use of the services and training that this core facility provides. Many of these research groups collaborate with other tertiary institutions nationally and internationally. Students co-supervised between the University of Pretoria and other institutions also have access to this facility.

Fountain of knowledge conference promotes research

Internal cross-faculty networking forms a very important part of the mandate of the UP Water Institute. There is no better way to promote cross-faculty research than through regular communication. To encourage such communication, the UP Water Institute has decided to present an internal annual conference for its supporters (Member's Forum). These conferences are presented under the theme “Fountain of knowledge” and the first one took place during November this year. The conference brought together scientists from different faculties and disciplines to share experiences and to exchange ideas on advances in the field of water.

Dr Inga Jacobs, Research Manager: Knowledge Management, Water Research Commission, gave a keynote address on the topic “The growth of young women leaders in the water sector”. Five prizes were also awarded for outstanding presentations from postgraduate students.



Front: Nadia Ibraimo, Tanja Yasvoin and Laura Danga. Back: Prof Hannes Rautenbach (Acting Director: Water Institute), Louis Coetzee and Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences).



Prof Martin Steyn (left) and Dr Linus Franke (right) in a potato field with Mr Sampie Roets, a farmer from Limpopo (centre).

How big is the carbon footprint of potatoes?

changing rainfall patterns due to global warming, which can impact crop production negatively and is of major concern.

The carbon footprint of any activity is defined as the total amount of greenhouse gases produced and is expressed in equivalent tons of CO₂ produced. The “Cool Farm Tool” (CFT) was developed to calculate the CO₂ footprint of crop production in Europe (kg CO₂ / ton product) and has been applied by Prof Steyn and his team to different potato producing regions and industries (table, seed, processing) in order to establish CO₂ emission levels in SA. Initial results show that the carbon footprint of dryland potatoes compares well with other parts of the world. However, the carbon footprint of irrigated potatoes is substantially higher than the global average, mainly due to higher irrigation requirements and pumping water from deep boreholes for long distances. The CFT is therefore a powerful tool to understand the impact of actions on global warming and can help growers identify main sources of CO₂ production and develop strategies to reduce emissions. A short course was also presented to train potato field officers and growers in the use of the CFT.

Potato is the most important vegetable crop in South Africa and the University of Pretoria has a long-standing agreement to conduct research for Potatoes South Africa. Prof Martin Steyn from the Department of Plant Production and Soil Science in the Faculty of Natural and Agricultural Sciences has recently launched a new project in collaboration with Prof Anton Haverkort and Dr Linus Franke from Wageningen University, Netherlands, to study the carbon footprint of potatoes in South Africa.

Potato production requires energy for operations such as tillage, planting and harvesting, whilst seeds, fertilisers and chemicals contain embedded energy. Generation of energy for all these inputs contribute to increased levels of greenhouse gases, such as CO₂, in the atmosphere, resulting in global warming. For southern Africa we expect higher temperatures and

Research

SA Agulhas II creates unique research opportunities with UP

Prof Hannes Rautenbach, Head of the Department of Geography, Geoinformatics and Meteorology recently had the opportunity to be part of the first winter cruise ever by an Agulhas research vessel. He joined the cruise from Port Elizabeth to Cape Town from 4 to 6 August 2012 as guest of the Department of Environmental Affairs.

South Africa's new Southern Ocean research vessel, the SA Agulhas II, was built in 2011 in Rauma, Finland, and has arrived in its home port of Cape Town on 3 May 2012. During July and August 2012 the vessel embarked on a shakedown cruise to the edge of the ice shelf in Antarctica, from where it cruised to Port Elizabeth and back to Cape Town.

The new SA Agulhas II takes over from the 34-year-old SA Agulhas as South Africa's new research and supply vessel, supporting and undertaking research in Antarctica and the Southern Ocean. The 134-m-long SA Agulhas II

is significantly bigger than the old ship and has vastly increased scientific capacity. She is also more powerful than her predecessor, with the



Prof Hannes Rautenbach (Head: Department of Geography, Geoinformatics and Meteorology) has recently joined the shakedown cruise of the new SA Agulhas from Port Elizabeth to Cape Town.

ability to break 1-m-thick ice at ten knots.

The purpose of the shakedown cruise was to test all ship systems under full operational conditions

and also to train researchers. The maiden voyage will also allow the ship's personnel, some of which have only recently joined the ship, to undergo full operational training. Apart from testing equipment, the shakedown cruise also included a multi-disciplinary program to measure both oceanographic and biological parameters that characterise the state of the Southern Ocean in the region of interest to South Africa.

The new SA Agulhas II creates unique opportunities for Southern Ocean research. According to Rautenbach, the Department of Geography, Geoinformatics and Meteorology will closely participate in new future research initiatives, especially in the discipline of Atmospheric and Earth System sciences, with its established networks in the South African

Weather Service (SAWS), the Department of Environmental Affairs and the South African National Space Agency (SANSA).



Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences) and Dr E William Colgazier.

Discussion on science and diplomacy

Dr E William Colgazier, the Science and Technology Adviser to the Secretary of State (United States of America) recently visited the Faculty of Natural and Agricultural Sciences. He had a roundtable discussion with members of staff and students on "Science and Diplomacy: Building Innovative Societies for the 21st Century."

Dr Colgazier was appointed in July 2011 as the fourth Science and Technology Adviser to the Secretary of State. The mission of the Office of the Science and Technology Adviser to the Secretary (STAS) is to provide scientific and technical expertise and advice in support of the development and implementation of US foreign policy. From 1994 to 2011, Dr Colgazier served as Executive Officer of the National Academy of Sciences and the National Research Council.



Prof Bernard Slippers (FABI) and Prof Mike Wingfield (Director of FABI) during Dr Colgazier's visit.

Collaborations on water issues with Japan

A top Japanese water scientist, Dr Takahiro Endo, from the Osaka Prefecture University in Japan, recently delivered a lecture at the University of Pretoria on the topic "Towards sustainable use of water resources: Lessons from water policy in Japan". The lecture was organised by the UP Water Institute and the Japanese Embassy.

Dr Endo explained in his lecture that "while sustainable water use became a global concern for some time, the problem still remains unsolved. Surface water moves from upstream to downstream, changing its volume every minute."

He asked: "How can we allocate such a mobile and fluctuating resource? Groundwater is a typical example of common pool resources that are often exposed to wasteful utilisation. How can we stop such wasteful pumping?" These are the basic questions that water policy makers in every nation have to deal with. Dr Endo also discussed some policy experiences in Japan in his presentation.



From left: Prof Hannes Rautenbach (Head: Department of Geography, Geoinformatics and Meteorology and Acting Head: UP Water Institute), Prof Brenda Wingfield (Deputy Dean: Faculty of Natural and Agricultural Sciences), Dr Takahiro Endo (Osaka Prefecture University) and Minister Ken Okaniwa (Embassy of Japan).

Dr Endo is currently an associate professor in the College of Sustainable System Sciences of the Osaka Prefecture University in Osaka. Dr Endo is also a member of the American Water Resources Association, Japanese Association for Water Resources and Environment, Japanese Association of Groundwater Hydrology, Japanese Political Science Association and the Public Policy Studies Association. He has published widely in policies concerned with ground and surface water, water conflict resolution, water trading and drought management and monitoring, and has presented talks on these topics at various international conferences.



South African and Canadian students and professors in the Kumba Iron Ore mine at Thabazimbi.

Cooperation between Geology departments of UP and Western University

In recent years a fertile cooperation was established between the Department of Geology in the Faculty of Natural and Agricultural Sciences at the University of Pretoria (UP) and the Department of Geology at Western University, London, Canada. This cooperation benefits students and lecturers of both universities equally.

In April 2011 Prof Patricia Corcoran (Western) and Prof Adam Bumby (UP) studied Waterberg Group outcrops in Limpopo Province in order to examine the relationship between the deposition of these rocks and the neighbouring mountain belt that existed in the Limpopo area about two billion years ago.

Prof Corcoran gave a two-day short course in April 2012 on "Unravelling Earth's evolution

from natural and anthropogenic sediment particles", organised by Prof Wlady Altermann (Kumba Exxaro Chair in Geodynamics), to our honours geology class. Subsequently, she spent a week with Prof Altermann and Mr Nkhupetseng Mohlahlana (honours student), working on Archaean sedimentary rocks in Griqualand West. She also agreed to co-supervise Mr Mohlahlana's future MSc thesis in the area.

In July 2012, Prof Bumby travelled to northern Ontario with Prof Corcoran to examine the sedimentation and deformation in the Huronian Supergroup. These rocks are similar and approximately the same age as those which outcrop in the Pretoria area.

Prof Corcoran and the Head of the Geology

Department at Western, Prof Gerhard Pratt, visited South Africa in October 2012 with 14 of their students on a mine tour, co-organised by Professors Bumby and Altermann. Again, the honours class of UP Geology students were involved and had an opportunity to visit South African mines and field outcrops at Barberton, Sudwala, Johannesburg, Vredefort, Sheba Gold Mine, Kumba's Thabazimbi Iron Mine and Exxaro's Inyanda Coal Mine. South African and Canadian students and professors had a rare but intensive opportunity to interact, exchange ideas, knowledge, cultural heritage and share new experiences.

In future we hope to create an opportunity to send at least a few UP students to Canada and to continue this fruitful cooperation.



International cooperation with Equatorial Guinea

The National University of Equatorial Guinea in Equatorial Guinea, Central Africa, recently visited the University of Pretoria (UP) to discuss the extensive possibilities offered by international cooperation. Front: Dr Mukanda Mulemfo (Writer and Children's Literature Consultant: Africa Reading Consultants), Prof Carlos Nze Nsuga (Rector and Vice-Chancellor) and Prof Willem Ferguson (Director: Centre for Environmental Studies, UP). Back: Prof Tito Mitogo N'zamio (Director of Cooperation, National University of Equatorial Guinea); Prof Anton Ströh (Dean: Faculty of Natural and Agricultural Sciences, UP), Prof Pedro Ndong Asumu (Vice-Rector: National University of Equatorial Guinea) and Prof José Manuel Esara Echube (Dean: Faculty of Environment, National University of Equatorial Guinea).

FABI hosts Annual Directors' Forum

The Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria is not only home to the Centre for Tree Health Biotechnology (CTHB), but also played host to the Annual Directors' Forum of the Centres of Excellence (CoEs) this year in November.

Australia, Canada and the United States. In 2004, following consultations with experts from various countries, the Department of Science and Technology (DST) and the National Research Foundation (NRF) developed a centre of excellence programme framework document to

north-south collaborative ventures.

The CTHB was launched in 2005 and conducts research through a countrywide network of scientists, with the node of the network represented by researchers at the University.



Prof Mike Wingfield (Director of FABI) in discussion with Dr Phil Mwjara (Director General: Department of Science and Technology).

The impact of the research conducted in the eight nationwide CoEs was high on the agenda as well as examining the impact made towards addressing government priorities and challenges.

Centres of Excellence (CoEs) are defined as physical or virtual entities of research that concentrate existing capacity and resources so that researchers can collaborate across disciplines and institutions on long-term projects. These centres have become a common research funding instrument, having already been established in several countries including

establish such centres. The Department and the Foundation signed a memorandum of agreement through which the NRF was appointed to perform the operational management of the CoE programme.

The DST-NRF CoE Programme was launched in 2004, focusing primarily on South Africa. At the same time, the NRF actively pursued collaboration through bilateral and multi-lateral initiatives to develop and link in to centres of excellence across Africa, as well as with similar initiatives linked to building capacity through

Over the last eight years, the CTHB has established a niche in South Africa's science system to promote the health of trees in natural woody ecosystems, particularly through applying a range of biotechnology tools. Since its inception, the CTHB team has produced 40 MSc and 31 PhD graduates and has published more than 300 scientific articles in international journals. Its broad and multidisciplinary research focus means it is ideally placed to contribute to the national challenges involving human resource development.

ACGT co-hosts regional Synthetic Biology Forum

The African Centre for Gene Technologies (ACGT) recently teamed up with the University of the Witwatersrand to host the second Regional Synthetic Biology Forum in Pretoria and was sponsored by Carl Zeiss.



Delegates from the University of the Witwatersrand

The ACGT is an initiative that involves the CSIR, the University of Pretoria, the University of the Witwatersrand, the University of Johannesburg and the Agricultural Research Council (ARC).

With a strong emphasis on metabolic engineering, the second instalment of the regional synthetic biology forums delivered in highlighting research in this area currently being undertaken both regionally at ACGT partner institute, the University of the Witwatersrand and nationally by the University of Stellenbosch. Guest speaker Dr Riaan Den Haan (University of Stellenbosch) presented his current research on the engineering of yeast cells for next generation ethanol production. Dr Karl Rumbold (Wits/co-organiser) outlined his research on the metabolic engineering of *Streptomyces*. The Forum also featured a talk entitled "The iGEM experience" by Ms Gloria Hlongwe, who was part of the iGEM 2011 Team.

Ms Hlongwe gave a very moving talk on the trials, tribulations, personal development and achievements of being part of the South African iGEM team. Ms Hazel Mufhandu and Ms Busisiwe Twala, both of the Emerging Health Technologies Platform at CSIR, presented talks on aptamers targeting HIV-1 entry and preparation of a self-contained, bi-enzymatic NADH co-factor recycling particle system respectively. Both talks highlighted key findings of Ms Mufhandu's and Ms Twala's research as postgraduate scholars at the CSIR. The forum also featured an interactive poster session, which resulted in much active engagement between delegates and poster presenters. The day was drawn to a close by Dr John Becker, Manager of the ACGT.

Hatching scientific excellence

The University of Pretoria's Hatchery at the Experimental Farm was officially opened on 18 October 2012 by Mr Terry Wiggill from Chemuniq  International.

The facility upgrade was sponsored by Chemuniq  International and includes four new state-of-the-art incubators. In addition, DuPont has sponsored the upgrading of the broiler research facilities at the Experimental Farm.

There are currently three MSc (Agric) students in the Department of Animal and Wildlife Sciences who are involved in research projects in collaboration with Chemuniq  International and DuPont. Through this development they are now able to conduct their research in an even more professional and technical environment. At the opening event Dr Peter Plumstead from DuPont said that "these facilities are for the students, who are the future of the industry". This fully functional, modern equipment and facilities will increase world-class research outputs

and will make significant contributions to the agricultural industry research drive.

Chemuniq  International aims to be valued as a leader in specialised nutritional additives through strategic investment in research as well as collaborate with universities.

Chemuniq  and DuPont would like to thank Dr Christine Jansen van Rensburg and Ms Kelly Brannan for facilitating the upgrade of the hatchery and broiler facilities as well as their continued efforts to ensure that the MSc students are staying on track with their studies.



Front, from left: Thabani Mbule (student), Gareth Salmond (student), Andries Malate (student) and Mr Tim Horne (Chemuniq ). Back, from left: Bonita Nortje (student), Kelly Brannan (University of Pretoria), Dr Peter Plumstead (DuPont), Mr Terry Wiggill (Chemuniq ), Casey Courtman (student), An Jacques (student), Mr Roelf Coertze (University of Pretoria) and Mrs Jackie Tucker (Chemuniq ).

Launch of first African ICA/OSGeo laboratory

The Centre for Geoinformation Science (CGIS) celebrated the official launch of the first ICA/OSGeo Laboratory in Africa at the University of Pretoria on 5 October 2012. In addition to representatives from the University of Pretoria, the launch was attended by Prof Elri Liebenberg, former Vice-President of the ICA, and OSGeo board member, Jeff McKenna.

In 2011, the International Cartographic Association (ICA) signed a Memorandum of Understanding (MoU) with the Open-source Geospatial Foundation (OSGeo) with a view to develop global collaboration opportunities for academia, industry and government organisations in the field of open-source GIS software and data. The MoU aims to provide expertise and support for the establishment of open-source geospatial laboratories and research centres across the world to support the development of open-source geospatial software technologies, training and expertise.



Front: Prof Elri Liebenberg (former Vice-President of the ICA), Dr Serena Coetzee (Director: Centre for Geoinformation Sciences) and Prof Hannes Rautenbach (Head: Department of Geography, Geoinformatics and Meteorology). Back: Mr Jeff McKenna (OSGeo board member) and Mr Gavin Fleming (AfriSpatial).

The first African open source geospatial laboratory, under the auspices of this MoU was established in May 2012 within CGIS at the University of Pretoria. CGIS engages in open source research for geospatial software and data, either using open source geospatial software and data as tools in research, or contributing to the software and data through research. Open source software and data are also used in formal tertiary education and continued education courses at the University. Other research themes in CGIS are forensic geography; space geodesy, earth and atmospheric observation; and spatial data infrastructures.

The ICA's Open Source Geospatial Technologies Commission aims to promote multi-national holistic research in free and open source geospatial technologies in order to make accessible the latest developments in open source tools to the wider cartographic community. The commission attempts to enhance the usage of free and open source geospatial tools among the cartographic community worldwide, especially for education and research. Their goal is to establish five laboratories in Asia, Europe, Africa, the Americas and Australasia, which will act as nodes for future expansion. The MoU also aims to provide support for building up and supporting the development of open-source GIS teaching and training materials, and the joint organisation of open-source GIS events and workshops through the ICA network in order to encourage wider participation globally.

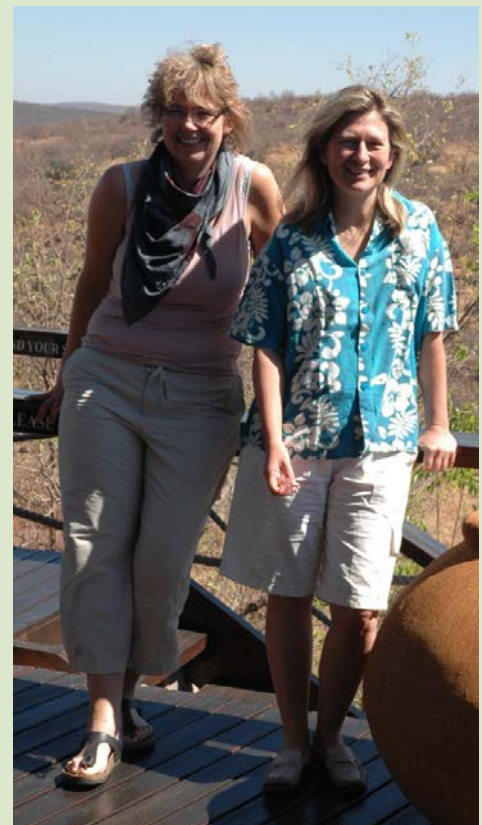
Credit: Position IT

Norwegian food safety specialist visits UP

Dr Gro Johannessen, Research Scientist at the Section for Bacteriology – Food and GMO at the Norwegian Veterinary Institute in Oslo, visited the Food Safety group of Prof Lise Korsten from 1 to 9 October 2012.

Dr Johannessen shared her knowledge and experience in working with pathogenic bacteria, particularly related to food-borne outbreaks, with scientists working in the Food Security, Biosecurity and Regulatory control Theme of the Institute for Food, Nutrition and Well-being. She presented two seminars, namely "Hazards in primary production, mostly on lettuce" and "Outbreak investigations in Norway (on pathogenic *E. coli*, *Shigella* and *Yersinia enterocolitica*)".

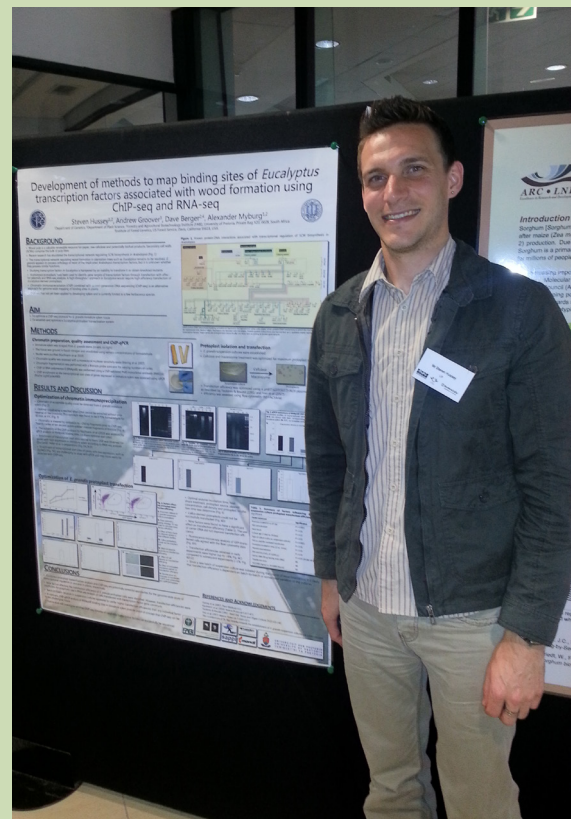
During her stay, Dr Johannessen also visited the National Institute for Communicable Diseases, evaluated postgraduate students' food safety related research projects and acted as an external examiner for the PhD defence of Stacey Collignon.



Dr Gro Johannessen and Prof Lise Korsten



Students from UJ during the poster presentations.



Poster presenter Mr Steven Hussey (UP)

Plant Biotechnologists share knowledge

Plant biotechnologists from the African Centre for Gene Technologies (ACGT) partner institutions, including affiliate the University of Limpopo, once again gathered in October this year in Johannesburg to share their research on plant biotechnology.

The African Centre for Gene Technologies (ACGT) is an initiative that involves the CSIR, the University of Pretoria, the University of the Witwatersrand, the University of Johannesburg and the Agricultural Research Council (ARC).

Even the rainy weather could not deter participants. The event kicked off with a hearty welcome by Prof Ian Dubery (UJ Biochemistry) on behalf of the host, the University of Johannesburg (UJ). Dr Alexander Valentine (Stellenbosch University), Dr Maretha O'Kennedy (CSIR) and Ms Lerato Matsaunyane (ARC) enlightened the audience on plant stress tolerance in response to phosphorous deficient soils, drought tolerance in sorghum and the unintended effects of plant transformation.

The afternoon session focused on plant metabolomics. Prof Dubery provided an extensive overview of the application of mass spectrometry-based metabolomics. He also highlighted the latest MS instrument acquisitions at UJ and their respective capabilities. Mr Heino Heyman (UP) informed the audience about the applications of plant-based metabolomics as well as its application to drug discovery.

The event also included two interactive poster sessions. These sessions allowed aspiring young researchers the opportunity to present their research in the form of brief oral presentations to the audience.

The event was graciously sponsored by Shimadzu. The next Plant Biotechnology Forum will be held early in 2013 at the University of Pretoria.

SCITAL Forum launched in Faculty

A new initiative, the Science Teaching and Learning (SCITAL) Forum, was recently launched in the Faculty of Natural and Agricultural Sciences. The aim of the SCITAL Forum is to bring together staff with a common and particular interest in teaching and learning

The recent launch was attended by well over 50 staff members, including the Vice-Principal, Prof Johann Engelbrecht and the Dean of the Faculty of Natural and Agricultural Sciences, Prof Anton Ströh, all enthusiastic in their expectations. At the spear of the Forum are Prof Marietjie Potgieter from the Chemistry Department and Prof Ansie Harding from the Department of Mathematics and Applied Mathematics.

It is anticipated that the establishment of a professional learning community in the Faculty will improve capacity among academic staff by providing a platform for identifying, creating, sharing and using knowledge of best practices in the scholarship of teaching and learning. An important objective for the establishment of the SCITAL Forum is the stimulation of research in tertiary science and mathematics education,



From left: Ms Thabi Mtombeni, Prof Marietjie Potgieter and Prof Ansie Harding, founders of the SCITAL Forum.

a new and growing field internationally. There are a few mathematics and science education researchers in the Faculty at UP who are isolated in different departments and need the critical input of others to enrich their work. There are also academic staff members who wish to enter this research area and need mentorship to develop the necessary expertise in order to establish themselves in their own niche research areas and others who do not intend to become active education researchers, but who have a keen interest in the contribution that education

research can make to improve their teaching practice. The SCITAL Forum aims to provide a place of belonging to all these groups.

At the launch Prof Potgieter gave an overview of her journey as a researcher in tertiary science education while Prof Harding described the well-established field of research in undergraduate mathematics education. The SCITAL Forum foresees regular meetings and workshops to gain momentum.

Workshops and Events

Successful Postharvest Technology workshop



Attendees at the Postharvest Technology workshop in August 2012

The Institute for Food, Nutrition and Well-being's Food safety Theme, together with the Produce Marketing Association (PMA), presented a Postharvest Technology workshop in August 2012.

More than 80 delegates from industry and research institutes were inspired by topics that ranged from extending the shelf-life of fresh produce to ensuring the safety of our food. Speakers included Dr Deirdre Hollcroft, a well-known postharvest consultant from California in the US, as well as researchers from the University of Pretoria, University of Johannesburg and Tshwane University of Technology. The workshop provided an ideal platform for the Agricultural Career Fair held at the Piazza. The Agrifood Career Fair was introduced in 2011 to attract students to exciting careers in Agriculture. The workshop was sponsored by the PMA and the Department of Science and Technology and Fresh Produce Forum, Postharvest Innovation Programme (PHI).



From left: Ron Kennet (Israel), Prof Subhabrata Chakraborti (United States), Marien Graham (South Africa) and Andreas Wienke (Germany).

Statistics across America: From Colombia to California

During July and August this year, Prof Subhabrata Chakraborti and Mrs Marien Graham from the Department of Statistics sought to further *SARChI's aims as they travelled to two large international conferences.

The first was the 22nd Colombian Symposium on Statistics held in Bucaramanga, Colombia, South America, from 17 to 21 July. A week later, the duo packed their bags again for the Joint Statistical Meetings (JSM) of the American Statistical Association (ASA) held in San Diego, California, from 28 July to 2 August.

Prof Chakraborti and Mrs Graham were invited to present a two-day three hour workshop titled "Statistical Quality Control: Implementations and Advances" at the 22nd Colombian Symposium on Statistics. In addition, they gave an hour long presentation on Nonparametric SPC.

The JSM is the largest gathering of statisticians, attended by more than 6 000 people. It presented an opportunity to network with top-notch researchers such as Professors Bill Woodall, Doug Hawkins, Doug Montgomery, N. Balakrishnan, Bob Mason and others. Prof Chakraborti organised and chaired a session titled "Some Current Research Problems in Statistical Process Control". The almost two-hour

session went through two rounds of rigorous selection to be finally chosen and was sponsored by the ASA sections Quality and Productivity.

* The National Department of Science and Technology (DST) and the National Research Foundation (NRF) have awarded the South African Research Chairs Initiative (SARChI) Social Science Chair in Nonparametric, Robust Statistical Inference and Statistical Process

Control to Prof Subha Chakraborti from the Department of Statistics, University of Pretoria. Under its auspices, exciting new opportunities are available for qualified honours, master's and doctoral students as well as postdoctoral researchers. Successful candidates will pursue a line of research leading to high quality publications under the guidance of Prof Chakraborti and other team/department members.



From left: Axel Gandy (United Kingdom), Amitava Mukherjee (India), Marien Graham (South Africa), Eugenio Eprecht (Brazil) and Prof Subhabrata Chakraborti (United States).

UP and SACI celebrate 100 years of Chemistry

Topics such as “Nuclear Energy and Medicine”, “Forensic Chemistry” and “The chemical industry in South Africa” were some of the matters addressed at the recent half-day symposium of the South African Chemical Institute (SACI) at the University of Pretoria. The symposium forms part of the centenary celebrations of SACI to commemorate 100 years of Chemistry in South Africa.



From left: Prof Egmont Röhwer (Head: Department of Chemistry), Prof Neil Coville (University of Witwatersrand, Past President of SACI), Prof Cheryl de la Rey (Vice-Chancellor and Principal of UP), Prof Jan-Rijn Zeevaart (Head: Radiochemistry Division, NECSA), Prof Debra Meyer (Head: Department of Biochemistry at UP) and Dr Jessie Pillay (MINTEK).

Water Research Commission project funded research workshop at UP

A microbiological methods workshop was held earlier this year as part of a Water Research Commission (WRC) funded project, no. 2175 (an investigation into the link between water quality and microbiological safety of fruit and vegetables, from the farming to the processing stages of production and marketing).

The purpose of the workshop was to discuss current and new methods for pathogen detection in water and food products. Students also gave

feedback on project progress and discussed new developments in diagnostics. The WRC funded project includes researchers from the Departments of Microbiology and Plant Pathology, Food Science (Faculty of Natural and Agricultural Sciences) and Virology (Medical Faculty) of the University of Pretoria, as well as the Department of Microbiology of the University of KwaZulu Natal. The project is managed by Prof Lise Korsten under the auspices of the Institute for Food, Nutrition and Well-being.



A lively discussion on pathogen detection in water and food products.



The Junior A team, front: Bill Gou, Emile du Plessis, Ulrik de Muelenaere, Johannes Coetzee and Charene Agenbach. Back: Marlise van Tonder, Lucien Magliolo, Simon Maenaut, Pieter Kok and Tony Guo.

Bronze in South African Inter-provincial Mathematics Olympiad (SAIPMO)

Students

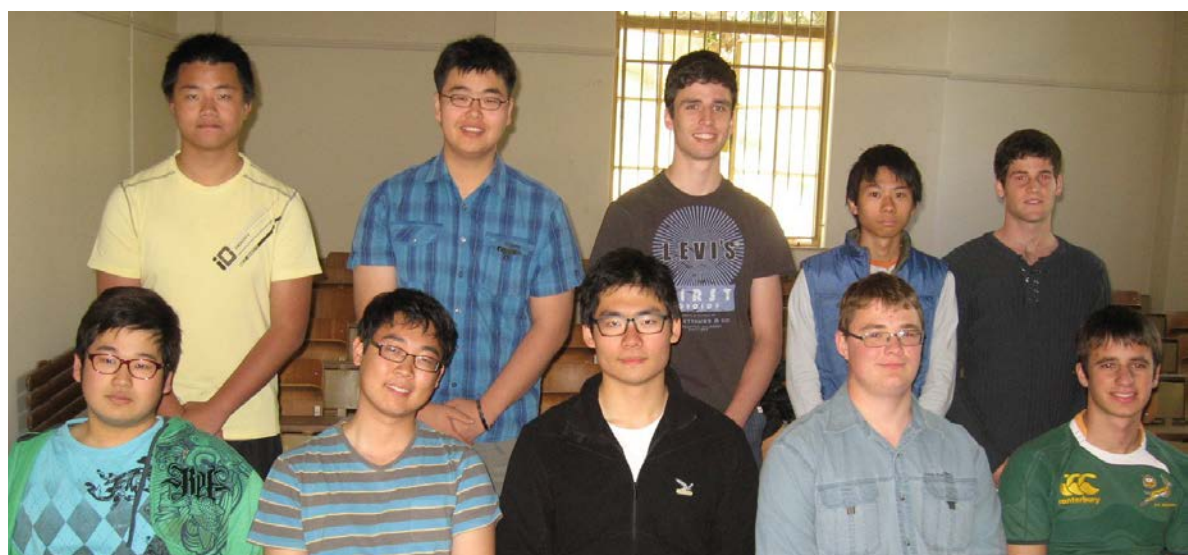
Two junior teams (Grade 8-9) and three senior teams (Grade 10-12) consisting of ten members each competed in the annual South African Inter-provincial Mathematics Olympiad (SAIPMO) on 29 September against teams from all over South Africa. The South African Inter-provincial Mathematics Olympiad is a yearly event in which the cream of the mathematically-talented high school learners compete against each other on provincial level. Two junior teams and three senior teams, consisting of ten members each, were selected in Gauteng North. A position in one of the teams is earned on grounds of continuous achievement and specific achievement in the SA Maths Olympiad, one of the activities of the South African Mathematics Foundation.

The competition has been running for the past nineteen years and the emphasis is on the fun element. Gauteng North traditionally provides fierce competition to the other provinces. This year our Senior A team came fourth out of 24 teams and the Junior A team third out of 27 participating teams countrywide. Congratulations to these learners on an excellent performance!

How it works:

After two workshops, which formed part of the Siyangoba Project, the Gauteng North teams met at the University of Pretoria for the final competition. Traditionally the competition starts with an individual section where every member of the team is presented with a paper consisting of

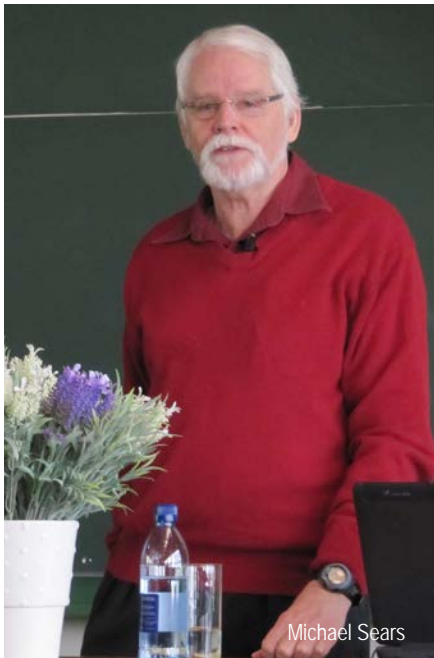
15 questions (worth 100 points) to be completed in an hour. The papers are marked while the team members relax for half an hour. A total for the team out of a possible 1 000 points is calculated. The individual section is then followed by the team section. Here the team as a whole is presented with 10 questions that they have to complete in 60 minutes. Strategy is of vital importance. Because mathematics is often practiced as a solitary activity the idea of a team paper is quite novel. Team members have to work together but at the same time utilise the strengths of the individual members. The team manager for this year's event was Ruan Kellerman and the coaches Harry Wiggins and Wali Rahman.



The Senior A team, front: Junho Son, Sae-ouk Oh, Seong-Hun Kim, Hannes Haasbroek and Johan Conradie. Back: Harry Zhao, Sung-Min Yang, Dewet van Schoor, Tung Tran Tanh and Alkmaar Swart.

Midwinter Mathematics morning with Michael Sears

This year's annual Midwinter Mathematics Morning, presented by the Department of Mathematics and Applied Mathematics, was graced by the wit of mathematician cum author Michael Sears.



Michael Sears

Michael Sears is an excellent applied mathematician, who was previously HOD at the University of Witwatersrand and Head of Remote Sensing at Anglo American. Michael has since become involved in writing crime novels, situated in Botswana and featuring CID Inspector Kubu, a larger than life character.

Michael co-authors with Stanley Trollip under the pen name Michael Stanley, a collaboration that extends over many years. The novels have received acclaim in the US, the UK, India and Australia and boast with various nominations and awards. Michael Sears entertained and amused the audience claiming, for example, that film producers were desperately wanting to offer them a contract but simply have as yet not been able to find them.

Old DNA sequencer gets new life at Sci-Enza

The DNA sequencing facility of UP's Faculty of Natural and Agricultural Sciences recently donated the old ABI 377 DNA genetic analyser to Sci-Enza, the science centre at the University of Pretoria. What used to look just like a plain white box has been transformed into an interactive display that allows visitors to explore the principles of DNA sequencing, transcription and translation in a fun, hands-on way.

Visitors can press a button to simulate the sequencing reaction and capture the nucleotide sequence of an unknown DNA sample. A random sequence of coloured lights represents the order of the four different DNA nucleotides in the sample, which visitors can arrange on an abacus-like board next to the instrument. This unique DNA sequence can be transcribed into the corresponding RNA

sequence and thereafter translated into a funny short sentence, where each word represents an amino acid.

The DNA sequencing exhibit is on permanent display at Sci-Enza and is used during facilitated life science workshops for high school learners. The manufacturing of this display was funded in part by Public Understanding of Biotechnology (PUB), which also funds other biotechnology related activities at the science centre. University students, staff and the general public are welcome to use this exhibit to help them understand basic genetic concepts better. For more information about events at Sci-Enza or bookings, please contact Yvette Barrett 012 420 3767 or visit the Sci-Enza website www.sci-enza.up.ac.za or Facebook.



Students at Sci-Enza explore the DNA sequencing facility



Learners browsing through all the exhibitions at the second Agri-Food Career & Bursary Fair at UP.

Showcase for career opportunities in agriculture and food

The Produce Marketing Association (PMA), an international industry organisation for the produce industry, held their second Agri-Food Career & Bursary Fair at the University of Pretoria (UP) on 22 and 23 August. This was done in collaboration with UP's Faculty of Natural and Agricultural Sciences as well as several role-players across the agricultural and food supply chain.

The Career Fairs' objective is to entice young people to consider a career in the agricultural/food industry. The more than 3 000 young people who visited the Career Fair included top performers in Grade 11 from 250 schools (through the JuniorTukkie programme aimed at prospective students), as well as first-year BSc Biological Science students, many of whom have not yet decided on an area of specialisation from their second year onwards. In addition, agricultural students currently registered at both the undergraduate

and postgraduate level and students from other disciplines such as BCom and Engineering also visited the Fair.

In the feedback from the exhibitors it was said that young people are hungry for information on something else than medicine, teaching, engineering, etc. And they are pleasantly surprised at the varied fields of study in agriculture.

The role-players across the agricultural and food supply chain that participated in the Agri-Food Career & Bursary Fair at the University of Pretoria: • Shoprite Checkers/Freshmark • Fruit & Veg City • ZZ2 • Monsanto • Sakata • Bayer • CHEP • Starke Ayres • McCain • RSA Market Agents • Potatoes SA • Hortgro • Citrus Academy • SUBTROP • SA National Seed Organization (SANSOR) • SantamAgri • Woolworths • Pannar • Standard Bank • Joburg Market • Westfalia • AgriAids • Mpack • Syngenta • PPECB • Gliogrow

Students



Grade 11 learners finding out more about agriculture as a career at the second Agri-Food Career & Bursary Fair.

Double scoop for the Chemistry Department

The Separations Science research group scooped both student prizes at the recent ChromSAAMS 2012 conference held at Dikhololo.

ChromSA has been acknowledging the achievements of our local scientists in the field of chromatography since 1991 by awarding the Chromatographer of the year Award to a person or group that has made the most significant contribution in the field of chromatography. Neil Malan (PhD student under the guidance of Prof Egmont Rohwer) won the Best student poster award, sponsored by the Royal Society of Chemistry, and Leandri van der Wat (an honours student supervised by Dr Patricia Forbes) won the Best student oral presentation award which was sponsored by ChromSA. The panel of four international judges were very impressed by the high standard of all the students' contributions.



The group from UP that presented at ChromSAAMS. From left: Leandri van der Wat, Dr Patricia Forbes, Paulina Seifert (back, visiting student from the University of Rostock), Genna-Leigh Geldenhuys, Elize Smit, Prof Egmont Rohwer, Neil Malan and Yvette Naudé.



Neil Malan (left) receives the prize for the best student poster from Dr Chris Marvin, Environment Canada.



Leandri van der Wat receives the best student oral presentation award from Dr Chris Marvin, Environment Canada.

Students

UP supports science with bursaries

The University of Pretoria (UP) has a long and proud tradition of being one of the main sponsors of the Eskom Expo for Young Scientists. At the Expo, the Faculty of Natural and Agricultural Sciences also awards annual bursaries to outstanding Grade 11 and Grade 12 candidates.

This year Retselisitsoe Monyake, a Grade 11 learner from Harmony High School in Welkom in the Free State, won a bursary to the value of R24 000 for his project entitled "The Pappus Chain Theorem" in the Mathematics and Statistics category. The bursary is for his first year of study in the Faculty of Natural and Agricultural Sciences in 2014. Wentzel Coetzer, a Grade 12 learner from Bergvlam Hoërskool in Enlanzeni, also won a bursary to the value of R24 000 for his studies at the University next year. His project



Wentzel Coetzer

with the title "Enhancing plant growth with magnetic field" in the Agricultural Sciences category made him a proud recipient of a UP bursary, too.

The national finals of the Eskom Expo for Young Scientists provide a unique opportunity for young minds with bright ideas to showcase their research and innovation in science, technology, engineering, mathematics and innovation (STEMI). This initiative is aimed at encouraging academic excellence in STEMI education. Each year South Africa's brightest and most promising young scientists and engineers are brought together to recognise their achievements and to encourage them to pursue their interests in science and technology.



Children learning that science is fun at the BASF Kids' Lab.



The magic of science!

BASF and UP collaborate to create interest in chemistry

Around 600 schoolchildren from the surrounding communities experienced the magic of science during the national science week, many for the first time, when leading chemical company BASF held the Kids' Lab at the University of Pretoria. The programme ran from 30 July to 3 August.

National Science Week is an initiative of the Department of Science and Technology (DST). BASF, in conjunction with the science centre at the University of Pretoria, Sci-Enza, used the week to conduct a sequence of water experiments which educated learners through methods that were exciting and fun.

Kids' Lab, aimed at children between 8 and 14, enables young people to gain a better understanding of chemistry and encourages them to find out more about the world around them. It provides a fun and practical learning environment for both children and teachers, allowing them the

opportunity to explore the chemistry in the world around us together.

Children visiting the Kids' Lab at Sci-Enza, under the supervision of their teachers, had the opportunity to conduct their own experiments on water purification, storage and research, directed by picture guides and the BASF supervisor team. The Kids' Lab encourages students to recognise that water is a critical resource and that chemistry can provide solutions to everyday problems such as waste, water storage and pollution.

This experimentation programme, themed "Water loves Chemistry", teaches children that chemistry is a solution provider. The didactic framework is based on storytelling and ties in with the experience children have; it also prioritises the teaching of good scientific practice.

"We are excited that BASF, through close cooperation with Sci-Enza, had the opportunity

once again to help children to discover a love for chemistry. Science can offer rewarding careers for those with curiosity and a desire to understand the world around them," said BASF's Managing Director and Head of Business Centre South Africa & Sub-Saharan, Dr Dieter Kovar.

Kids' Lab was developed by BASF in Ludwigshafen, Germany and the programme Water loves Chemistry has been tested by children from Germany, China and South Africa. In 2011 alone 54 813 children and young people in 33 countries visited the Kids' Labs. BASF opened new hands-on, interactive laboratories in 16 countries around the world in 2011, including in South Africa. BASF in South Africa has also sponsored similar science programmes targeting young people, in recognition of the critical need for science education in South Africa.

Credit: BASF – The Chemical Company

Students

More Eskom Expo winners

At the recent Eskom Expo for Young Scientists a number of UP with Science learners presented projects they did at their respective schools. UP with Science is a Science Enrichment Programme for secondary school learners presented by the University of Pretoria in the Faculty of Natural and Agricultural Sciences.

Three learners won gold medals: Simon Scholtz (Grade 10) with his project "Renewable energy from speed bumps", Zanne Terry (Grade 11) with "Science Without a Laboratory" and Marlene Meyer (not UP with Science, but she is the daughter of Prof Marion Meyer from the Department of Plant Science) with her project entitled "Raaiselagtige kaalkolle". A silver medal went to Bennie Botha (Grade 10) for his project "Bio-energievlakke" where he proved that sekelbos makes excellent braaiwood! Nqobile Sibiya and Harshan Vallabh (UP with Science and Grade 10) received a bronze medal for their project "Simulating and measuring projectile motion".

Another group of UP with Science Grade 11 learners (Neo Moima,



From left: Neo Moima, Luveshnie Gounden, Hanco Brits, Nompumelelo Mthimunye and Ofentse Mogoatlhe. Absent: Karen Bezuidenhout.

Luveshnie Gounden, Hanco Brits, Nompumelelo Mthimunye, Ofentse Mogoatlhe and Karen Bezuidenhout) chose to do a project in biochemistry. They chose to study the applications of a biosensor for their project. Their product was a faster and more accurate test for alcohol misuse by using a biosensor. This product will be marketed as a portable size "biosensor" that uses vapour (breath) to analyse the alcohol levels in humans. They also won a bronze award.