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Newsletter of the Faculty of Natural and Agricultural Sciences

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Credit: Anton Pauw

A workshop on pollinators was recently hosted at UP. *Read more on page 51.*

A new Dean for the Faculty of Natural and Agricultural Sciences

A mathematician of international stature, the former holder of the DST/NRF SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences, as well as the former Head of the Department of Mathematics and Applied Mathematics. This, in a nutshell, describes the new Dean of the Faculty of Natural and Agricultural Sciences (NAS), Prof Jean M-S Lubuma.

Prof Lubuma took up his position with effect from 15 March 2015 and took over the reins from Prof Anton Ströh, who was appointed as Vice-Principal: Institutional Planning at the University of Pretoria (UP) after a tenure of ten years as Dean.

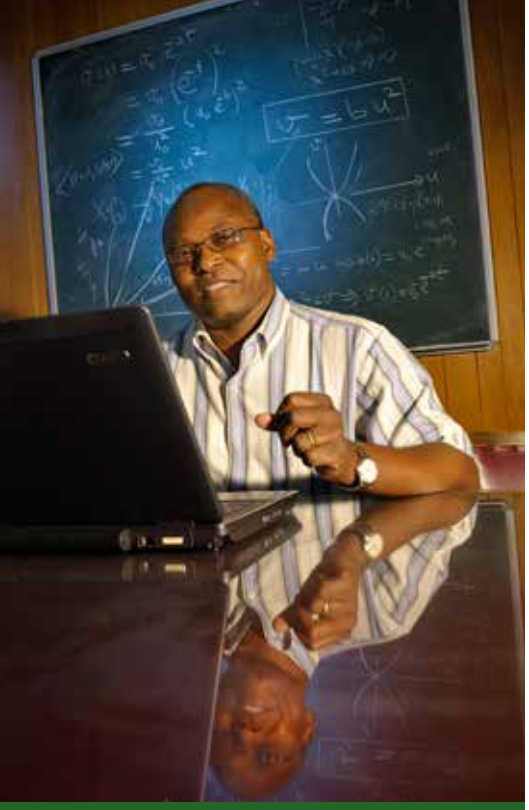
After just more than 100 days in office, Prof Lubuma says that the past few months as Dean were challenging but interesting. "I started my term as Dean after a transition period of eight months in the leadership position of the Faculty. This on its own was a source of challenges. Some challenges, however, were more serious than others, specifically in view of the size of the Faculty. I can state, without hesitation, that the Faculty has a strong and competent leadership team, consisting of the Dean and the two Deputy Deans who enjoy the full support of the members of staff."

Prof Lubuma reiterated what he said at his first meeting as Dean with the heads of departments and directors regarding his participative and consultative management style within UP's decentralised model. "We are not in a 'command structure'. I trust the heads of departments and directors of centres and institutes to fulfil their roles and duties, as they are fully responsible for the strategic, academic and operational management of their entities."

"Right at the beginning of my appointment, it was made clear to the Faculty that transformation is one of the priorities of my deanship. We have established the NAS Transformation Desk. Transformation was made a standing item on the agenda of the monthly meetings of the heads of departments and directors who were asked to initiate transformation committees in their entities."

To prove his commitment to get to know the Faculty, only one week after his appointment Prof Lubuma embarked on a series of one-on-one meetings with all the Heads of Departments and Directors of the respective research institutes and centres. Although this was a time consuming exercise lasting more than 45 days due to the size of the Faculty (17 departments and more than 25 centres/institutes), the benefits are invaluable with regard to learning much more

Continued on page 3



Message of the Dean

Be a part of the future of science

As new Dean, I am honoured to lead such a diverse and prestigious Faculty for the next few years. This Faculty of Natural and Agricultural Sciences (NAS) is one of the top faculties of sciences in the country, and I believe that it will continue to grow and prosper with the support of all the staff members and students in the Faculty. The past few months as Dean were challenging, but interesting. Some challenges, however, were more serious than others, specifically in view of the size of the Faculty. Read more on page 1 about the appointment of the new Dean.

The announcement of three researchers from NAS as winners in the 2015 NSTF-BHP Billiton Awards Ceremony recently, confirmed the Faculty's commitment to excellence in research. The winners are **Prof Nigel Bennett, Prof Zander Myburg** and **Dr Thulani Makhalanyane** (page 8). The University, with support from Eskom and Sasol, furthermore launched the Laboratory for Atmospheric Studies, which is based at UP and will be a national centre of excellence, with an international reputation, that provides infrastructure and world-class education for studies in the atmospheric sciences (page 52).

One of the interesting research projects in the Faculty is the **Marion Island Marine Mammal Programme** (MIMMP) of the Mammal Research Institute (MRI). The MIMMP has been doing marine research for more than 30 years and has documented fascinating findings. Their primary research is aimed at understanding the ecology of seal and killer whale populations at the island. A current research focus is on how these populations interact with the changing environment (read more on page 25).

Research on Grapevine leaf-roll disease by **Prof Gerhard Pietersen**, a plant virologist assisted wine farmers to enhance the profitability and quality of wine. Grapevine leaf-roll disease affects vineyards globally, decreases the yield and quality of affected grapevines significantly (page 33). Research by **Prof Naushad Emmambux** and his colleagues has shown that it is possible to modify high GI starch, using fatty acids so that it becomes a low GI starch. This means that it should soon be possible to make low GI foods that taste as good as high GI foods (page 35).

Since its inception in August 2013, the **South African Research Chair Initiative (SARChI) Chair in Mathematical Models and Methods in Bioengineering and Biosciences (M^3B^2),** has been working towards strengthening collaboration between mathematicians and biologists. A milestone in this regard was the Second Joint University of South Africa (Unisa)-University of Pretoria (UP) Workshop on Theoretical and Mathematical Epidemiology that was held early this year (page 45). A successful workshop on **'Pollination and Threats to Pollinators'**, funded by the National Research Foundation and the Royal Society (UK), was also recently hosted by the University (page 51).

As always, we are very proud of the outstanding achievements of our staff. At the annual Excellent Academic Achievers function, **Prof Don Cowan** (page 7) was the recipient of the Chancellor's Award for Research. Furthermore, four of six of the UP Excellent Academic Achievers are from NAS, namely **Prof Wlady Altermann, Prof Rashid Hassan, Prof Marion Meyer** and **Prof Clarke Scholtz. Dr Irene Barnes** and **Prof Naushad Emmambux** were acknowledged as Exceptional Young Researchers (page 4).

Prof Brenda Wingfield received the Christiaan Hendrik Persoon medal during the awards ceremony at the 49th Biennial Congress of the Southern African Society for Plant Pathology (page 10), while **Prof Bob Millar** was elected as President of the International Neuroendocrinology Federation (page 12). **Prof John Taylor** was elected as Honorary President of the International Association for Cereal Science and Technology (page 13) and **Prof James Raftery** received the South African Mathematical Society (SAMS) Award for Research Distinction at the 57th SAMS Annual Conference (page 14).

Excellence in teaching and learning is one of the five strategic goals of the University's Vision 2025. Two lecturers in statistics, **Ms Thea Corbett** and **Ms Christine Kraamwinkel,** were awarded with a Teaching Excellence and Innovation Laureate Award in the Team Category at this year's Academic Achievers function (page 6).

As always, our students excelled. **Sanli van den Brink** was honoured for being the recipient of the Vice-Chancellor's and Principal's Medal for excellent undergraduate academic achievement as the best student in NAS, with a weighted average performance of more than 90% during her three years of study (page 22)**. Yvonne Mashaba**, a final-year masters student in Agricultural Economics), was selected as a Student Ambassador of the Talloires Network in April (page 56).

Many more outstanding achievements by our staff, students and affiliates, of which we are very proud, can be sited. With this newsletter we aim to showcase some of these achievements and we hope that you will enjoy this update on the latest developments in our Faculty.

Prof Jean Lubuma
Dean: Faculty of Natural and Agricultural Sciences

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about the Faculty and its challenges. Some of the challenges that transpire from these meetings include the restructuring of certain academic departments, the need to upgrade research and teaching laboratories, as well as the need for additional funding for space and laboratories for new research initiatives that have already secured external funding for equipment.

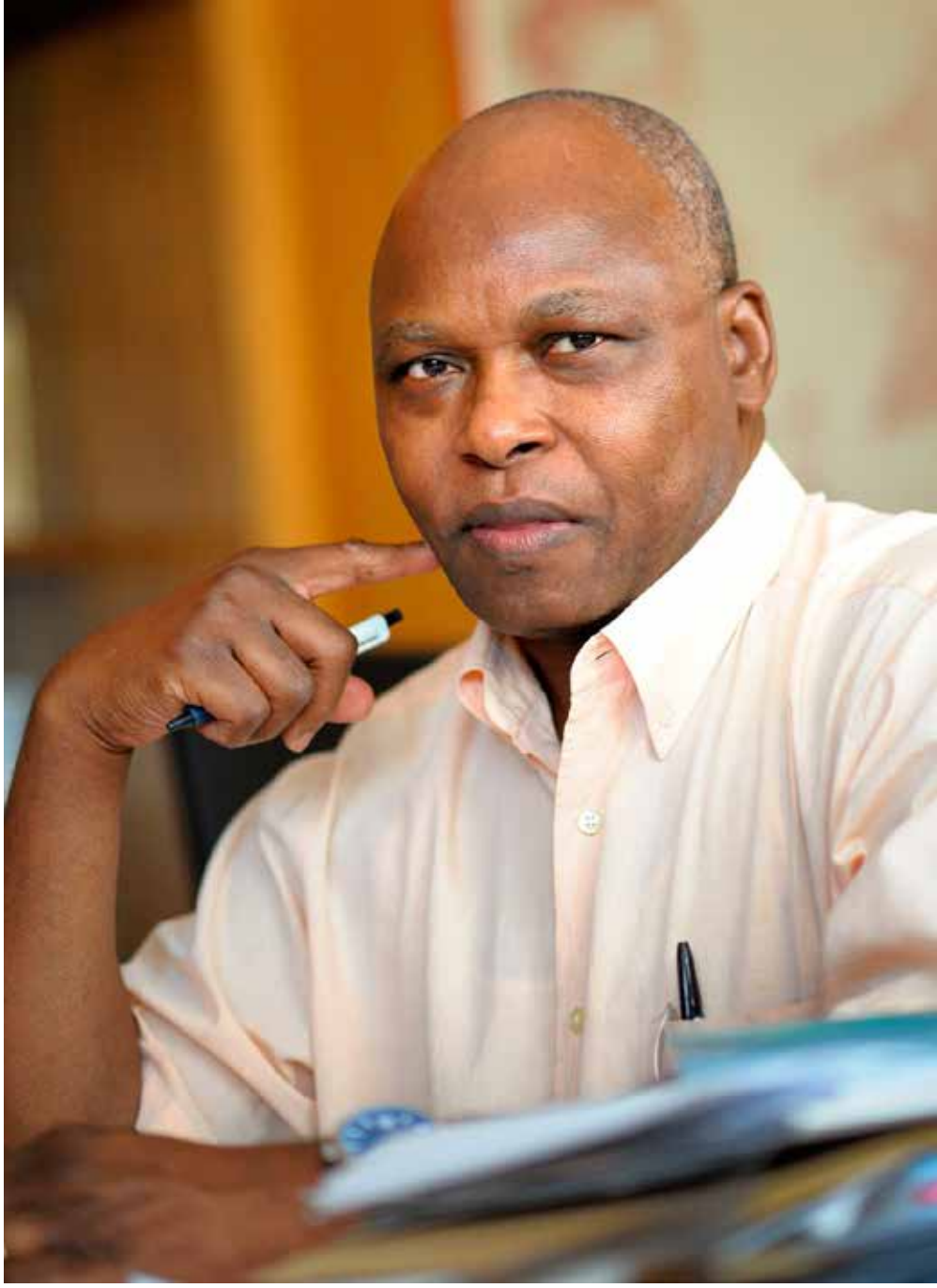
According to Prof Lubuma, "my learning curve goes beyond the Faculty. I appreciate that there has been a continuous inflow of UP support units to my office to introduce me to some of the realities of our institution." He views the visit of the Internal Audit Unit as one of the highlights of these meetings.

He recently presented the Faculty Performance 2014 to the Executive and said that "this was not an easy task, since the work was not done under my leadership. However, being in strong support of the principle of continuity in the management system, this exercise was an additional opportunity to get a better understanding of the Faculty."

Regarding the Faculty Plan 2016, Prof Lubuma said: "Next year is the end of the first cycle of the implementation of the UP Strategic Plan 2025. As an integral part of the NAS Strategic Plan 2016, there will be a SWOT analysis of the past four years. The aim is three-fold: to refocus our strategies in order to address our shortcomings, to finalise initiatives that are at an advanced stage and to take to the next level those strategies that have been successfully implemented."

As the new Dean of the Faculty, Prof Lubuma will focus on specific activities to achieve the University's goal of becoming a more research-intensive university. These activities include strengthening the culture of excellence in research and increasing the number of citations by focussing on identified high-impact research fields and strategic areas in which the Faculty has proven capacity and expertise. It also includes pursuing excellence in teaching and learning through inquiry-led curricula in order to better equip students to proceed with postgraduate education and research. Furthermore, retaining and developing human capital, as well as attracting and recruiting new champions of UP's vision for 2025 is of the utmost importance.

Laying the foundation for his future as a renowned mathematician, Prof Lubuma commenced his studies at the University of Kinshasa, DRC, where he obtained his BSc and BSc(Hons) degrees. He completed the MSc and PhD degrees in Mathematics at the Université Catholique de Louvain in Belgium.



Prof Jean Lubuma

He began his academic career in 1985 as Lecturer and later Senior Lecturer at the University of Annaba, Algeria before completing a stint as a Postdoctoral Fellow at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Italy. Thereafter, he served as Associate Professor and Professor at the University of Kinshasa, DRC before moving to South Africa for an academic appointment at the Mamelodi Campus of Vista University, where he served as Senior Lecturer, Associate Professor and Professor. He joined the Department of Mathematics and Applied Mathematics at UP in 2000 as Professor and was appointed as Head of Department and Chairperson of the former School of Mathematical Sciences in 2004. He served as Head of Department until 2013, when he took up the SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences.

An NRF B-rated scientist who has supervised a number of master's and doctoral students to completion, Prof Lubuma has published extensively in prestigious journals in a variety of mathematical fields. He is widely recognised as a leading researcher who has initiated several successful research projects and obtained substantial research funding from national and international bodies. He has received a number of awards, including the UP Exceptional Academic Achiever Award for three consecutive periods, the South African Mathematical Society Award for Research Distinction in 2011 and the Bulgarian Academy of Sciences Sign of Honour, awarded in 2013. He is co-editor of three scientific journals, a member of numerous national and international scientific bodies in the field of Mathematics, and a Fellow of the African Academy of Sciences (AAS), the Suid-Afrikaanse Akademie vir Wetenskap en Kuns and the Academy of Science of South Africa (ASSAf).

Excellence awarded in Faculty of Natural and Agricultural Sciences

A university and therefore a faculty cannot excel in teaching and learning, research and community engagement without excellent staff members.

The University of Pretoria annually hosts a special gala occasion to pay tribute to academics that have shown exceptional achievement in the preceding year. Two new categories were added to the Academic Achievers Awards, namely the Vice-Chancellor's Book Awards and an award to recognise innovative community engagement.

The Faculty of Natural and Agricultural Sciences again scooped up most of the awards this year. Prof Don Cowan, Director of both the Genomics Research Institute and the Centre for Microbial Ecology and Genomics was the recipient of the Chancellor's Award for Research. The Vice-Chancellors Book Awards for scholarly books, monographs or collections were awarded in the Natural and Applied Sciences to Prof Jan Boeyens for his book, *The Chemistry of Matter Waves*.

Furthermore, the Faculty can boast with four of six of the UP Excellent Academic Achievers this year, namely Prof Wlady Altermann (Department of Geology), Prof Rashid Hassan (Department of Agricultural Economics, Extension and Rural Development), Prof Marion Meyer (Department of Plant Science) and Prof Clarke Scholtz (Department of Zoology and Entomology).

Two academic staff members from the Faculty were also recognised as Exceptional Young Researchers. They are Dr Irene Barnes (Forestry and Agricultural Biotechnology Institute and Department of Genetics) and Prof Naushad Emmambux (Department of Food Science).

The Teaching Excellence and Innovation Laureate Awards in the team category were awarded to Ms Thea Corbett and Ms Christine Kraamwinkel as part of the BSc Extended Programme on the Mamelodi Campus.

A total of 91 UP researchers received new ratings or were re-rated by the National Research Foundation. This includes two researchers who received A ratings for the first time, namely Prof Andries Engelbrecht (Information Technology) and Prof Yves van de Peer (part-time professor in the Department of Genetics).

From this recognition of staff members in the Faculty of Natural and Agricultural Sciences by the University of Pretoria it is evident that the Faculty is one of the leading science faculties on the continent.

Excellent Academic Achievers

Prof Rashid Hassan

Prof Marion Meyer

Prof Clarke Scholtz

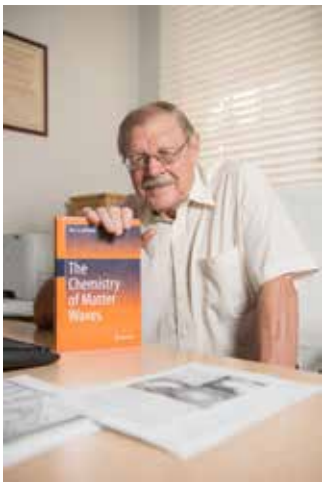
Prof Wlady Altermann

Exceptional Young Researchers

Prof Naushad Emmambux

Dr Irene Barnes

Vice-Chancellor's Book Awards



Prof Jan Boeyens

Excellence in teaching acknowledged and honoured

The winners of the prestigious Excellence in Teaching Award, as well as the Award for Adding Value to Teaching for 2014 were announced at the annual "Bosberaad" of the Department of Mathematics and Applied Mathematics. Dr Alta Jooste received the Excellence in Teaching Award from Prof Izak Broere, Chairperson of the Adjudication Panel, citing the following:

"The BSc Extended Programme was restructured to be functional as from 2014, a major process that required the rethinking of a teaching model that is applicable to almost a thousand students, spread over three campuses. Dr Alta Jooste was instrumental in this process and has been a dedicated leader in the important first semester pre-calculus module WTW 133. She guided and monitored the activities of the WTW 133 module in her capacity as course coordinator. Dr Jooste tirelessly commuted between campuses, always keeping a tight rein on the academic activities. The excellent and vastly improved results of this module are testimony to her leadership and the role she played in this process. The Department has received praise for the improved model, the success of which is a contributor to the access of large numbers of previously disadvantaged students. Alta's input into restructuring and leading this important entrance module makes her a worthy recipient of the Excellence in Teaching Award for 2014."

Prof Lou Pretorius (right) received the award from Prof Marietjie Potgieter (Deputy Dean: Teaching and Learning)

Prof Cheryl de la Rey (Vice-Chancellor and Principal) handed the award to Dr Alta Jooste.

Prof Lou Pretorius received the award for Adding Value to Teaching from Prof Marietjie Potgieter (Deputy Dean: Teaching and Learning) with the following citation:

"Lou Pretorius has added value to teaching mathematics over a period that spans almost five decades. He has witnessed many changes on the University teaching front and has not only managed to implement and adapt to these changes, but has consistently functioned in a leadership role. Lou is always willing to venture and to learn, whether it was moving from teaching small classes, which was the norm when he started out, to teaching classes that fill large lecture halls, or moving from traditional blackboard teaching to using the latest technology, such as Tablet PCs and online homework systems. He has consistently taught with enthusiasm and diligence at all levels. He is known for placing a large premium on cultivating mathematical thinking in students, never giving way to superficial teaching. He has mentored many junior staff members and has guided them into becoming valuable teachers of mathematics. Lou has often spearheaded teaching initiatives, of which the most notable is the role he played in leading the Quality Teaching Committee from its inception to becoming an integral part of the Department's structure and activities. This is a task that he performed with singular dedication. Lou is an exemplary academic, combining research and lecturing successfully but it is for the value that he has added to teaching mathematics that he deserves to be honoured with an award that recognises his lifelong contribution."

Laureate Award for Statistics lecturers

The hard work and dedication of Ms Thea Corbett and Ms Christine Kraamwinkel, involved with the BSc Extended Programme paid off when they were awarded with a Teaching Excellence and Innovation Laureate Award in the Team Category this year.

The Laureates are awarded to nominated projects that display teaching practices with clear purpose and intent, with strong alignment between the different elements in the broader context, that address identified needs or gaps, with the aim of innovative optimisation of teaching and learning.

Ms Corbett and Ms Kraamwinkel teach statistics to students in the BSc Extended Programme on the Mamelodi Campus. As their entry stated, Mamelodi merits: not only stepping stones, but a cornerstone for independent learning

The BSc Extended Programmes on the Mamelodi Campus provides access to science and science-based study programmes by setting lower entrance requirements and offering intensive support in order to prepare students for further studies in mainstream programmes. Ms Corbett and Ms Kraamwinkel present subject content by applying a variety of methods, designed to remedy possible gaps, focus on understanding and develop critical thinking and practical skills. Progress is continuously assessed to meet the required levels of academic performance.

In the first phase of this programme, content is presented at a slower pace to provide ample opportunities for improvisation and innovation, thereby allowing for an assessment model that specifically targets students' approach to learning. This is achieved by the appropriate structuring of a variety of assessment opportunities and constructive alignment to desired learning outcomes, based on a balanced mixture of ideas, connections and extension levels of learning and thinking. It is their belief that this model has the potential to positively influence students' approach to learning towards adopting deep learning, which is the key to high levels of statistical literacy, reasoning and thinking, and produces quality graduates. Inquiry-based project work is at the centre of this innovation. This activity culminates in predominantly higher-level responses, such as connections and extensions, through constructively focused input from flipped classroom large-group lectures, student-driven small-group tutorials and computer-based practical blended learning sessions. Extremely satisfactory student results, overwhelmingly positive student feedback and healthy retention rates bear testimony to the first important steps taken in instigating independent learning and a research culture in line with UP's status as a research intensive university.

Ms Corbett said that she considers it a privilege to lead this reflective practice which is informed, through scholarly research, by teaching and learning theories. She acknowledges the role of Ms Bettie Basson, now retired, as instrumental in the launch of a revised curriculum in 2012 and commends Ms Christine Kraamwinkel for her passion in promoting the innovation and its sustained application. The team enjoys the unwavering and enthusiastic support of Prof Andriette Bekker, Head of the Department of Statistics, and Dr Quenton Kritzinger, former Director of the Extended Programmes on the Mamelodi Campus.

Ms Thea Corbett and Ms Christine Kraamwinkel

Prof Don Cowan receives Chancellor's Award

Prof Don Cowan, an international researcher of note and the Director of both the Genomics Research Institute (GRI) and the Centre for Microbial Ecology and Genomics (CMEG) was awarded the Chancellor's Award for Research for 2014 at a special gala occasion in May this year. The Chancellor's Award for Research is awarded annually to a maximum of two staff members on the professional level, who have performed exceptionally in terms of research output and the international acknowledgement of their research.

Prof Cowan is an A-rated scientist and also shared the first place in the Capacity Building category with Prof Brenda Wingfield in the NSTF-BHP Billiton Awards in 2014.

Prof Cowan was educated in New Zealand, at the University of Waikato, where he completed a period of postdoctoral study before relocating to University College, London, as a lecturer in 1985. After 16 years in London, he accepted the position as Senior Professor of Microbiology in the Department of Biotechnology at the University of the Western Cape, Cape Town. During his sojourn there, he was also the Director of the 60-person strong Institute of Microbial Biotechnology and Metagenomics. Prof Cowan joined the University of Pretoria in May 2012.

He published more than 250 research papers, review articles and book chapters, and is a member of the editorial boards of ten international journals.

Some of the achievements on Prof Cowan's impressive CV include the post of Adjunct Professor at the University of Waikato (NZ), being elected as a Fellow of the Royal Society of South Africa in 2007, as a Member of the Academy of Sciences of South Africa in 2008, and as an Honorary Fellow of the Royal Society of New Zealand in 2009. He received the University of the Western Cape Vice-Chancellor's Award for Research Excellence in 2008 and the South African Society for Microbiology Silver Medal in 2009. Currently he is President of the Royal Society of South Africa.

Prof Don Cowan

Prof Cowan's research activities are linked by the theme of environmental extremes. Since his PhD studies, he has retained an interest in the ecology and enzymology of extreme thermophiles, organisms living at the temperature of boiling water and in the heat of the Namib Desert. For the past decade he has worked at the other end of the temperature scale with New Zealand, Chinese and American scientists, studying the microbial ecology and metagenomics of the Dry Valleys of Eastern Antarctica. He collaborates with South African and Spanish researchers on bacteria in high salt environments and with a network of local and international researchers on the microbial ecology of deserts and agricultural soils.

Three NAS researchers receive NSTF awards

Their research interests range from the genetic improvement of forest trees to the mole-rat queens of the Kalahari to life under rocks in Antarctica, but now Profs Zander Myburg, Nigel Bennett and Dr Thulani Makhalanyane have something important in common: All three of them were winners of the National Science and Technology Forum (NSTF)-BHP Billiton Awards.

A total of six UP researchers from a wide range of study fields were nominated for the 2014/2015 awards that annually honour and celebrate outstanding contributions to Science, Engineering, Technology and Innovation (SETI) in South Africa. The awards have been held in high esteem since its inception 17 years ago. Just being selected as a finalist is an honour in itself.

The three winners are all from the Faculty of Natural and Agricultural Sciences (NAS).

Prof Nigel Bennett

Prof Nigel Bennett received a Research Capacity Development Award in recognition of his individual work over 5 to 10 years. He occupies the joint Department of Science and Technology (DST)/National Research Foundation (NRF) Research Chair in the field of Mammalian Behavioural Ecology and Physiology, as well as the UP Austin Roberts Chair of African Mammology. His research focus is ecology, animal physiology and behaviour using the African mole-rat as a model animal. He and his co-workers have investigated the ecological and physiological factors that affect the control of reproduction and the evolution of sociality in mole-rats, by adapting a multi-faceted approach.

Among other things, Prof Bennett's research has shown that Damaraland mole-rat queens of the Kalahari are able to physiologically suppress the hormones that trigger ovulation and reproduction in so-called 'worker females' in the colony, and is currently trying to find out how this might occur. His research has set a benchmark for our understanding of reproductive success and social evolution in mammalian species, and his research record ranks him among the best researchers studying social regulation of reproduction in any group of mammals in the world.

Prof Zander Myburg won a Special Photonics (named in celebration of Unesco's International Year of Light and Light-based Technologies) TW Kambule Award in recognition for his research and its outputs as individual over the last 5 to 10 years. He holds the Chair in Forest Genomics and Biotechnology and directs the Forest Molecular Genetics (FMG) Programme, a highly successful research venture started by UP, Sappi and Mondi in 2003. Together with his team, Prof Myburg's work has focused on the genomics and molecular genetics of wood development in forest trees and, in particular, the genetic regulation of cellulose biosynthesis in Eucalyptus trees.

Under his leadership, the FMG research team has pioneered the use of population genomics and systems genetics approaches to unravel the genetic control of wood formation in Eucalyptus trees. Prof Myburg is the coordinator of the international Eucalyptus Genome Network (EUCAGEN) and was the lead investigator of the US Department of Energy (DOE) Eucalyptus Genome Project which last year resulted in the publication of the entire Eucalyptus genome sequence in the journal *Nature*.

Currently his work concerns the genetic improvement and engineering of forest trees to increase biomass and growth and enhance cell wall biopolymer properties for bio-based products.

Prof Zander Myburg

Dr Thulani Makhalanyane won a TW Kambule Award for Emerging Researcher, recognising his postdoctoral research in the period after having been awarded a PhD. He serves as a Young Ambassador for the International Society for Microbial Ecology (ISME), is one of the UP's top young scientists who has helped the University become a research leader in the study of extremophile organisms.

Before taking up a postdoctoral fellowship at the UP, he completed a BSc (Hons) degree in Microbiology at North West University and then moved to the University of the Western Cape where he earned both an MSc degree (obtained cum laude, 2010) and a PhD (2013) at the Institute for Microbial Ecology and Genomics in the Department of Biotechnology in record time.

His research has focused on understanding the ecology of soil microbial communities in extreme environments, including hyper arid deserts like the Antarctic Dry Valleys and the Namib Desert. His work on unique organisms called Hypoliths, which create thriving communities below quartz rocks sheltered from extreme desert environments, aims to understand how they interact and take part in biological cycles such as carbon and nitrogen fixation.

He applies highly sophisticated techniques in his studies, including metagenomics and, more recently, metaproteomics and metabolomics. A number of publications in respected international journals (e.g. *FEMS Microbiology Reviews, The ISME Journal, Molecular Ecology*) were produced as a result. Dr Makhalanyane has presented his work at numerous international meetings and has also participated in various sampling expeditions.

Dr Thulani Makhalanyane with Minister Naledi Pander (left).

Prof Brenda Wingfield honoured

Prof Brenda Wingfield

Prof Brenda Wingfield, Deputy Dean: Research and Postgraduate Studies in the Faculty of Natural and Agricultural Sciences received the Christiaan Hendrik Persoon medal during the awards ceremony at the 49th Biennial Congress of the Southern African Society for Plant Pathology (SASPP) in Bloemfontein earlier this year. Prof Wingfield is the first female member of the SASPP to receive this honour.

This gold medal is the highest award that a member can receive from the SASPP. The award honours famous mycologist Christiaan Hendrik Persoon (1761-1836) who was born in the Cape Province, South Africa and was sent to Europe at the age of 13 to pursue his education. Later in his life, he was recognised as one of the 'fathers' of mycology. World-renowned epidemiologist and member of the SASPP, Dr JE van der Plank was the first person to be awarded the Persoon medal in 1979.

Subsequent recipients include Prof WFO Marasas (1987), Prof MJ Wingfield (1999), Prof PW Crous (2005) and Prof ZA Pretorius (2009). Prof Brenda Wingfield received the award for her outstanding contributions to Plant Pathology. This is only the sixth time in 53 years that the medal has been awarded.

As receiver of the Persoon medal, Prof Wingfield, who has been an active member of the SASPP (an affiliate of the International Society for Plant Pathology) for two decades, was recognised as a plant pathologist of substantial international repute. As an SASPP member she made a substantial contribution to Plant Pathology in South Africa and globally. Her contribution is perhaps manifested most clearly in the successes of the students she has supervised, some of them who became South Africa's most active and most recognised scientists in the field of plant pathogens. Many of these students, including a past president of the SASPP, are now working abroad.

Brenda Wingfield is also a Professor in the Department of Genetics. Her research over the past 20 years focused on the global movement and evolution of fungal pathogens – particularly those on trees. She was intensely involved in developing tools to study the phylogenetic relationships among tree pathogens. In recent years, she expanded her research focus to the study of fungi at population level. In doing this, she developed the molecular tools to make this possible. Her research group is one of the most active groups internationally and uses DNA-based markers to examine the distribution and population dynamics of tree pathogens. She has supervised and still continues to advise a large number of postgraduate students working on plant pathogens and, together with her students, has produced a substantial body of research results on plant pathogens in some of the best-known journals on the topic. The impact of the work is evidenced by ISI/Thomson's listing of 373 of these publications with a Hirsch (H) factor of 45 (an average citation rate of 15,2 per paper). The Google Scholar equivalent is H=45.

Prof Wingfield is recognised all over the world for her excellent work in science and for her mentorship of students. For ten consecutive years, she has received the prestigious Achiever Award for Excellence of the University of Pretoria. She is one of only a few South African scientists who holds an A rating (the highest) from the National Research Foundation of South Africa and enjoys significant national and international recognition for her work in Plant Pathology. She received numerous significant awards for research, including the Women in Water, Sanitation and Forestry Award in 2007, the South African Department of Science and Technology's Distinguished Women in Science Award in 2008, and the National Science and Technology Forum of South Africa's Award for Mentorship and Human Capacity Development in 2014. As programme leader at the Centre for Tree Health Biotechnology (one of South Africa's first seven centres of excellence identified by the Department of Science and Technology and the National Research Foundation) during the first five years of its existence, Prof Wingfield played a leading role in the centre's development.

She exemplifies what women can achieve in science. Her research programme is recognised internationally and her postgraduate students compete successfully at global level. Some of them are now leading world scientists. She was a PhD supervisor or co-supervisor for more than ten women, all of whom are now successful scientists in their own right, and many of her current PhD students are women. In addition, she has advised a large number of female masters students and is part of the mentorship team in numerous MSc student programmes. Clearly, Prof Wingfield is a notable role model in terms of promoting scientific excellence and Plant Pathology, not only in Africa, but also in the rest of the world.

Prof Wingfield is one of the founding members of the Forestry and Agricultural Biotechnology Institute (FABI) and has played an active role in building the reputation and global footprint of this Institute since its establishment in 1998.

Prof Ferdi Meyer a pioneer in the field of agriculture

Prof Ferdi Meyer, who was chosen by the Agriculture Writers of South Africa as Agriculturalist of the Year at the end of 2014, is commonly regarded as a pioneer in the field of agriculture.

He founded the Bureau for Food and Agricultural Policy (BFAP), of which he is currently the Director. The policy forum, currently ten years old, is a first for South Africa and delivers a worthwhile contribution to scenario planning and risk analysis in the industry.

Under Prof Meyer's leadership the BFAP has grown to become a unit which brings together analysts and researchers. The BFAP publishes the annual South African Agricultural Baseline in which the prospects of 44 agricultural commodities and consequently the effects of the prospects on farming profitability and the affordability of household foods are given for the next ten years.

Prof Meyer attained his PhD at the University of Missouri in the United States where he developed the first market prospects and scenario planning model for the South African agricultural sector. In 2009 he started expanding the research activities and to reach out to other research bodies in Africa and private firms which invest in Africa.

As associate professor in the Faculty of Natural and Agricultural Sciences, Prof Meyer acts as supervisor for postgraduate students and lectures in the analysis of commodity markets, partial balance modelling, policy analysis and scenario contemplation.

Some of the recent awards honouring his work, is the Grain SA Inspiration Award of 2015 for the role he played in the BFAP and his contribution to the grain industry, the Award as Extraordinary Performer of the University of Pretoria, as well as various awards for the best contributory paper at the annual meetings of the Society of Agricultural Economists of South Africa. As young researcher, he possesses a Y rating from the National Research Foundation.

Prof Meyer also served in the National Committee for Harvest Assessment which supported the development of a new methodology to examine harvest assessment. He is a non-executive Director of Agrico Machinery and a Council member of the Protein Research Foundation.

In addition to this, he acts as a consultant for the United Nations' Food and Agriculture Organisation (FAO) and the Organisation for Economic Cooperation and Development (OECD), with a specific focus on Africa.

With acknowledgement to Rapport

Prof Ferdi Meyer

Prof Terry Aveling awarded for contribution to SA Seed Industry

Prof Terry Aveling

Prof Terry Aveling from the University of Pretoria's Department of Plant Science received the 2015 SANSOR-Bayer Science for a Better Life Award. The prize is awarded by the South African National Seed Organisation and Bayer CropScience in recognition of leadership, innovation and positive contributions to the seed industry and agriculture.

She is a seed scientist and conducts research on fungi associated with diseases of seeds. Prof Aveling is the second University of Pretoria (UP) scientist to receive this award. Dr Wayne Truter of the Department of Plant Production and Soil Science scooped the award last year.

Prof Terry Aveling leads the UP Seed Science Group and is also part of the Forestry and Agricultural Biotechnology Institute. She has been involved with the International Seed Testing Association (ISTA) for many years and was Vice-chairman of the ISTA Seed Storage Committee (2001 to 2007), Chairman of the Seed Health Committee for the periods 2007 to 2010 and 2010 to 2013 and is currently Vice-chairman of this committee (2013 to 2016). Prof Aveling was appointed as Chairman of the Seed Pathology Committee of the International Society of Plant Pathology (ISPP) in 2013 and currently holds this position.

Bob Millar appointed as President of International Neuroendocrinology Federation

Prof Bob Millar

Prof Robert (Bob) Millar, Director of the Mammal Research Institute and the Medical Research Council (MRC) Receptor Biology Unit was recently elected as President of the International Neuroendocrinology Federation (INF). This prestigious appointment increases the visibility and profile of the University of Pretoria (UP) and the recently established Centre for Neuroendocrinology at UP.

He was the recipient of a National Science and Technology Forum (NSTF) Lifetime Achiever Award during 2013 to an individual for his outstanding contribution to Science, Engineering, Technology and Innovation (SETI) during his lifetime. Prof Millar is a Fellow of the Royal Society (Edinburgh), a Fellow of the Royal Society of South Africa and a Fellow of the Academy of Science of South Africa (ASSAf). He has published more than 400 articles in internationally peer-reviewed journals (cited over 15 000 times) and has an H-index of over 60. Prof Millar is also an NRF A-rated scientist.

The INF was established to promote the development of research and education in basic and clinical neuroendocrinology, to disseminate scientific information in this and related fields, to arrange for publication of information aimed at the advance of the field, to facilitate the exchange of ideas among scientists of all nations and to attract young investigators to the field.

The Federation organises an International Congress of Neuroendocrinology every four years and Prof Millar will preside over the next international meeting in 2018 in Toronto. The Congress provides a forum for the presentation and discussion of recent neuroendocrinology research among scientists from all countries.

The INF facilitates the exchange of scientific information between scientists by sponsoring meetings, workshops, teaching courses, new neurosciences technologies and discussions in coordination with national neuroendocrine groups and societies. To support its abovementioned activities the INF provides travel grants to scientists and students to encourage participation at meetings.

The official journal of the INF is *Frontiers in Neuroendocrinology* which has an Impact Factor of 7.58 (10.6 for five years).

International recognition for Prof John Taylor

Prof John Taylor of the Department of Food Science, a research theme leader in the Institute for Food, Nutrition and Well-being, was elected as Honorary President of the International Association for Cereal Science and Technology (ICC). He was awarded this life presidency in recognition of his exceptional and meritorious service to the ICC since 1986, and for his contributions in the field of international cereal science and technology.

The highlights of Prof Taylor's involvement with the ICC include his chairmanship of the scientific committee of the ICC International Cereals Symposium held in Pretoria in 1993, which was one of first international conferences held in post-apartheid South Africa. From 2009 to 2010 he served as President of the ICC and from 2011 to 2012 as Chair of the Association's Governing Committee. He has been particularly active in organising meetings regarding cereal production in developing countries, for example in India in 2012 and in Brazil in 2015.

Prof John Taylor

The ICC is an international organisation of experts from around the world who specialise in the milling of wheat and other cereals, bread-making and the production of different cereal-based foods. This independent, apolitical forum also focuses on improving food quality, food safety and food security.

The ICC actively promotes international cooperation at international, national and regional levels. As Honorary President, one of Prof Taylor's main objectives will be to create a unified body to oversee cereal science and technology. Although the American Association of Cereal Chemists International (AACCI) works independently from the ICC, he hopes to bring these two associations together in order to give them a stronger voice when it comes to shaping global and government policies. This will be a challenging task, but the benefits that can be derived from such an amalgamation cannot be underestimated.

He recognises the contributions that can be made by scientists from developing countries and is dedicated to bringing more scientists from across the world on board as ICC members. By bringing scientists together to work on common themes, a clearer and better understanding of controversial issues can be developed.

In a world where food security is threatened by the constantly growing human population, the importance of cereal production requires urgent attention. Factors such as the large scale increase in urbanisation and the changes in communities' dietary preferences put major strain on food producers and on the availability of food. As developing countries become more developed, demands for specific food types also increase. People eat food that requires the availability of more land, for example, for every kilogram of beef consumed, seven kilograms of grain have to be produced. South Africa used to export food, but today we are forced to import up to 40% of the required wheat. This can, to some extent, be attributed to the huge paradigm shifts in present-day agricultural industries. Another cause for concern is that mining activities have taken over land that was traditionally used for agriculture, which also affects food security. Prof Taylor highlights the reality that every year the world has to produce at least two per cent more food than the previous year in order to provide for the increasing population and rising standards of living, which will not be sustainable in the long term.

More needs to be done, but in fact, South Africa is now training fewer young food scientists than in years gone by. Tertiary institutions need to extend their focus beyond simply generating knowledge. 'If academics do not apply their knowledge, it has little value,' Prof Taylor said.

One thing remains certain, and that is that cereal science and technology have a very important role to play in future food security. Prof Taylor hopes that by bringing food scientists from across the world together to tackle some of the threatening challenges the world is facing, the ICC and the AACCI will become a strong and unifying force that will be able to fill some of the important gaps currently evident in food security.

Prof Keith Bristow

Soil physicist receives award for excellence

Prof Keith Bristow, an extraordinary professor in the Department of Plant Production and Soil Science received a *Vadose Zone Journal (VZJ)* Award for excellence as an Outstanding Associate Editor of this journal. The *VZJ* is a highly ranked ISI journal in the Soil Science discipline.

The *VZJ* Editorial Board awarded Prof Keith Bristow, along with three others for excellence in performing their work as associate editors. The recognition is based on their efforts in establishing a quality review process – for timeously and professional manuscript editing, for fair and rigorous integration of reviewer comments, and for overall excellence in managing a professional review process. Members of the *VZJ* Editorial Board expressed their deepest appreciation for these associate editors who have benefitted the journal, our community, and our sciences through their outstanding work.

Prof Bristow is a soil physicist/hydrologist with more than 30 years' experience in scientific research. He has been involved in various projects, including the following: planning and leading strategic and tactical research activities across Australia, particularly in northern tropical Australia; building partnerships with communities, industries and government agencies; leading major national research projects; and conducting research in soil physics, groundwater hydrology, irrigation systems and integrated water management, nationally and internationally.

He currently leads the Commonwealth Scientific and Industrial Research Organisation (CSIRO) 'Polymers in Agriculture' project. This project is developing novel sprayable biodegradable polymer membranes to minimise the evaporation of water from soil and to improve agricultural water productivity.

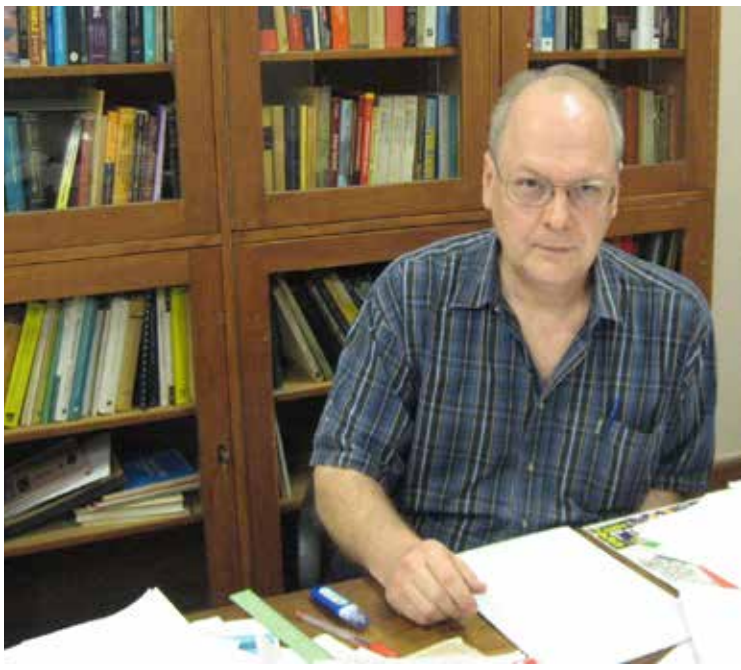
Prof Bristow serves as a Research Scientist with the CSIRO Agriculture Flagship in Townsville, Australia. He is a Fellow of the Soil Science Society of America as well as Fellow of the American Society of Agronomy. Furthermore, he was awarded the Don and Betty Kirkham Soil Physics Award by the Soil Science Society of America in 2009.

Mathematician honoured by South African Maths community

Prof James Raftery, a Professor in the Department of Mathematics and Applied Mathematics received the SAMS Award for Research Distinction at the 57th Annual Conference of the South African Mathematical Society (SAMS). The award is the highest honour that the South African mathematical community can bestow in recognising and stimulating excellence in research. It was awarded for the first time in 1983, and afterwards, on average, only once every two years.

This award is only presented in recognition of important research contributions to Mathematics, or to the applications of Mathematics in any field. The intention of the Society is that this award should recognise and reward substantial research carried out in South Africa, which does credit to Mathematics in South Africa. The award is presented in the form of a silver Möbius band with a golden rim and appropriate inscription. A person can receive the award only once.

Prof Raftery completed his PhD in Mathematics in 1988 at the University of Natal and has been a Professor at the same institution until he joined the University of Pretoria in July 2013. He is currently rated by the National Research Foundation in the B1 category. His main research interests are Logic, Algebraic Logic, Algebra and Universal Algebra.



Prof James Raftery

Prof Johann Kirsten appointed as editor of *Agrekon*

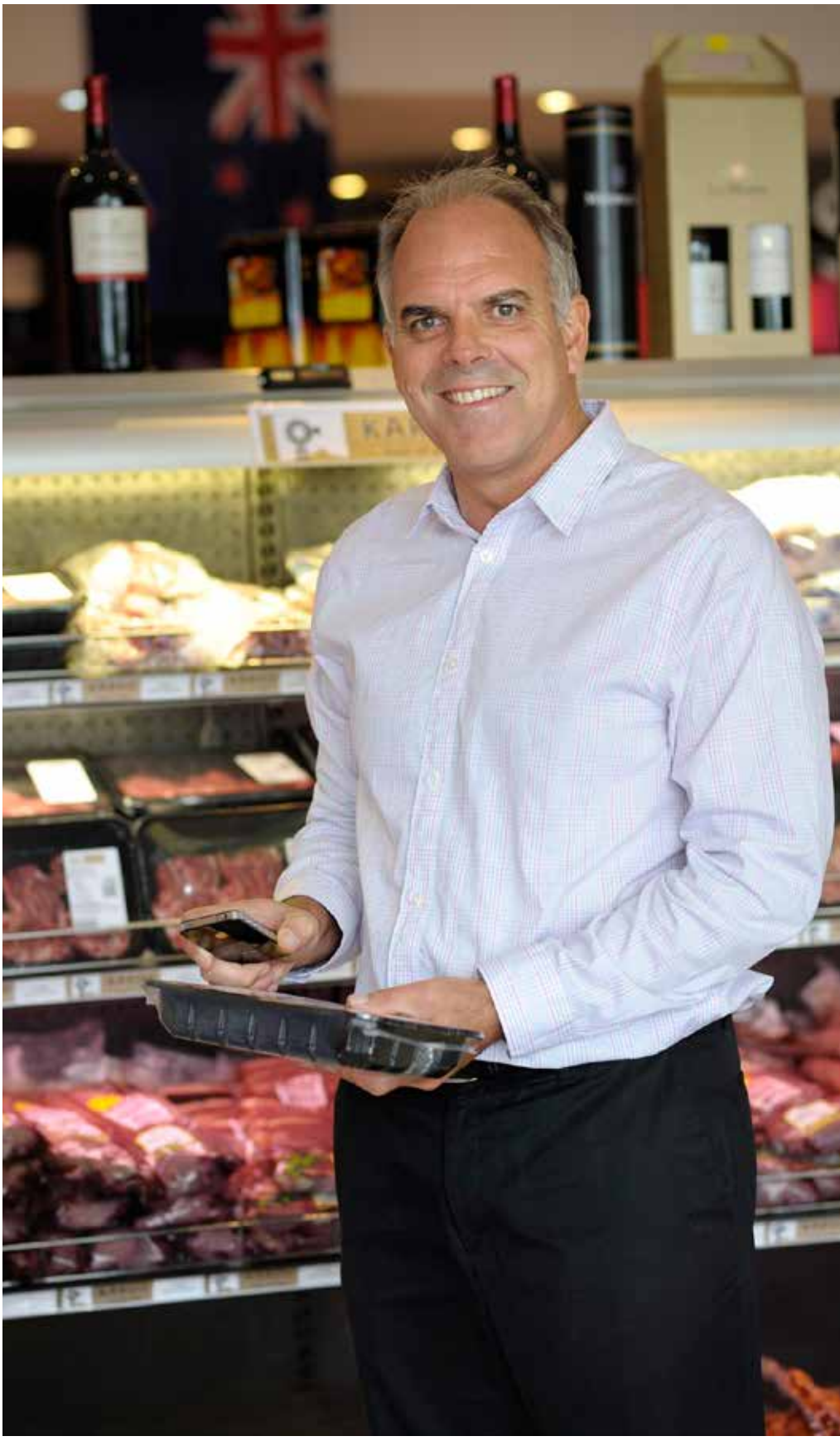
Prof Johann Kirsten, Head of the Department of Agricultural Economics, Extension and Rural Development was recently appointed as the Editor of *Agrekon,* published by Taylor and Francis and indexed by Scopus and Web of Science. He succeeds Prof André Jooste who was *Agrekon* editor since 2010.

Agrekon is a quarterly publication of the Agricultural Economics Association of South Africa (AEASA). Prof Johann Kirsten has been a member of AEASA since 1985 and has previously served the Association in various capacities: Secretary from 1992 to 1994, Editorial assistant for *Agrekon* from 1998 to 1999, President from 2001 to 2002; and Past President: 2003 and 2004.

He is Professor and Head of the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria since 1997. Furthermore, he has published more than 110 articles in peer reviewed journals as author and co-author and also co-edited six books. A total of 68 masters students and 22 PhD students completed their studies under his supervision. He served as a Council member of the National Agricultural Marketing Council in South Africa from 2001 to 2011 and was also appointed by the Minister of Agriculture as Chair of the Food Price Committee for the period 2003/4.

Prof Kirsten also served as the Vice-President of the International Association of Agricultural Economists from 2006 to 2009. His main research interests are agricultural policy, land reform and the economics of origin based foods.

Agrekon aims to promote research and discussions on agricultural economic issues related to southern Africa. It includes disciplinary, multi-disciplinary and problem orientated work. Prof Kirsten says he is looking forward to tackle the challenge to improve the status and impact of the journal and to make sure the content addresses the key challenges in the economics of food, agriculture, agribusiness and natural resources in the southern African region.



Prof Johann Kirsten

Dr Ikenna Mbakwe wins with "The Chameleon"

An example of the Chameleon – The Chameleon is a new and simple tool that helps farmers to know how much water is contained in the soil on their farms so that they can avoid plant water stress, or over-irrigation. It shows different colour outputs, depending on the soil water content (blue = wet; green = drying; red= dry).

Dr Ikenna Mbakwe, a postdoctoral fellow in the Department of Plant Production and Soil Science recently won the first prize in the Open category in the 2015 South African Agency for Science and Technology Advancement (SAASTA)/National Research Foundation (NRF) Young Science Communicators Competition with his poem "What the Chameleon Said".

Dr Mbakwe works with Prof John Annandale and Prof Richard Stirzaker from the same Department. They recently developed a simple tool to assist resource-poor farmers in knowing how much water is available in the soil on their farms, so that they will know when to irrigate. They called the tool "The Chameleon" because it changes colour according to how much water the soil contains.

In the SAASTA/NRF national competition, young scientists and researchers between the ages of 18 and 35 had to communicate their world to a larger audience beyond their scientific community in an exciting way.

Dr Ikenna Mbakwe

Altech Young Scientist Award for Marthie Nickols

Marthie Nickols, a MSc (Production Physiology) student in the Department of Animal and Wildlife Sciences recently was honoured with a medal and was honourably mentioned in the Altech Young Scientist Competition in the African region.

The purpose of the Altech Young Scientist Competition is to bring together the world's cleverest scientific thinkers from colleges and universities across the globe.

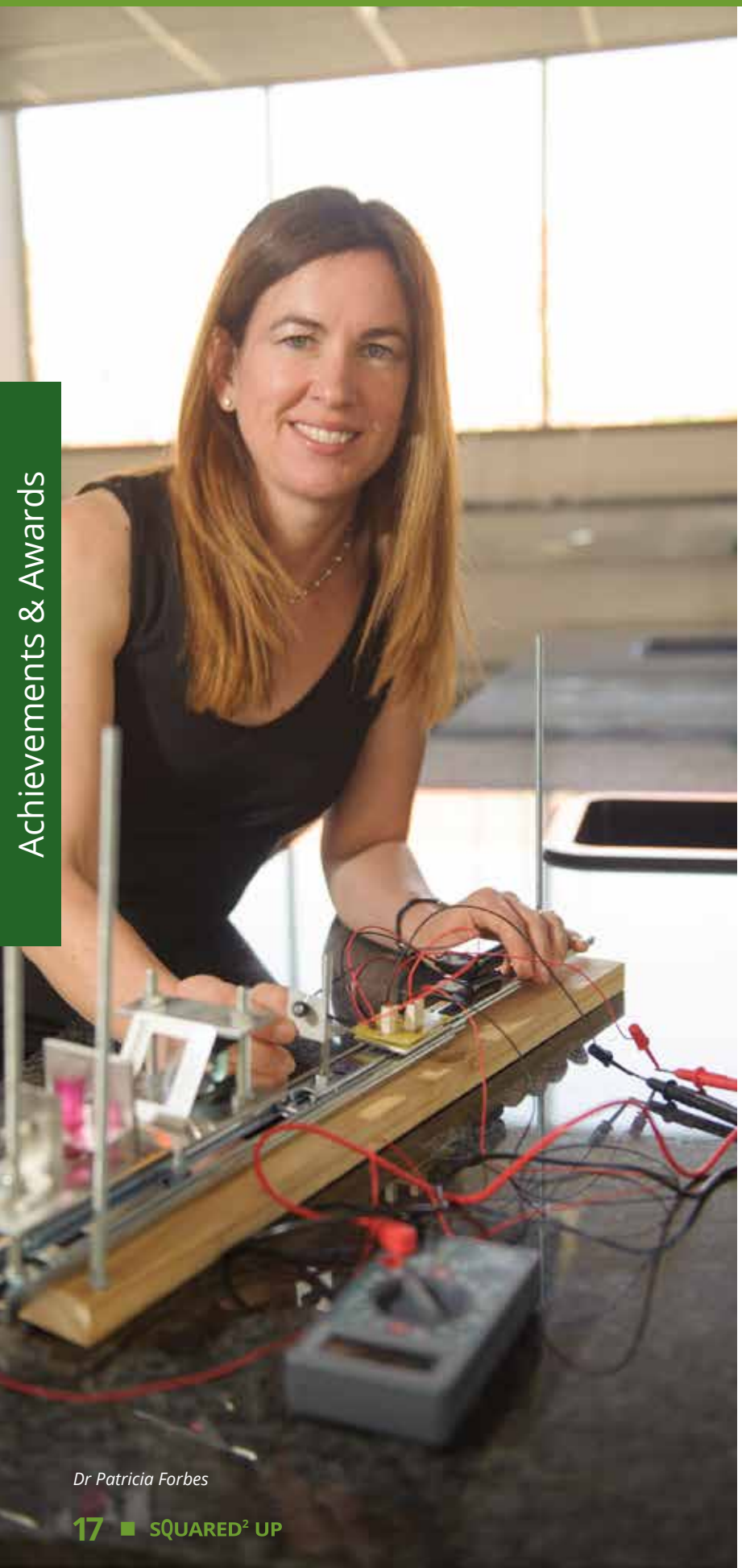
Marthie received this recognition for her article titled *Effects of feeding methods and exercise on the physiological status of captive cheetah (Acinonyx jubatus)* in the postgraduate division of the competition.

For a long time she has been interested in animals such as lions and cheetahs. At the end of her third year BSc (Agric): Animal Sciences, Marthie worked for a few weeks on a farm near Bloemfontein. She wanted to do her research seminar on the feeding needs of lions. To her dismay only a little research has been done on the feeding needs of lions. Prof Eddie Webb, Head of the Department of Animal and Wildlife Sciences, recommended that she does her research on the similar needs in cheetahs. Marthie's undergraduate article dealt with the feeding deficiencies, diseases and disabilities due to the feeding deficiencies and the influence thereof on cheetahs in captivity. The project at the end of her fourth year was submitted for the undergraduate division of the Altech Young Scientist Competition in 2013. With her article titled *Nutritional Management and Feeding of Cheetah (Acinonyx jubatus) in Captivity* she achieved second place in South Africa.

Marthie hopes to make a positive difference in the lives and the management of cheetahs in captivity. She finally emphasises that "we can work together to protect, preserve and help threatened species to flourish."

Marthie Nickols

Dr Forbes featured in SPIE Women in Optics planner



Dr Patricia Forbes

Dr Patricia Forbes, from the Department of Chemistry is featured in the latest SPIE (the international society for optics and photonics) Women in Optics 18 month-planner for 2015-2016, in which advice and insights based on the experience of 27 successful women working as researchers, executives, marketers and scientists are featured.

Comments in the annual planner, published by the international society for optics and photonics, provide insights for those in the field and inspiration for students considering careers in optics and photonics. More information can be found at http://spie.org/x111964.xml

In the annual planner, women in STEM (Science, Technology, Engineering, and Mathematics) occupations ranging from university professor and laboratory researcher to entrepreneur and CEO share stories of inspiration and discuss the challenges and rewards of careers in fields not often practiced by females. The planner is available at no charge from the publisher SPIE, the international society for optics and photonics.

In the calendar, Dr Forbes is quoted, saying the following: 'There have been different challenges at each stage of my career, although perhaps the biggest was completing my PhD while being employed full-time! When I applied for bursaries to study at a university while still at school, I did not realise the impact that the field of chemistry which the sponsoring company represented (such as organic or inorganic chemistry focus), would have on my early career. Advice on this aspect would have been useful. If you have a passion for science, I recommend that you take up the challenge and give it your best. There are many exciting opportunities to grow personally and to contribute to society, which make a career in science very rewarding. Go for it!'

SPIE Women in Optics promotes personal and professional growth for women through community building, networking opportunities, and encouraging young women to choose optics and photonics careers.

Starting in 2005, SPIE has produced the Women in Optics planner, highlighting women in the fields of science and engineering. This planner includes photos and interesting facts about women who are making a difference through their work and other contributions to the fields of science, optics and engineering. Five thousand (5 000) copies of the planner are printed and distributed, free of charge, in more than 25 countries worldwide.

Genetics staff member in Top 10 of FameLab SA

Mr Kishen Mahesh from the Department of Genetics proudly made it to the Top 10 of the 2015 FameLab South Africa Science Communication competition.

FameLab SA forms part of the international FameLab competition – a "pop idols for scientists" that seeks out and nurtures science communication talent. Engagement between scientists and society is essential to grow a critically informed society and ensure that science remains relevant and responsive to societal needs.

This competition is designed to engage and entertain by breaking down science, technology and engineering concepts into three-minute presentations. Contestants from around the world participate, armed with only their wits and a few props that they can carry onto the stage. The result is an unpredictable, enlightening and exciting way to encourage your curiosity and to discover the latest research.

The regional competition was held at Unisa early in March. Contestants from all over Gauteng presented their speeches, based on various fields in science. Mr Kishen Mahesh also participated and along with four other Gauteng contestants progressed through the regionals heats. They then journeyed to Grahamstown for the national semi-finals and finals that were held at Scifest.

Masterclass training provided by UK based science presenter Dr Emily Grossman and Robert Inglis from Jive Media Africa helped them to hone their messages and prepared them for media engagement. The training was supported by the British Council which encourages the strengthening of links between science in South Africa and that in the UK.

Mr Mahesh is quoted as saying: "FameLab provides us with the opportunity to showcase the wonderful work we do in all disciplines of science. It provides us with a platform on which we are able to show the general public that what is generally perceived as 'too hard' or 'too difficult' isn't really the case. At the same time this competition tests us, researchers, scientists and academics alike on how we communicate our science to others. We sometimes get lost in the fancy jargon that is attached to the specific work we do and forget that if not explained correctly … we can become lost in translation of the jargon."

Mr Kishen Mahesh

Mr Kishen Mahesh (second from left)

Inaugural address of Head of Insurance and Actuarial Science

Actuarial education and the University of Pretoria's contribution, was the title of Ms Marli Venter's inaugural address earlier this year. As a seasoned and experienced actuary who also possesses an excellent academic record, Ms Venter was appointed as the new Head of the Department of Insurance and Actuarial Science in the Faculty of Natural and Agricultural Sciences as from January 2014.

According to Ms Venter it is well known that there is a significant shortage in analytical skills in South Africa. "In the changing times in which we work and live, we need to continuously assess the actuarial toolkit and how we teach it. The way we view knowledge is also changing and the skills we need to teach students and actuaries are changing at the same time," Ms Venter said.

She said that in her address she will consider the importance of actuarial education and the role that we as the University of Pretoria play. She reiterated that her address was not about the actuarial profession as such, "though I will touch on it and refer to it, but it will rather be about the actuarial programme at the University of Pretoria." She further discussed the development of the actuarial programme, some of its achievements and her vision for the Department.

Ms Venter completed a BSc degree and an honours degree in Mathematical Statistics at the former Rand Afrikaans University. Subsequently, she completed a BCom (Honours) in Actuarial Sciences at the University of Cape Town. She enhanced her academic qualifications while working in the actuarial services sector and obtained an MBA degree at the University of the Witwatersrand, as well as a Postgraduate Certificate in Higher Education at the University of Pretoria.

In 1990 Ms Venter started working at Metropolitan Life in Cape Town and continued her actuarial studies part time, qualifying as an actuary in 1994. Following six months of backpacking through Europe after qualifying, she returned to Johannesburg and started working at Sage Life. In 2005, she resigned as the Executive Director: Employee Benefits and started teaching, first at the University of the Witwatersrand and later at the University of Pretoria. During this time she did consulting work for Absa and in 2009, she joined them on a full-time basis.

She is currently a member of the Education Board of the Actuarial Society of South Africa, a member of the Actuarial Committee of MMI, a trustee of the UP pension and provident funds and also the treasurer for South African Masters Swimming.

From left: Prof Anton Ströh (Vice-Principal: Institutional Planning), Ms Marli Venter and Prof Brenda Wingfield (Deputy Dean: Research and Postgraduate Studies, Faculty of Natural and Agricultural Sciences).

Article on wheat production acknowledged by SA Grain

Divan van der Westhuizen and Lindsay Trapnell, both Farming Systems Analysts with the Bureau of Food and Agricultural Policy in the Department of Agricultural Economics, Extension and Rural Development, recently received congratulations from Grain SA for the best item of the month, printed in the February issue of their journal.

The article was evaluated, using the criteria of readability, correctness, worthiness, research and the impact the article will have on agricultural. At the end of the year this article will be also evaluated together with the other 11 best articles, to determine the best article of the year.

The article was titled 'How do we compare with down under? Measuring and comparing the competitiveness of the South African wheat industry with Australia'.

It was written in response to the concern about the persistent decline of areas sown with wheat in South Africa. Over the past 32 years, the area sown with wheat in South Africa declined ffrom two million to half a million hectares.

The decline was due to the effects of climate warming in the Free State, making wheat production too risky, with the land use being switched to the production of soy beans and oilseeds.

The main conclusions of the article are that South African farmers enjoyed higher yields per hectare and higher prices per ton, with approximately similar variable cost per hectare to Australian farmers, giving them higher gross margins per hectare than those in Australia.

However, Australian farmers had a huge comparative advantage over South African farmers, derived from the economies of size. Each Australian farmer, on average, produced double the volume of wheat on a larger number of hectares, compared with the South African farmer. Their systems for wheat production were much more profitable than those of South African producers, because the Australian farmer was able to spread the overhead costs over a much larger tonnage of output. Consequently, while the area of wheat sown in South Africa was declining, Australia's cropping area for wheat increased from 9.2 million hectares in 1990 to 13. 8 million hectares in 2014.

Lindsay Trapnell

Divan van der Westhuizen

UP students sweep up top honours in Madagascar

Out of more than seventy oral and twenty poster presentations centred on the plight of habitat loss and fragmentation, invasive species and emerging zoonotic diseases, two students from the University of Pretoria, Ms Lushka Labuschagne and Mr Stewart McCulloch emerged as the best in their categories, receiving awards from the African Small Mammals Symposium (ASMS) organising committee.

Early in April this year over 100 of the top scientists from around the world descended on the island paradise of biological specialisation – Madagascar. This congregation of scientific excellence brought together some of the leading minds in multidisciplinary fields of Zoonotic diseases, Zoology and Ecology in the 12th meeting of the ASMS.

Ms Lushka Labuschagne, an MSc student under the supervision of Dr Mark Keith in the Centre for Wildlife Management won the poster section and won over the crowd with her topic, 'Occupancy models and nest monitoring to quantify the Barn Owl (*Tyto alba*) presence and diet in an agricultural matrix'. This work showed that not only where the reproductive system of the owl populations in the agricultural land successful, but that these populations play an important role in the bio-control of rodent pest species. Whilst Mr Stewart McCulloch, a PhD candidate in the Department of Microbiology and Plant Pathology, under the supervision of Prof Wanda Markotter stole top honours away from Czech and German student presentations with his cross disciplinary presentation, titled 'The Seasonal variation in Lagos bat virus neutralizing antibody levels present within a population of *Rousettus aegyptiacus* fruit bats in the Limpopo Province of South Africa'. This presentation highlighted the ecological and environment impacts influencing zoonotic disease prevalence in South African bat populations.

This internationally attended conference showcased the world class research being performed in the Faculty of Natural and Agricultural Sciences.

From left: Dr Mark Keith, Ms Lushka Labuschagne, Dr Steve Goodman (Department of Zoology, The Field Museum of Natural History, Chicago, USA), Prof Wanda Markotter and Mr Stewart McCulloch.

Distinguished scientist from Canada honoured by UP

Prof Howard Alper is the current Chairperson of the Government of Canada's Science, Technology and Innovation Council (STIC), and a Professor at the University of Ottawa. The University of Pretoria awarded him an honorary doctorate in science in recognition of his extensive research in organic and inorganic chemistry, which investigates their potential applications in the pharmaceutical, petrochemical and commodity chemical industries.

Prof Howard Alper

Using homogeneous, phase transfer, and heterogeneous catalysis (for instance, clays and dendrimers) he discovered new reactions. He succeeded in preparing valuable products in pharmacologically active form by using chiral ligands in metal catalysed cycloaddition and carbonylation reactions. He has published 544 papers, holds 37 patents and is the editor of several books.

Prof Alper has been awarded a number of prestigious fellowships and has received many awards for his work.

STIC, which Prof Alper has chaired since 2007, advises Canada's cabinet and Prime Minister on science, technology and innovation issues. The Council also issues State of the Nation reports every two years, benchmarking Canada's global performance. In December 2012 the Government of Canada reappointed Prof Alper to a third term as Chair of STIC.

Prof Alper acknowledged the honorary degree bestowed on him by the University of Pretoria by saying "I am pleased to receive this recognition, given the reputation of this University as one of South Africa's premier educational and research institutions."

Encouraging the graduates in the Faculty of Natural and Agricultural Sciences during the award ceremony he said "We count on you graduates to transform hope into reality regarding the quality of school education and teaching, as well as to address global challenges such as Aids and the reduction of poverty."

Young scientists encouraged to do the impossible

"You can do the impossible. Years ago it seemed impossible that humans can fly – today we travel the world by aeroplane. As scientists we dream of the impossible every day. We as humans were born to do the impossible." These were the inspiring words of Prof Lyn-Marie Birkholtz at the Annual Top Achievers Function for students of the Faculty of Natural and Agricultural Sciences in May.

Prof Birkholtz, an Associate Professor in the Department of Biochemistry, who occupies the SARChI Chair in Sustainable Malaria Control, was the guest speaker at this prestige function. She also heads the Malaria Parasite Molecular Laboratory and is a leader in the discipline of discovering antimalarial targets for sustainable malaria control.

She encouraged the students with her enthusiasm, reminding them that they can do anything they set their mind on. "Remain inquisitive and passionate and refuse to give up. Keep on pushing the boundaries and you will achieve the impossible." Prof Birkholtz also shared some of her own successes and breakthroughs during her career up to now, especially with regard to her research focused on finding the Achilles heel of the malaria parasite.

Liezl Ferreira was not only awarded for being the number one student on the Dean's Merit list, with an average of 93%, but she also scooped up the most awards at the event. She received four awards, all from FNB. The awards were for the best student in Financial Mathematics, the best second-year student in BSc (Actuarial Science) degree programme, the best student in Actuarial Mathematics, as well as the best student in Mathematical Statistics.

Sanli van den Brink was honoured for being the recipient of the Vice-Chancellor's and Principal's Medal for excellent undergraduate academic achievement as the best student in the Faculty of Natural and Agricultural Sciences, with a weighted average performance of more than 90% during her three years of study. At the ceremony, she also received the Dewald Hattingh Book Prize for the best third-year student in Mathematics.

The Dean's Merit List for 2014 was announced (the list includes students with an average of more than 75%) and the Top 30 undergraduate students on this list (with averages of 85% and more) were also acknowledged at this event. The Dean also especially mentioned all the candidates who received their doctoral degrees during the recent Autumn graduation ceremony and announced that they will also be included in the Dean's Merit List.

At this prestigious event, more than 60 prizes and trophies were awarded to the top students in the Faculty. The Faculty is proud to have such outstanding academic achievers and is very grateful to all the sponsors of the prizes and trophies.

Prof Roumen Anguelov (Head of the Department of Mathematics and Applied Mathematics) and Sanli van den Brink.

Liezl Ferreira and Prof Jean Lubuma (Dean of the Faculty of Natural and Agricultural Sciences).

Vibrant life in the ground below

Damaraland mole-rats

Research

Few of us spend our days thinking about the forms of life that exist beneath our feet; even fewer imagine castles of clay and flourishing life in the soil below. Endemic to the soil of Africa is the fascinating small mammal known as the mole-rat that lives underground, excavating burrow systems that may extend for more than a kilometre. These clay castles have areas designated as sleeping parlours, others as pantries to store food and still others strictly designated as toilets.

The incumbent of the South African Research Chair of Mammal Behavioural Ecology and Ecophysiology, Prof Nigel Bennett, has dedicated most of his career to researching mole-rats. His main area of focus has been to better understand the modes and mechanisms responsible for reproductive suppression in the non-reproductive females of various species.

Mole-rats are nothing if not fascinating – their sociality, body structure diversity, and their ability to increase plant life above ground in the vicinity of the area they occupy underground are just some of the things that keep researchers enthralled. New species are being discovered and added to the already identified 32, with the latest species just found in Tanzania. The differences between species are far greater than their size although the smallest adult, the naked mole-rat, weighs as little as 20 grams and the largest, the Cape dune mole-rat, exceeds two kilograms in mass.

Mole-rat species are either solitary or social, but all feed on geophytes, the underground storage organs of plants. Solitary species are typically found in areas that are mesic, or moister, as opposed to social species that have adapted to dry environments known as xeric areas. The wonders of nature are evident in these habitat preferences. In the mesic areas, food is evenly distributed so the solitary mole-rat does

not have to dig very far to find its food. In arid areas, however, the workforce of the colony has to excavate very long burrows in order to get to the food source and there are only short windows of opportunity when this can occur, namely after a period of good rainfall, which occurs sporadically and is unpredictable. Burrow excavation using (perpetually growing) incisors causes the teeth to wear down, but with up to 30 members in a colony, food is reached quicker, reducing the wear on their teeth. Food is then shared among the colony members and excess items are stored in a carefully crafted pantry.

The very specific roles of animals within social colonies add to the interest of mole-rats. Colonies have distinct divisions of labour that are based on reproductive abilities. Exactly why some members of a colony are able to reproduce and others are not remains to be confirmed, but Prof Bennett has found it particularly captivating to try to figure out how the colony's queen is able to suppress the reproduction of the working non-breeders. By studying the hormone levels in the different animals, Prof Bennett is trying to unravel where and how suppression takes place. He is currently investigating the different hormone concentrations released from different regions of the brain in order to provide a possible explanation of how the queen inhibits reproduction in some members.

What make these mammals even more complex are the vast differences not only between solitary and social species, but between the different social species. In naked mole-rats, found in parts of East Africa, for instance, both non-reproductive males and females are physiologically suppressed. In the Damaraland mole-rat, found across parts of southern Africa, a completely different pattern is observed. Only the non-breeding females are physiologically suppressed. The non-breeding animals can be divided into frequent workers (those animals that perform large amounts of burrow maintenance) and infrequent workers (those that perform relatively little work).

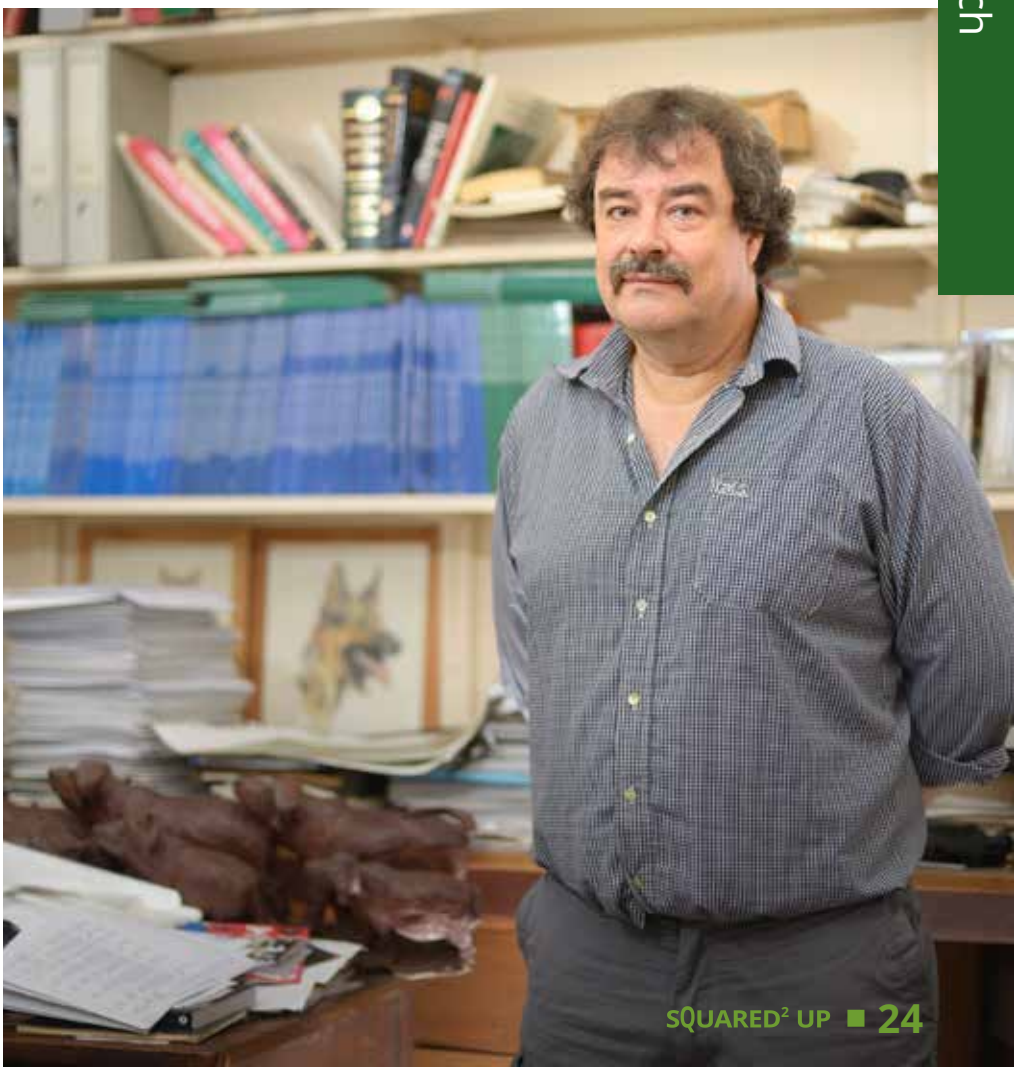
By using epigenetics (the study of chemical reactions and the factors that influence them) Prof Bennett is collaborating with a research team from Cambridge University to determine how these divisions occur. Results have already shown that there are different metabolic rates between the two groups of animals in a colony, for example between the frequent workers and the infrequent workers. In 2006, Bennett and his research team published their findings in *Nature*, a distinguished international weekly journal of science. The article precipitated a large amount of research into and debate on this area of study and has resulted in a number of scientists becoming eager to solve this evolutionary puzzle of why some animals work unselfishly for the good of the colony.

Solitary species display different reproductive patterns entirely. These mole-rats are described as highly xenophobic. They do, however, seem to believe in courtship before mating takes place. Using seismic communication, the male will signal his intention to mate and make his way to the female by drumming sounds to let her know he means no malice. As soon as they have mated, though, the female tires of him and chases him from her area. Babies stay with their mothers for about 45 days, after which they disperse along new little tunnels, setting up burrow systems of their own.

Prof Bennett conducts his research in the field through a mark and recapture system, capturing mole-rats every six months over a number of years and monitoring the changes in colony composition. He also studies them in the laboratory, measuring hormone concentrations and investigating immunohistochemical binding in different parts of the brain. He also collected genetic material from over 2 500 animals over a 13 year period from one population of mole-rats in Namibia and established that the breeding pair is genetically unrelated. He and colleagues in London have shown that colonies may possess litters exhibiting multiple paternity, but of which only one father remains in the colony. This suggests that some males enter the colony transiently, mate with the queen and then exit before they are detected and sent packing. Bennett has contributed significantly to knowledge of the sociality of and reproductive suppression in these fascinating creatures and is recognised as one of the leading experts in his field.

While much is still being discovered about these spellbinding little animals, one thing is certain, the soil is much richer in elements like calcium, nitrogen and phosphorus where mole-rats occur. This results in more diverse plant life. Mole-rats are thus eco-engineers and vital to a healthy and thriving environment.

Prof Nigel Bennett



Learning from life in the waters

Credit: Nico de Bruyn

Imagine an island that teems with animal life, far removed from any human encroachment. A place like this does exist: it is called Marion Island and forms part of the Prince Edward islands archipelago, situated between South Africa and Antarctica. In terms of South African legislation, the archipelago is administered by South Africa and is regarded as a 'Special Nature Reserve', possessing the highest level of protective status and set aside solely for the purposes of biodiversity conservation and research. Marion Island is home to unique flora and fauna and this uninterrupted marine habitat is a haven for breeding seals, seabirds and a resident population of killer whales.

The Mammal Research Institute (MRI) in the Faculty of Natural and Agricultural Sciences is in the privileged position of being able to conduct research on the island, acquiring valuable new information about marine mammals and environmental changes in the region. The MRI's Marion Island Marine Mammal Programme (MIMMP) has been doing marine research there for more than 30 years and has documented fascinating findings. Their primary research is aimed at understanding the ecology of seal and killer whale populations at the island. A current research focus is on how these populations interact with the changing environment. This group has published internationally significant findings related to species biology, population demography, foraging, movement and ecosystem interaction. Additional serendipitous observations have been bizarre, such as seals trying to mate with penguins, while other reports included mass die-offs of fur seals, and sightings of vagrant/rare seal species at the island.

Marion Island is the terrestrial base of three species of seals, namely the southern elephant seal, *Mirounga leonina* (SES), the sub-Antarctic fur seal, *Arctocephalus tropicalis* (SAFS), and the Antarctic fur seal, *Arctocephalus gazella* (AFS). The MIMMP is made up of a capable core team of researchers who perform tasks associated with the three seal species on the island, as well as the resident killer whales *Orcinus orca* (KW).

While work with killer whales is shore-based because of their near-shore visitation, and is therefore inherently not invasive, the UP team has devised ways to gather valuable information from seals without resorting to invasive means. Measuring the body mass of animals can provide useful information about the health of the animal and its environment, but can be difficult to measure without upsetting the animals. Taking advantage of progressive technology, The MIMMP's Principal Investigator, Dr Nico de Bruyn devised a less-invasive method to determine the weight of elephant seals, using photogrammetry. The process enables Dr De Bruyn to calculate the animals' weight, using measurements obtained from photographs. The size and weight of animals are important variables in determining population processes, ecosystem changes, such as food availability, as well as survival and reproduction.

Although thorough research on the breeding and moulting periods of seals is done on Marion Island, southern elephant seals spend up to ten months of their annual cycles at sea. For several years, selected seals have been fitted with non-invasive sensors, sending environmental information from remote and icy locations. Putting tracking devices on marine animals like elephant seals, provides researchers with insight into their foraging migrations and diving behaviour during these migrations. Because seals are able to go to places in the ocean not accessible to man (elephant seals can reach depths of 2 000 metres) they are able to collect information

that would otherwise not be available. Dr De Bruyn says the devices have also revealed differences in the seals' diving and movement behaviour, based on gender and age. Researchers now know that their foraging and diving are strongly related to oceanographic eddies (fluid dynamics), water temperature and primary productivity.

The MIMMP has deployed over 150 satellite-linked devices over the past 15 years and, thanks to this technology, research results can be shared with the international research community, in order for better understanding and research developments to occur. The international collaborative, Marine Mammals Exploring the Oceans Pole to Pole (MEOP), launched a data portal at the beginning of June 2015 that serves as a platform for learning more about seals' foraging behaviour and migration patterns, as well as other comprehensive and valuable oceanographic data. UP's MIMMP plays an integral role in MEOP and their data is shared widely among researchers across the globe.

The MIMMP's work does more than merely provide a better understanding of marine mammals. As Dr De Bruyn notes 'This is just a piece of the bigger puzzle.' Sub-Antarctic islands, such as Marion Island, are sensitive to change, because of their relatively simple ecosystems. These islands are also in a part of the world that is experiencing rapid climate change. Marion Island researchers have observed a decrease in rainfall and an increase in wind speed and frequency. Dr De Bruyn relates the findings of Marion Island researchers that these factors, together with an increase in the number of sunshine days, result in changing vegetation patterns, which affects the ecosystem of the area.

The work of the MIMMP enhances our understanding of marine top predator populations, their relationships to the environment and other species, and ultimately, how changes in their environment affect us as human beings.

Dr Nico de Bruyn

Getting to know Africa's 'little elephants'

Credit to: Heike Lutermann

Despite the great advancements made by humankind through research, which is an exclusively human ability, nature still holds many unexplored secrets. Researchers in the Department of Zoology and Entomology are seizing the opportunity to enrich the pool of knowledge and to answer some of the questions that have long remained unanswered.

In this particular case the questions relate to the elephant shrew, also known as the sengi. Dr Heike Lutermann of the Department has been studying this small mammal, which is endemic to Africa, for several years. Large populations of a number of sengi species are found across most of the country.

Over the past few years, several new species have been identified, and Dr Lutermann suspects that more will be discovered as her research progresses. The elephant shrew is a fascinating small mammal, despite its confusing name. Its closest relatives are dassies (hyrax), elephants, dugongs and golden moles. This strange classification is based on the genetic relationship among these animals, which are among Africa's most ancient surviving mammals. Elephant shrews are thought to be monogamous, which is rather strange, since less than 3% of mammals subscribe to this way of life. Their monogamy is even stranger as they rarely seem to interact or touch. A male and female may share a home range, but they seldom move around together.

Their morphology is also very interesting: they have very long hind legs and a tongue that is almost the same length as their legs. Studies have shown that proportionate to size, sengis are in fact faster than cheetahs! Babies are born fully furred with eyes that are wide open and they are fully mobile almost immediately after birth. They grow very quickly and are weaned in less than a month. Dr Lutermann believes that the young are born fully furred because elephant shrews live among taller grasses and do not have nests in which to shelter their young. Depending on the species, their weight can range from 45 grams to two kilograms.

Sengis living in the wild appear to have very specific trail systems and are very particular about the environment within that system. If there is an intruder, for instance another sengi, or even a twig or rock

that causes an obstruction, they will do everything in their power to remove it. Maintaining the trail system is a duty they take very seriously. If one knows what to look for, these trail systems are clear to see, especially in the case of grassland species.

The physiology of these little animals is fascinating and they can lower their body temperature substantially to conserve energy. When they need to increase their body temperature, they lie in the sun, in order not to expend energy unnecessarily. Although they are considered to be insectivores, Dr Lutermann's dietary evaluation has proved that they are happy to try just about anything – at least once. Some of her colleagues have even discovered that sengis have a sweet tooth and enjoy the nectar of certain plants, which means that they also play an important role as pollinators.

Dr Lutermann and her research team have successfully established a thorough baseline for this ancient small mammal and are now ready for more detailed and exciting research. Throughout her research career, Dr Lutermann had a specific interest in parasites, and apart from the fact that they are ridiculously cute, what originally attracted her to sengis was the fact that they were covered in ticks. A small rock elephant shrew that weighs about 45 grams can easily have more than 300 ticks hiding in its fur!

Ticks go through three stages in their life cycle, namely the larval, nymph and adult stages. Adult ticks are found on livestock, and if one considers the economic value of livestock, it seems only natural that much research has been done on adult ticks, while very little has been done on the hosts of immature ticks. Many small mammals harbour ticks that, in their adult stage, have a negative impact on the livestock economy. Furthermore, ticks are vectors of a large number of diseases that affect both livestock and humans.

This, according to Dr Lutermann, explains why it is so important to understand the full life cycle of ticks. She is not only interested in the relationship between parasite and host, but also in the factors that drive the dynamics between them. She is currently looking at seasonal dynamics and environmental factors, as well as the differences between animals and why some animals and individuals of the same species attract more parasites than others.

Results obtained by this research team suggest that by targeting one specific parasite, unexpected and even unwanted effects may result. After treating wild sengis with Frontline™, the topical product that targets ticks and fleas, researchers found that although it effectively got rid of the ticks, the number of mites increased dramatically. Further tests will have to be conducted in this very complex area, but the preliminary evidence suggests that a holistic approach is essential in combating parasites.

While sengis may be small and relatively unknown animals, they are certainly not insignificant contributors to a healthy ecosystem. Dr Lutermann's research promises not only to offer greater insight into a species that has not been thoroughly studied, but also to improve recommendations regarding parasite control. It has the potential to provide more cost effective alternatives to the livestock farmer and to reduce zoonosis and other tick-borne diseases.

Credit to: Heike Lutermann

BioBlitz sets out to record 1 000 species in 48 hours

A team consisting of amateur naturalists and students from the Department of Zoology and Entomology at the University of Pretoria (UP) organised the 2015 BioBlitz in the Limpopo mining town of Lephalale (Ellisras) during March. The team was hopeful that they will record at least 1 000 species in the 48-hour period. A number of staff members, students and associates of the Department donated their time towards the event, and several experts (amateurs and professionals) from across the country assisted with collecting and identifying specimens.

A BioBlitz is an intense biodiversity survey that attempts to record all living species within a designated area over a predetermined time period. The primary objectives of such a survey are to form an idea of the wealth of species in a particular area and to make the local community aware of the diversity around them. The presence of endangered species is also being noted.

The survey involved the gathering of data regarding the presence of as many different species in as many different taxa (organism groups) as possible. All the data was not available by the publication's deadline, yet the available data will prove useful to specialists and other persons in the field of conservation. One of the main reasons for organising the recent BioBlitz was to provide experts in various fields with an opportunity to learn more about other animal groups.

According to Nina Parry, an MSc student and one of the organisers of the event, a BioBlitz can be vitally important to someone who is studying a group of animals and who needs to understand their ecological interactions, as it provides information on how the presence of other animals may affect their presence, prevalence, overall distribution and behaviour. She further noted that while many researchers' knowledge of fields outside their own areas of specialisation may be limited, they are keen to learn more and can benefit from the information gained through a BioBlitz. Once the report has been compiled, the data will also be shared with the public and other interested parties.

The first BioBlitz, held in Lephalale in March 2014, was very successful and 619 species were recorded in the designated area. Considering that only nine people (six experts and three volunteers) participated in last year's exercise, Parry is hopeful that this year's bigger team will record at least 1 000 species in the 48-hour period. This year's team includes more than 20 experts from across the country, six of which are from UP. UP masters and PhD students in the team are Nina Parry (a Diptera specialist), Arne Verhoef (a general entomology specialist) Deon Bakkes (a Neuroptera specialist) and Dina Fagir (a small mammals and parasite specialist). Other members representing the Department include Christiaan Deschodt, who will be involved in identifying the scarab beetles that will be collected, Prof Mervyn Mansell, who will assist with the identification of lacewings and flies, and Ian Engelbrecht, a PhD candidate, whose field of expertise is the identification of scorpions.

The 2015 BioBlitz was held on the same farm as last year's event. This farm is situated in an extremely species-rich, but relatively poorly surveyed area. Parry, who was positive that this year's BioBlitz would successfully record the species of the area, said that another area that has not been well studied will probably be selected for the 2016 event so that the data collected can have greater value. This year's Bioblitz has aroused the interest of the producers of the television programme *50/50*, who also sent a crew to report on the activities.

Several experts from across the country assisted with collecting and identifying specimens in the 2015 BioBlitz.

Busy recording some species...

Bill Gates funding assists PhD students in improving agricultural policy in Africa

One of the key outcomes of the multimillion dollar grant from the Bill and Melinda Gates Foundation to the Department of Agricultural Economics, Extension and Rural Development in 2012 was to train more PhD students in agricultural economics to assist with better analysis and research for better policy making in Africa.

It is commonly argued that some of the main reasons for the poor performance of African agriculture are poorly crafted policies and poor infrastructure. Poor policies are often the result of poor data, poor research and therefore poor design. The PhD students funded by this grant are currently all working on topics (listed below) to improve our understanding of certain key dimensions of the agricultural sector in South Africa and other countries in Africa. A total of eight PhD students are currently funded by this grant. Two of these students are likely to submit their theses for examination by the end of this year. Three of the students are South Africans, two are Zimbabweans, two are Swazis and one student a Kenyan.

Danie Jordaan Topic: Agribusiness value chain risk, fragility and coordination strategies: Case studies of South African lamb, pear and mohair value chains.

Melissa van der Merwe Topic: Agent behaviour, governance mechanisms and incentives in the South African lamb/mutton supply chain

Deon Scheepers Topic: A crop revenue insurance product for the South African agricultural industry.

Charity Nhemachena Topic: Biological innovation in South African agriculture: A study of wheat varietal change, 1950-2012.

Colleta Gandidzanwa Topic: The changing nature and quality of physical capital inputs in South African agriculture.

Raphael Gitau Kanyingi Topic: Maize production, marketing and the impact on the welfare of the rural households in Kenya.

Linda Mahlalela Topic: The economics of wetland conservation and management in Swaziland.

Thabo Sacolo Topic: Stochastic dynamic optimization and farm investment decision in South African agriculture.

Seven of the eight students sponsored by the Gates Foundation grants are pictured here with Prof Kirsten (registration dates in brackets). Front from left: Charity Nhmechena (2012), Linda Mahlela (2015), Raphale Gitau (2014) and Colleta Gandidzanwa (2012). Back from left: Melissa van der Merwe (2014), Deon Scheepers (2014), Danie Jordaan (2013) and Prof Johann Kirsten, Head of the Department of Agricultural Economics, Extension and Rural Development. Absent: Thabo Sacolo (2014).

Changing the way South Africans view potatoes

Researchers at the University of Pretoria have been commissioned by Potatoes South Africa to assist in research studies to change the way South Africans view their potatoes.

Since 2006, Potatoes South Africa (PSA) has supported consumer-specific postgraduate research at the University of Pretoria. The results from previous studies have assisted in the development of the South African potato classification system which was implemented in 2010 by PSA to class different cultivars into groups based on their cooking qualities. These three classes of potatoes, namely waxy, floury and waxy/floury have been used by the industry as a valuable tool to communicate the suitability of the potato for specific recipes between producers and retailers.

Now, PSA is supporting further research to apply the classification system to satisfy the needs of our unique consumer market. Carmen van Niekerk, an MSc Nutrition graduate under the supervision of Prof Hettie Schönfeldt at the Institute of Food, Nutrition and Well-being is investigating how consumers would describe their ideal potato, fit for specific dishes. The information will be used within consumer education and marketing campaigns to increase consumer satisfaction.

As part of the research, the perceptions of low to middle socio-economic consumers (considered a very important market segment contributing notably to annual fresh produce sales) were investigated through focus group discussions and target-specific interactive research methodologies. A variety of interesting lessons were learnt, including that culture plays a very important role in this consumer-segment's potato-eating culture. Observations made include that textural and sensory qualities or cues might make little contribution to their purchasing decisions, while tuber size and colour are two very important factors when they choose their potato for tonight's meal. The perceptions of higher socio-economic groups will be the next to be investigated.

Additional research commissioned by PSA and being performed under the supervision of Prof Schönfeldt includes identifying the perfect potato to make uniquely South African "slap chips", and developing a rapid assessment method to determine the classification of new cultivars as they emerge onto the consumer market.

A consumer discussion session where consumers' opinions on potatoes were discussed

Examples of potatoes

Research

FABI researchers unravel *Eucalyptus* tree genomics and biology

Prof Zander Myburg

Research

Researchers and postgraduate students from the Forestry and Agricultural Biotechnology Institute (FABI) and the Genomics Research Institute (GRI) at the University of Pretoria contributed to eight articles in a special issue of the journal, *New Phytologist*. These articles cover diverse topics, such as genome diversity, comparative genomics, carbon allocation, protein evolution, floral development and woody biomass production in *Eucalyptus* trees.

New Phytologist published a special online issue [http://onlinelibrary.wiley.com/doi/10.1111/nph.2015.206.issue-4/issuetoc], celebrating the completion of the *Eucalyptus* genome, the results of which were published in the prestigious journal, *Nature,* in June 2014. The special issue of *New Phytologist* (June 2015) contains genome companion papers, which further unfold into the unique biology of *Eucalyptus* trees, gained from the analysis of the genome.

Prof Zander Myburg, Prof Dave Berger, Dr Eshchar Mizrachi, Dr Steven Hussey from FABI and GRI and their postgraduate students contributed to the eight articles (listed below). This set of papers represents a significant advance in the understanding of the biology of the most widely planted hardwood fibre crop in the world. Together with the completed genome *Populus*, this genome resource will serve as a model and reference for the study of fast-growing woody plants that are used as renewable feed stocks for a growing number of bio-based products, such as timber, pulp, paper, cellulose, textiles, pharmaceuticals and bioenergy.

Strauss SH, Myburg AA. (2015) **Plant scientists celebrate new woody plant genome**. *New Phytologist* **206**(4):1185-1187. 10.1111/nph.13053

Carocha V, Soler M, Hefer CA, Cassan-Wang H, Fevereiro P, Myburg AA, Paiva JAP, Grima-Pettenati J. (2015) **Genome-wide analysis of the lignin toolbox of *Eucalyptus grandis***. *New Phytologist* **206**(4):1297-1313. 10.1111/nph.13313

Kersting AR, Mizrachi E, Bornberg-Bauer E, Myburg AA. (2014) **Protein domain evolution is associated with reproductive diversification and adaptive radiation in the genus *Eucalyptus***. *New Phytologist* **204**(6):1328-1336. 10.1111/nph.13211

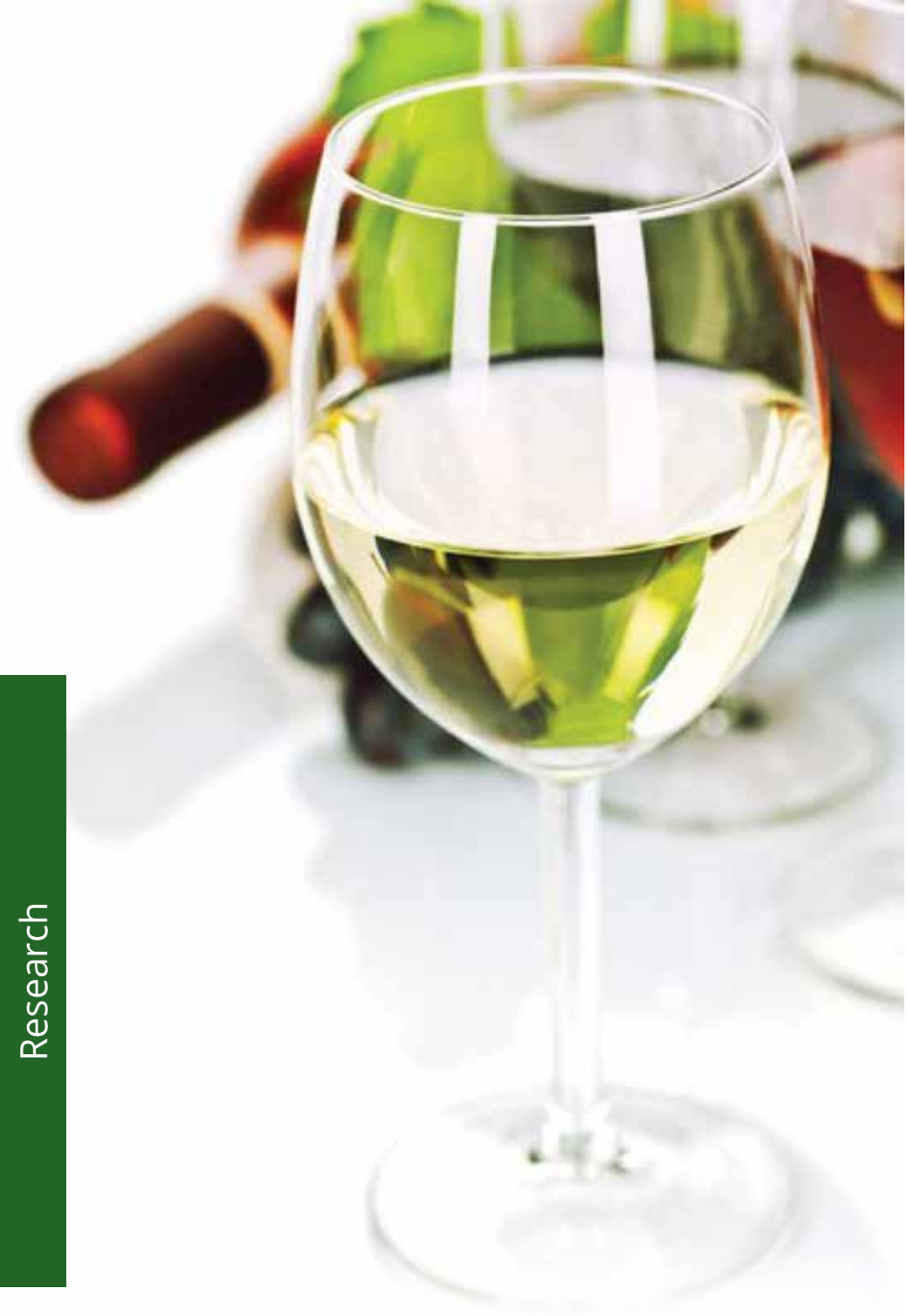
Hussey SG, Saïdi MN, Hefer C, Myburg AA, Grima-Pettenati J. (2014) **Structural, evolutionary and functional analysis of the NAC domain protein family in *Eucalyptus***. *New Phytologist* **206**(4):1337-1350. 10.1111/nph.13139

Mizrachi E, Maloney VJ, Silberbauer J, Hefer CA, Berger DK, Mansfield SD, Myburg AA. (2014) **Investigating the molecular underpinnings underlying morphology and changes in carbon partitioning during tension wood formation in *Eucalyptus***. *New Phytologist* **204**(6):1351-1363. 10.1111/nph.13152

Soler M, Myburg AA, Paiva JAP, Hefer CA, Savelli B, Clemente HS, Cassan-Wang H, Carocha V, Camargo ELO, Grima-Pettenati J. (2015) **The Eucalyptus grandis R2R3-MYB transcription factor family: evidence for woody growth-related evolution and function**. *New Phytologist* **206**(4):1364–1377. 10.1111/nph.13039

Hudson CJ, Freeman JS, Myburg AA, Potts BM, Vaillancourt RE. (2015) **Genomic patterns of species diversity and divergence in *Eucalyptus***. *New Phytologist* **204**(6):1378-1390. 10.1111/nph.13316

Hefer CA, Mizrachi E, Myburg AA, Douglas CJ, Mansfield SD. (2015) **Comparative interrogation of the developing xylem transcriptomes of two wood-forming species: *Populus trichocarpa* and *Eucalyptus grandis***. *New Phytologist* **204**(6):1391-1405. 10.1111/nph.13277



Research by UP plant virologist enhances profitability and quality of wine

Every year around autumn people marvel at the sight of acres and acres of bright red vineyards decorating the landscape of the Cape Wine lands. What most of them don't know, however, is that the red coloration of the leaves has nothing to do with autumn, but is in fact a symptom of a disease that has plagued grapevines and winemakers for centuries.

Grapevine leaf-roll disease affects vineyards globally, decreases the yield and quality of affected grapevines significantly, and has long been considered a devastating but insurmountable recurring hindrance.

Prof Gerhard Pietersen, a plant virologist from the University of Pretoria's Forestry and Agricultural Biotechnology Institute (FABI), with a joint appointment at the ARC-Plant Protection Research Institute (ARC-PPRI), found a solution to this problem.

"Because it becomes most visible during autumn, and because the virus has been with us since the very beginning of agriculture, people have simply come to accept the red grapevines and vineyards as a consequence of the changing seasons," says Prof Pietersen.

His research on grapevine leaf-roll disease is quite literally changing the face of the world's grape and wine industries. "The reality is that leaf-roll disease affects every aspect of a vineyard, causing lower yields, weaker grape colours and flavours. It also causes grapes to ripen unevenly, making it difficult for winemakers to harvest at just the right time."

Prof Pietersen says the fact that he functions as an academic outside of the wine industry itself was exactly what gave him an advantage, because he was able to do an objective epidemiological study of the disease; he didn't look at it as a wine problem, but rather as a plant virus.

"What we saw was that grapevine leaf-roll disease actually spreads very slowly, compared to other plant viruses, which makes it possible to control the disease simply by using proper prevention and management strategies," says Prof Pietersen.

"We were able to determine that if you notice a sick plant in a healthy vineyard, removing only that plant and treating the surrounding plants with a systemic insecticide is sufficient to prevent any further spread. By being vigilant, leaf roll can be stopped long before it infects a whole vineyard."

Thanks largely to Prof Pietersen's method, South Africa has become the first country able to produce wine from totally disease-free vineyards.

The first wine farm that took full advantage of Prof Pietersen's research is the Vergelegen Wine Estate in Somerset West. Because of the vast improvement in the quality of their grape yields, some of their wines now sell for around R1 000 a bottle.

His research has also already attracted tremendous interest from abroad. For the last couple of years the New Zealand Wine Industry has flown Prof Pietersen in for regular consultations in that country. As a result, an appellation within New Zealand's Hawks Bay wine district is almost leaf-roll-free. Prof Pietersen has also been invited for talks in Israel's Golan Heights wine district and in Napa Valley in the United Stated of America.

For his research efforts in helping to control and potentially eradicate grapevine leaf-roll disease, Prof Pietersen was recently recognised as one of the University's Academic Achievers during a gala event. He is rated as a grade C1 researcher by the National Research Foundation and was recently inducted as a Fellow of the South African Society for Plant Pathology.

His research grading also recognised Prof Pietersen's efforts in developing a new technique, using next generation DNA sequencing, to better classify populations of different strains of the Tristeza virus (which affects citrus trees). This makes it easier to identify the correct mild strains with which to inoculate trees in specific areas.

Tragically however, Prof Pietersen says South African wine farmers have been far slower than their New Zealand counterparts in adopting methods to control leaf-roll disease in their vineyards. "I think it is because the South African wine industry is old and traditional. There is a bit of a resistance to change and to the application of new methods. Which is a shame, because we have shown that these methods work and that vineyards can be completely free from this disease," says Prof Pietersen.

"The sooner more wine farmers start employing these methods, the sooner we can all enjoy even better wine."

Prof Gerhard Pietersen

Wine leaves with Grapevine leaf-roll disease

An example of vineyards affected by Grapevine leaf-roll disease – the red coloration of the leaves is in fact a symptom of a disease

Have your (low GI) cake and eat it

Research

Food with a low glycaemic index (GI) is generally considered to be healthier than food with a high GI index, because it is digested at a slower rate, thus providing a sustained energy release.

However, many people prefer high GI food, such as cake, because it simply tastes better.

Research by Prof Naushad Emmambux, associate professor at the Department of Food Science, and his colleagues has shown that it is possible to modify high GI starch, using fatty acids so that it becomes a low GI starch. This means that it should soon be possible to make low GI foods that taste as good as high GI foods.

'Using chemicals, starch can be modified in various ways, but nowadays consumers prefer "clean labelling", meaning that they don't want to use starches that have been modified by using synthetic chemicals,' says Prof Emmambux.

What we have demonstrated in the laboratory is that you can use fatty acids, which are food-friendly chemicals that qualify for clean labelling, to modify various starches that have the potential to lower their GI.'

Starch contains two molecules, namely amylose and amylopectin. Prof Emmambux's team showed that when certain starches are cooked in water, together with fatty acids, the amylose reacts with the fatty acids to produce amylose-lipid complexes. The presence of these complexes changes the functionality of the starch.

'This can potentially result in four applications, the first of which is that the starch becomes more slowly digestible by enzymes – making it low GI. Secondly, it makes the starch non-gelling, which means it becomes more stable when it is frozen. If you were to put porridge made of the modified starch into the fridge, it wouldn't become hard like normal porridge, but would remain soft.

'Thirdly, the modified starch can be used as a fat replacement, for instance in mayonnaise. Finally, we also found that the amylose-lipid complexes, which are digestible and biodegradable, form at the nanoscale, creating an edible food-based nanomaterial. We believe this could, for instance, in future improve the properties of bioplastic films used in food packaging.'

Prof Emmambux demonstrated this process in the laboratory, using three different types of cereal starch (maize, wheat and tef). His team has not done any *in vivo* studies, so the process is yet to be tested in animals and people. However, he is confident that the technology has a lot of potential.

'It should be possible to make low GI cake, using this process, and the other applications are also very promising. We are already working with the local starch industry to look at various options for commercialisation.'

Prof Emmambux is also working on finding food-friendly ways to modify amylopectin molecules in starch to make it similarly less digestible, as well as to improve the stability and release of vitamins by protecting them from the harsh environment of the stomach through encapsulation.

Prof Naushad Emmambux

The glycaemic index (GI) of a particular food type indicates that food type's effect on a person's glucose (also called blood sugar) level. Glucose is one of the body's main sources of energy. Low GI foods are foods with a low glycaemic index, which have a slower rate of digestion and absorption than higher GI foods.

Dr Yolanda Pretorius

Learning from the intelligence and emotion of elephants

Research

Dr Yolanda Pretorius of the Centre for Wildlife Management in the Faculty of Natural and Agricultural Sciences has studied elephants for many years. She is an elephant specialist and the ideal person to consult with regard to elephant management.

According to Dr Pretorius, what she appreciates most about elephants is their ability to show exactly what they feel. Unless they have spent too much time with humans, they seldom lie. She said that elephants always tell you how they feel and there are many signs one can observe in this regard

Earlier this year, two bull elephants from Botswana crossed the Limpopo border into South Africa and trekked for four days, moving south to the Mokolo Dam at Lephalale before turning around and following exactly the same route back into Botswana. This was a particularly rare event – the last time that such an incident occurred, was more than 70 years ago! While many farmers tend to resort to drastic measures to rid their land of roaming animals, particularly ones as large as these two, Dr Pretorius managed to convince those involved that this was not only an exceptional occurrence, but also an important opportunity to learn more about the environment, as elephants are undoubtedly highly intelligent and can convey vital information.

Dr Pretorius is a co-founder of the Elephant Specialist Advisory Group (ESAG), which offers guidance on how to deal with varying issues relating to elephants. After a farmer had contacted her about the sighting of these elephant bulls on her farm, Dr Pretorius reported that it had been most uplifting to see how the community responded to this incident, with farmers cooperating with nature conservation officers to make sure that the animals did not land in trouble by entering a village or maize field. According to her, the nicest thing about this whole experience was that, despite the fact that you so often hear about farmers just wanting to shoot an elephant because it would be a big notch on their list of hunting achievements, they managed to convince everyone involved that this was a rare and very special event.

While further investigation is underway to understand why these bulls wandered away from their natural environment, Dr Pretorius suspects that their purpose was to find better forage after the dry season in Botswana. Dr Pretorius also believes that the fact that Botswana recently banned all forms of hunting within its borders, may result in an increase in animal movement in the future, as the removal of the virtual borders, determined by hunting concessions, could cause animals to feel safer when exploring larger territories. This expectation of increased movement led Pretorius to start setting up a protocol to guide farmers in order to ensure that elephants are not harmed unnecessarily when they do cross borders. She is also writing an article on suitable habitats for elephants in South Africa.

The incident involving these two elephant bulls is a stark reminder of the difference between South Africa and Botswana. South Africa promotes the ownership of game, which warrants the erection of fences. While this may have some advantages, the fact remains that animals are kept in unnatural conditions. Nature's intention has never been to keep animals confined, especially not large ones like elephants. Due to the financial benefits of keeping special game, such as the golden wildebeest and black impala, a game farm is often viewed as a business opportunity rather than an opportunity to practice conservation. With an estimated 9 000 game farms in the country, so much attention is given to special game that all other animal life often occupies a secondary position.

A further problem is that many of these farms do not have perennial rivers, which makes the availability of water an issue. The fact that animals cannot migrate puts pressure on the vegetation, resulting in the degradation of habitat. Wildlife and farm management is then forced to find ways to accommodate animals and have to resort to frequent monitoring and food supplementation. In open systems, such as that in Botswana, interference becomes unnecessary, since nature knows best.

Dr Pretorius will continue studying the mechanisms of animal migration once she has received funding from the National Research Foundation (NRF). Her research will focus on how the erection of fences has disrupted the movement of animals and inhibited their self-facilitating abilities. Factors such as the lack of perennial rivers and the competition for space and food are detrimental to a healthy environment and have a negative impact on the ecosystem as a whole. Through her work Dr Pretorius hopes to highlight the benefits that freer movement can offer, not only to wildlife, but also to farmers.

How Soil Science can contribute to set land speed record

What do University of Pretoria (UP) Soil Science students and the BLOODHOUND supersonic car (SSC) have in common? Well, among others, a serious interest in the flat surface of the earth.

Eight BSc Soil Science honours students from the Department of Plant Production and Soil Science are currently generating specific soil mineralogy, physics and chemistry data for Hakskeen Pan in the Mier district in the Northern Cape.

This project, titled the Hakskeen Pan Challenge, is conducted under the guidance of Dr Johan van der Waals (Terra Soil Science and part-time lecturer in the Department of Plant Production and Soil Science) and Mr Chris de Jager, for the purpose of providing relevant data to the BLOODHOUND SSC project, as well as for research and educational purposes.

The BLOODHOUND SSC team aims to set a land speed record of 1 609 km/h at Hakskeen Pan. Dr Van der Waals said: "In order to attain such a speed, a very specific track is required. This track must be long enough, flat enough and hard enough to allow an 8 ton vehicle, running on solid aluminium wheels, to safely accelerate to such a speed, as well as to stop within the track perimeter."

The BLOODHOUND SSC project has, as its main aim, an education drive that focuses on the stimulation of interest in science, technology, engineering and mathematics (STEM) among school learners. As this record attempt takes place within a very specific, but poorly studied biophysical context, the Hakskeen Pan Challenge aims to generate very relevant and novel information on the soil conditions of the track. The information will be communicated to the BLOODHOUND SSC team, as well as to schools (UP with Science), and through popular and peer reviewed publications. One of the first aims is to elucidate the chemical, mineralogical and physical parameter interaction that yield a track that varies with less than 20 cm elevation over a distance 20 km, from one side of the pan to the other.

More about the BLOODHOUND SSC

The BLOODHOUND SSC is designed to go faster than the speed of sound. It is jet and rocket-powered and has a slender body, approximately 13,4 m in length, with two front wheels within the body and two rear wheels mounted externally within wheel fairings. It weighs 7,5 tonnes and the engines produce more than 135 000 horsepower, which is more than six times the combined horsepower of all the Formula One cars on a starting grid! The BLOODHOUND SSC represents a mix of car and aircraft technology: the front half consists of a carbon-fibre monocoque, which it has in common with a racing car, and the back half consists of a metallic framework and panels, as seen in aircraft. The car will be under the full control of its driver, Andy Green, when he attempts to set a new world land speed record in the BLOODHOUND SSC later this year. He is also a fighter pilot in the Royal Air Force.

Hakskeen Pan

Flat earth

Bloodhound supersonic car

Research

Satisfying Africa's sensory experience

Research

Have you ever wondered why people have a preference for one food more than another? The obvious answer is the taste, but, if you think about it, the texture, sound, smell and appearance of food also play a fundamental role in our food choices. Together with taste, these four elements are known as the sensory properties of food.

Prof Riëtte de Kock of the Department of Food Science and the Institute of Food, Nutrition and Well-being (IFNuW), has been involved in Sensory Food Science research since 1990. Over the years, Prof De Kock's research has focussed on the food security issues facing sub-Saharan Africa, by applying sensory science to indigenous and locally relevant food sources, including cereals, legumes and animal types that are adapted to the African climate and that are potentially nutritious and affordable.

One nutritional challenge facing developing Africa is urbanisation. On the one hand, this results in an affluent urban lifestyle, where people move away from traditional staples to variants that offer a more satisfying sensory experience. Unfortunately, such dietary changes have the tendency to cause lifestyle diseases, ranging from diabetes and cardiovascular disease to hypertension and obesity. On the other side of the spectrum, the diets of many poor urban households consist mainly of cereal-based porridges, which lack proteins and essential micronutrients.

Prof Riëtte de Kock

Prof De Kock's team responded to this problem by developing modern foods, based on traditional African crops that are highly nutritious and locally available. A challenge the team faced, however, was that, compared to modern alternatives, traditional African food products generally do not offer the same satisfactory sensory experience as modern foods do. African green leafy vegetables, for example, are rich in vitamins and minerals that are essential for growth and development, but often have a bitter taste. A well-growing food staple such as wholegrain sorghum is also nutritious but, because it tends to have a strong flavour and gritty texture, it is often substituted by more refined alternatives. Unfortunately, research shows that if food is not satisfactory in terms of its sensory properties, it will not be consumed, no matter how nutritionally beneficial it is. Food products therefore need to be not only adequately nutritious, but also appealing and appetising. To improve the sensory experiences of foods from these traditional crops, Prof De Kock and her colleagues are using modern food technologies, such as extrusion cooking and micronisation to develop food products based on traditional foods, but that cater for modern tastes. For example, the team has developed new, composited cereal-legume products that have a higher protein content, such as porridges and snacks.

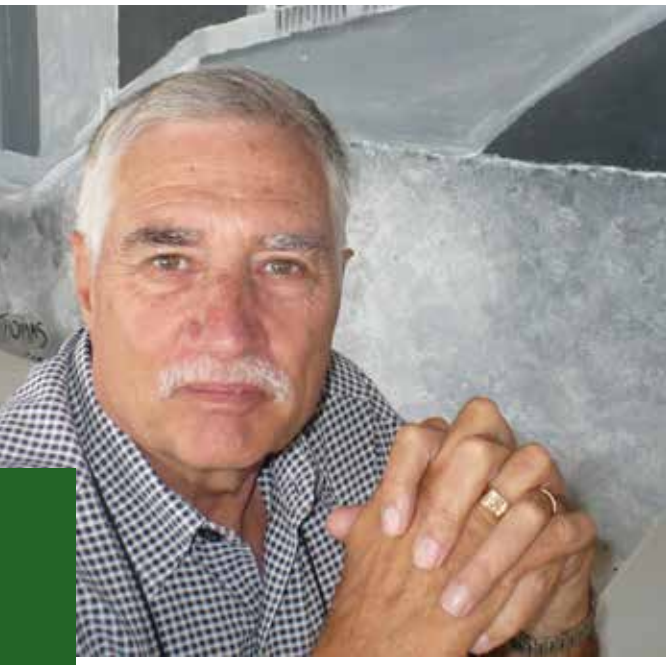
However, Prof De Kock remarks: 'Very little sound scientific documentation on the taste properties of some of the traditional African food products is available.' Therefore, in order to create modern versions of these traditional foods, researchers have to spend time in rural communities, accessing traditional recipes from the 'gogos' of the communities. The team also utilises facilities at UP's Mamelodi Campus to reach a larger target group of consumers.

The vision of the UP team is multi-layered: Firstly, it aims to improve the diets of African communities. Secondly, research focuses on developing ready-to-eat products and products that do not require much cooking time, in order to save the consumer time and the associated costs of high energy usage. Furthermore, by developing modern foods, made from locally relevant ingredients, the demand for produce from small-scale farmers will increase, which consequently empowers and benefits the farmers. This research team is certainly finding viable solutions to both the food and poverty challenges facing Africa.

Prof De Kock and her sensory evaluation research team also assist leading food companies in the development of food products. A special laboratory, where a group of trained and experienced sensory panellists evaluate food products, using standardised procedures, is a key part of the research. The Sensory Research Division at UP conducts contract research for the food industry, consults, and develops and presents short courses as part of Business Enterprises at UP (Pty Ltd.) (BE@UP).

Prof De Kock has a C2 NRF rating and also acts as supervisor for with several postgraduate students. She is also the author of numerous publications in international peer-reviewed journals, serves as the current Research Chair of the European Sensory Network (www.esn-network.com), and is a member of several internationally recognised bodies.

Mentorship is essential for successful land reform in South Africa



Dr Fanie Terblanche

"Effective mentoring of new farmers is a key factor in successful land reform. We cannot afford any more land reform failures." This is the opinion of an expert in the field of mentoring farmers," Dr Fanie Terblanche from the Department of Agricultural Economics, Extension and Rural Development.

"As food security is a serious concern worldwide and even more so in South Africa, we need successful and productive farmers who can positively contribute."

Dr Terblanche recently undertook research on successful land reform mentorship projects in South Africa. With the support of several role players 15 mentors and 21 new farmers involved in successful mentorship projects, have been identified. He visited and interviewed each mentor and each new farmer personally. The success stories that they shared, clearly indicated that mentoring of new farmers is a key factor in successful land reform.

One of the interesting findings of the research was that it took approximately three years before the project (farm) became financially successful, and in some cases even as long as five years.

"This confirms that sustainable farming as a business is not an easy road to travel and mentorship is not a quick fix solution. The development of a sustainable farming operation/business plan with the support of a mentorship programme is a long-term venture."

According to Dr Terblanche, the mentors and new farmers emphasised that no land reform project and mentorship programme can be successful without a viable and sustainable business plan (farm plan). "There is enough evidence of several land reform projects with mentorship programmes that have failed because of either no business plan or an unrealistic (non-feasible) business plan. Mentors and new farmers, in cooperation with other role players, together should develop the business plan. Both mentors and new farmers must have the same understanding of the business plan and develop a common vision with regard to the future of the farming enterprise."

"Furthermore, new farmers starting a new farming enterprise with unrealistic and non-feasible expectations, is doomed to fail. One can dream big, but should be realistic. The more sophisticated and intensive the enterprise, for instance greenhouse production, the more realistic one needs to be. Top, experienced and trained farmers in the greenhouse industry, claim that it took at least four to five years before they mastered greenhouse cultivation."

The research also proved that the availability of essential infrastructure and the necessary equipment is non-negotiable to manage a farm successfully. A dedicated and well cared for farm worker team is indispensable. Another important element in effective mentorship to take into account is that no farm can be operated and managed without financial support. A financial plan, which forms part of the business plan, is essential. Financial institutions (banks) need to support new farmers with loans/credit. Government grants need to be released on time and according to the business plan and not months or even years too late. "Dr Terblanche found that new farmers need to have access to markets for their products. A contract linked to a market is to some extent an insurance policy for success.

"In 85 per cent of programmes, mentorship programmes were initiated by either a new farmer or a mentor and not by an outside person or organisation. In only 15 per cent of cases, an organisation linked new farmers to their mentors."

Dr Terblanche concluded by saying that in the majority of the long-term mentorship projects, mentors and new farmers formed partnerships. "In some of the most successful projects, the mentor became a Trust member with shares in the farming enterprise. If the new farmer loses money, the mentor loses money. When there is a profit, they share it. The new farmer, however, remains responsible to manage the farm."

UP research shows leopard numbers are vulnerable

Mr Dave Powrie, Mr André Burger (Chief Operating Officer of Welgevonden) and Dr Lourens Swanepoel with a captured leopard.

A few years ago, Dr Lourens Swanepoel, under supervision of Prof Michael Somers and Dr Fredrik Dalerum of the Centre for Wildlife Management at UP, decided to look into the survival rates and causes of mortality of leopards in southern Africa, as part of his PhD. Before Dr Swanepoel's research, there was little science available regarding the viability of the species. The little data available stemmed from only two studies dating from the late 1970s and one during the late 2000s. Dr Swanepoel is now an Extraordinary Lecturer at the University and about to take up a lectureship at the University of Venda.

As Dr Swanepoel gathered information, one thing became depressingly more clear – leopard survival rates were under pressure, largely related to human activities. The objectives of his study included understanding why leopard survival rates were low and investigating existing wildlife management systems as possible reasons for such low survival rates. He soon realised that in order for his children and next generations to see wild populations roaming freely, better management interventions would have to be put in place.

Leopard survival rates, in protected as well as in non-protected areas, were found to be low for a variety of reasons, such as trophy hunting, killing of problem leopards and poaching for skins. Dr Swanepoel regards the illegal and legal killing of so-called 'problem leopards' as the most troubling reason. Leopards live in very complex and stable social systems, which are disrupted whenever a leopard is killed. Besides the loss of the animal, the disruption of the social system leads to high levels of intra-specific conflict, which normally leads to additional mortalities. Adding to the complexity of this problem is the deep-rooted opinions people regarding predators. Large carnivores have long carried the connotation that they are vermin and troublesome to the livestock and game farmer and that they need to be eradicated. Because leopards' habitat includes protected as well as unprotected areas, they often fall victim to accidental and non-accidental deaths. Accidental deaths include snaring and roadkill. Non-accidental deaths include people's deliberate efforts to get rid of them by trophy hunting or killing so-called problem leopards on livestock and game farms.

Leopards roam across wide areas, therefore their range often crosses livestock and game farms; smaller farm animals are easy prey for leopards. Livestock farms are usually easier to manage, and there are ways that leopards can be deterred from entering the farm, such as the introduction of livestock guarding dogs and suitable fences.

Game farms, however, are a different matter, and the rapid growth in the game farming industry is proving most negative to leopard numbers. Game farms are not suitable grounds for guarding dogs, as guarding dogs cannot guard wild animals such as antelope. Game farms are also often much larger than livestock farms and therefore much more difficult, though not impossible, to manage. Dr Swanepoel says that a large proportion of game farms are business enterprises where profit ultimately drives decisions. It is becoming increasingly common for game farmers to spend vast amounts of money on breeds of game such as the black impala and other expensive colour morphs. Farmers will resort to drastic measures to protect these 'commodities'. Applying for permits to get rid of leopards is not an impossible task when the law says if a predator kills any wild specimen, it can be classified as 'causing damage'. Dr Swanepoel stresses that, if farmers are spending millions on exotic animals, adequate precautionary measures should be taken to protect them. Unfortunately, farmers do not always take adequate precautions, resulting in leopards often unfairly being classified as 'causing damage'. The same applies to most of the larger carnivores in South Africa.

Dr Swanepoel's data shows that leopard killings on game and livestock farms are having a huge effect on the survival rates of leopards. The killing of adult females are taking a heavy toll, which has dramatic effects on population viability, even though the perceptions of the public and of farmers are that leopards are increasing in numbers.

However, studying leopards is a huge challenge and data is limited. Massive gaps exist between the scientific research and the application of this research on the ground. Researchers can only take their work up to a point, with the main focus usually being on having research published. How the research is disseminated and received is often beyond the researcher's control. Ideally, governmental involvement in effecting adequate management and implementation would contribute to the acceptance of scientific research.

All the data presented in Dr Swanepoel's study is data that can be defended. According to this data alone, leopard numbers and survival seem to be vulnerable rather than a 'least concern', as previously thought. Dr Swanepoel notes the existence of other factors causing leopard numbers to dwindle which are not included in his study. These include poaching leopards for muti and for the skins. In South Africa, the Zulu practice of wearing leopard skins during religious celebrations is affecting leopard numbers.

Based on Dr Swanepoel's findings, there is definite cause for concern regarding the viability of leopards in southern Africa. The fact that suitable habitats are often not in protected areas increases the threat to their numbers. Unethical hunters and farmers also do not bode well for leopards. One certainty remains at this stage – the mortality of this elusive creature is a direct result of human activities. Swanepoel's research, however, offers some hope by successfully highlighting how predators, specifically leopards, show where problems in wildlife management exist. If these management issues are addressed, leopard populations will most likely recover.

Leopards

Well-known statistician and former UP Professor passes away

Prof Leon Vivier

Prof Leon Vivier (77), a former professor in Statistics and Econometrics at the University of Pretoria passed away on 9 April 2015. He is survived by his wife, Hendrien, their three children and five grandchildren.

Leon Vivier was professor in Statistics and Econometrics from 1986 up to his retirement in 1999. He received a BSc degree in Statistics in 1960 and a BCom degree in 1963. Prof. Vivier followed this up with an Honours degree in Statistics in 1965, and later a MCom (Statistics) in 1969. Consequently he completed his PhD in Statistics in 1975, as well as a BCom (Hons) in Economics in 1977.

Prof Vivier started his career in 1961 as a researcher at the Central Statistics Services. Afterwards he respectively worked at the Maize Board and Sasol as a statistician. In 1969 he joined the University of Pretoria as a lecturer and was later promoted to Senior lecturer. From 1976 to 1981 Prof Vivier served as Chief Statistician at the Central Statistics Service. He followed this up with an appointment as Director at the Central Economics Advice Service. From 1986 to 1999 he was professor in Statistics and Econometrics at UP. Prof Vivier was study leader and supervisor for several master's and PhD-students. He also was an inaugural member of STATOMET, the Bureau for Statistical and Survey Methodology of the Department of Statistics.

From 1999 to 2002 Prof Vivier was involved with the economic development of the Blaauwberg Municipality and the City of Cape Town. Until recently he was very active as a consultant at and primarily concentrated on training at small businesses and also acted as mentor for them. Prof Vivier was very involved in high profile projects and publications, for example the development of an inflation barometer for South Africa.

Prof Herbert Kunert passed away

Prof Herbert Kunert

It is with great sadness that we report that Prof Herbert Kunert (Department of Physics) passed away.

Prof Kunert undergone an emergency by-pass heart operation a few weeks before he passed away.

Prof Kunert was born in 1943 in Poland, where he also obtained his university degrees. In 1986, he was appointed by the Head of the Department of Physics, Prof Jan van der Merwe, as a senior research fellow at the University of Pretoria. In 1989 he joined the academic teaching staff of the Department of Physics at the University of Pretoria, as a senior lecturer. In 2008 he retired as associate professor in the Department. After his retirement Prof Kunert was employed by the Department as a part-time researcher and supervisor to postgraduate students. He held a C rating from the NRF.

He spent most of his research career investigating various properties of materials, using group theory. During the early years of his career he worked on properties of materials exhibiting liquid crystal applications. At that time, liquid crystals had just become known in physics and considerable research went into the field to perfect the materials to produce commercial devices. Working with Prof Jan van der Merwe resulted in a shift of his research towards solid state epitaxy and the influence of misfit dislocations.

When the research in the Department of Physics changed to the study of irradiation of semiconductor materials, Prof Kunert investigated these effects, also including optical changes by using group theoretical methods. Some of the most exciting research done by Prof Kunert was in the latter part of his career, when he started to investigate phase transitions and time reversal symmetry in magnetic materials. More recently, Prof Kunert collaborated with researchers at the CSIR to investigate practical applications of nano-materials.

Many of us, colleagues and students, remember Herbert Kunert with great fondness. He was a real academic and a real scholar who thought deeply and widely.

Final goodbye to Prof Nathanaël Grobbelaar

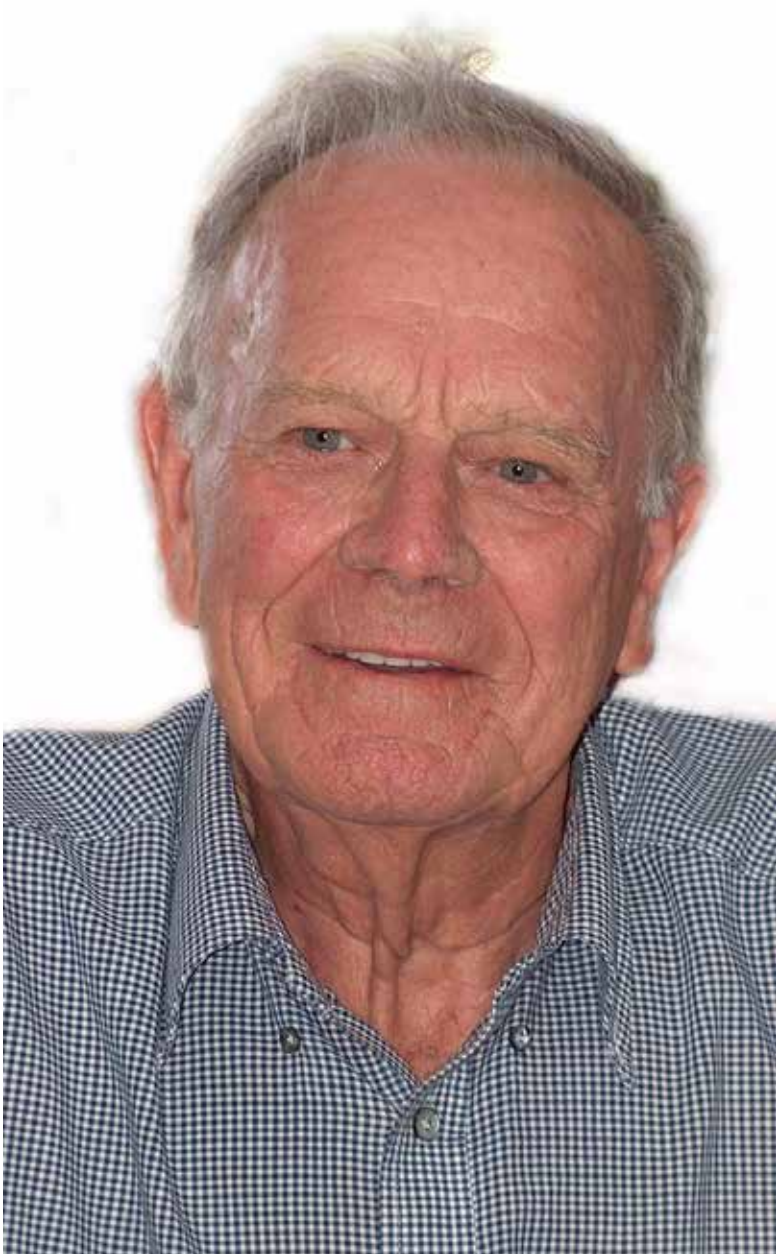
Prof Nathanaël Grobbelaar passed away on 4 January 2015. He is survived by his wife, Hanneke, four children and eight grandchildren.

Prof Grobbelaar was a former professor and Head of Department (1958 to 1986) of Plant Physiology and Biochemistry and later of the Department of Botany, University of Pretoria. He also held the Bertha Stoneman Chair from 1959 to 1985 at the University.

Prof Grobbelaar was born on 27 August 1928 and obtained his matric at the Pearson High School in Port Elizabeth. He received a bursary for being the top scholar in the Eastern Cape and later obtained the degrees BSc in Chemistry and Botany at the University of Rhodes *cum laude* and MSc in Plant Biochemistry (1952) also *cum laude*, at the University of Pretoria. He was awarded a prestigious Rockefeller Fellowship and left for the USA where he obtained his PhD in Plant Biochemistry at Cornell University in 1954. The results of Prof Grobbelaar's research on the biosynthesis of amino acids, including pipe colic acid, as well as his novel work on nitrogen exchange of cyanic bacteria and plants, can still be found in today's main international textbooks. He also became an internationally recognised scientist for his work on the metabolic regulation of various plant metabolites, especially poisonous compounds, as well as for his cycad research.

He served on various professional international boards and commissions, including the American Association for the Advancement of Science, the *Association pour l'Etude Taxonomique de la Flora d'Afrique Tropicale*, the American Society of Plant Physiologists, and the Botanical Society of America. Prof Grobbelaar was president/or chairman of various organisations, including the International Union of Biological Scientists, *The South African Journal of Science,* the Professional Advisory Board of the SA Council for Natural Scientists, the SA Association of Botanists and the Cycad Society of South Africa. Furthermore, he was a founding member of the *SA Journal of Botany*, which is now a highly rated international journal.

Prof Grobbelaar received several awards and prizes for his research contributions, including the Junior Captain Scott Medal and the Havenga Prize of the SA Academy of Science and Art. He is one of the few South African researchers to be included in the Marquis' Who's Who in the World. He was the author and co-author of more than 185 articles in scientific and popular journals and of 12 books, including the well-read '*Cycads: with special reference to the southern African species*'.



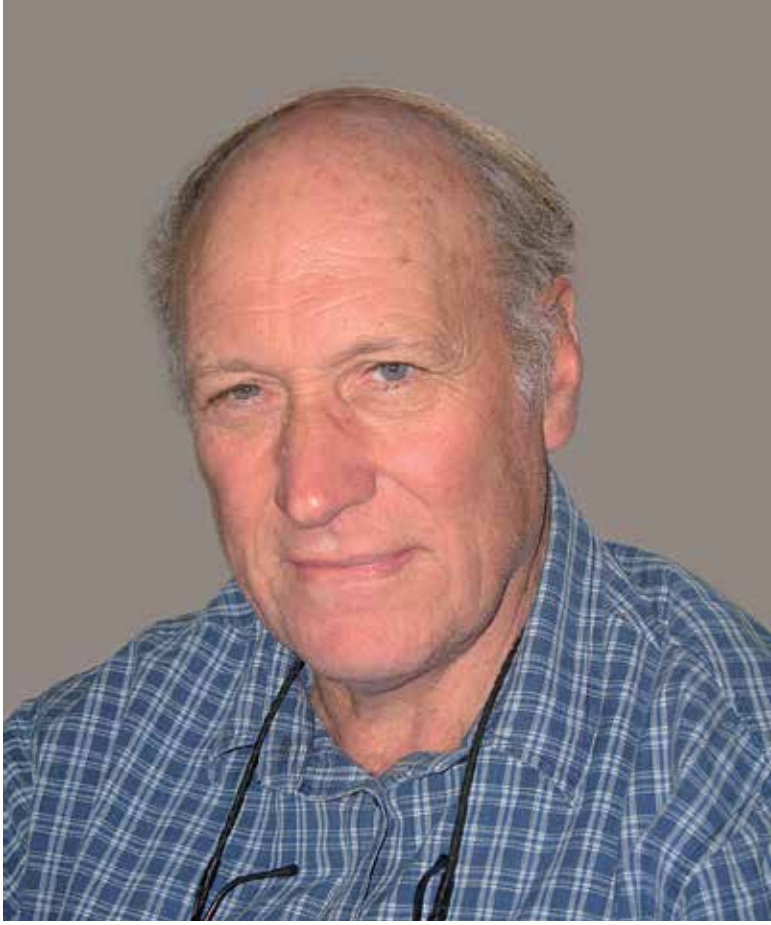
Prof Nathanaël Grobbelaar

His logical, objective, rational and enthusiastic approach to research was an exceptional gift. His honest, open and straightforward opinion on any matter was often a talking point amongst his colleagues. He frequently played pranks on his colleagues and could recount these episodes with much humour. Prof Grobbelaar's favourite quote by Louis Pasteur was probably:

'In the field of observation, chance favours only the prepared mind.'

Prof Nathanaël Grobbelaar was an exceptional leading mind, role-model and inspiration for many natural scientists, young and old.

Remembering Prof Peter Best, whale and dolphin expert



Prof Peter Best

Professor Peter Best, an extraordinary professor and former head of the University's Whale Unit at the Mammal Research Institute, passed away on 22 April 2015.

Prof Best, who was described as the world's foremost authority on the whales and dolphins of the Southern African region, was born in London in 1939 and completed his schooling at Bradfield College in Berkshire, England, in 1957. Before enrolling at university, he spent two summers at the Antarctic whaling factory *Balaena* as a chemist's assistant and a winter at the Saldanha whaling station near Cape Town, where he collected biological specimens and in particular obtained detailed information on the little-known Bryde's whale. After obtaining a BA Honours degree from Cambridge University in 1962, he worked as a whale research officer with the Fisheries Development Corporation of South Africa in Cape Town until 1969. In 1971 he was awarded a PhD by Cambridge University for his thesis titled 'Studies of South African Cetacea with special reference to the sperm whale (*Physeter catodon*)'. This was one of the earliest degrees awarded by this university for fieldwork done elsewhere (Jane Goodall's degree received for research on chimpanzees was another). Between 1969 and 1984 he was employed consecutively as a Professional, Senior and finally Chief Professional Officer at the Sea Fisheries Research Institute in Cape Town, where he oversaw marine mammal research. In 1985 he joined the staff of the Mammal Research Institute of the University of Pretoria, first as an Antarctic/Senior Research Officer between 1985 and 2004, and thereafter as an extraordinary professor.

Prof Best was a leading figure in marine mammal research, not only locally, but in the world. His international colleagues regarded him as among the best, if not *the* best, cetacean field biologist in the world. His field experience was extensive and included specimen examination at whaling stations in South Africa and at sea in the Antarctic; whale-marking off the South African coast and in the Indian Ocean; participation in sighting surveys of large whales in the Antarctic and the Western Indian Ocean; and at-sea and aerial surveys of fur seals off the South African west coast and Namibia. However, he is probably best known for his extensive aerial surveys of southern right whales off the South African coast, where he undertook fixed-wing surveys between 1969 and 1987, and photographic surveys by helicopter between 1979 and 2004. He continued to oversee this programme until 2014. This research programme, which has now been running for 36 years and has tracked the remarkable recovery of this population, has resulted in one of the longest time-series of large-whale research information in the world. His interests in right whale biology extended to photogrammetry and genetic and satellite tracking studies. Through student supervision, Prof Best initiated shore-based surveys of migrating humpback whales off both the east and west coasts of South Africa, an intensive photo-identification project on Heaviside's dolphins between 1999 and 2001, and more recently a study on southern right whale feeding off the South African west coast.

During his tenure with the Mammal Research Institute, Prof Best supervised six PhD and five MSc students. He was a respected and valued member of a number of research committees and fora, among others the Scientific Committee of the International Whaling Commission between 1971 and 1982, after which he was an invited participant (acting as vice-chairman in 1982 and 1983); the International Union for Conservation of Nature (IUCN) / Species Survival Commission (SSC) Group of Specialists on Whales between 1971 and 1975; the IUCN/SSC Group of Specialists on Seals between 1983 and 1986; and the IUCN/SSC Group of Specialists on Cetaceans from 1985 onwards. He was a charter member and later an honorary member of the Society of Marine Mammalogy, an associate editor of *Marine Mammal Science* between 1985 and 1995, and a member of the Society for Marine Mammalogy's Committee of Scientific Advisors from 2003 onwards. He published more than 160 papers in peer-reviewed journals. Peter's seminal *Whales and Dolphins of the Southern African Subregion* was published by Cambridge University Press in 2007, which was the year in which he was the Conference Chair at the 17th Biennial Conference on the Biology of Marine Mammals, held in Cape Town.

Among the numerous awards he received were the Cape Times Centenary Medal (1993), the gold medal of the Zoological Society of Southern Africa (1998), the Gilchrist Memorial Medal (2005) and the University of Pretoria's Commemorative Research Medal (2008). In 2004 he was elected a Fellow of the Royal Society of South Africa.

Peter Best married Margaret Ann Ralph (Maggi) in June 1974 and is survived by her and their children Robert and Alison.

Breaking down the wall between mathematicians and biologists

Since its inception in August 2013, the South African Research Chair Initiative (SARChI) Chair in Mathematical Models and Methods in Bioengineering and Biosciences (M^3B^2), has been working towards strengthening collaboration between mathematicians and biologists.

A milestone in this regard was the Second Joint University of South Africa (Unisa)-University of Pretoria (UP) Workshop on Theoretical and Mathematical Epidemiology that was held in early March at UP. The workshop aimed to build on local expertise from the first workshop held in 2014, and to generate novel interdisciplinary insights into new and older forms of diseases such as tuberculosis, HIV/AIDS and other communicable diseases, which pose a massive threat to development in South Africa and other African countries.

The workshop focused on the formulation of advanced deterministic/stochastic epidemic models in different settings, such as delay models, meta-population models, and vector- and water-borne diseases. It also focussed on some case studies, including new diseases and old forms of new diseases such as Ebola, Lymphatic filariasis, Cutaneous leishmaniasis, Typhoid fever, Tuberculosis (TB), African trypanosomiasis and Lipodystrophy syndrome. It also highlighted the impact of measures put in place to control the spread of infectious diseases. The in-depth quantitative and qualitative analysis of the models, as well as the design of health policies was also stressed.

Four high profile researchers, Professors Christopher Kribs (University of Texas at Arlington), Farai Nyabadza (University of Stallenbosch), Pauline van den Driessche (University of Victoria) and Abdul-Aziz Yakubu (Howard University), considered among the best and internationally reputed experts in Mathematical epidemiology, conducted some of the working sessions. Furthermore the workshop gave rise to the production of a critical mass of local experts and emerging researchers in Mathematical Biology. Group projects were given to the participants during the workshop and the initial results were presented on the last day of the workshop. Each topic chosen was very actual and relevant to the current problems in the South African situation. Participants were encouraged by the "team spirit" shown during group discussions and agreement was reached to have a follow-up mini workshop at the beginning of June 2015.

Unisa and UP as two of the largest universities in the region are combining their resources to address problems of national interest in epidemiology. Integration and cross-discipline collaborations among participants were the hallmark of the workshop.

The organisers and the participants of the Second Joint Unisa-UP workshop are very grateful to the sponsors: DST/NRF SARChI Chair M^3B^2, University of Pretoria, the Office of Prof Mamokgethi Phakeng, Vice-Principal: Research and Innovation, Unisa, the DST/NRF Centre of Excellence in Mathematical and Statistical Sciences (MaSS), and the University of the Witwatersrand.

For further information see: http://www.up.ac.za/unisa-up-workshop

From left: Dr Jeanine Mwambakana (UP), Prof Pauline Van den Driessche (University of Victoria, Canada); Prof Jean Lubuma, (Dean: Faculty of Natural and Agricultural Sciences, UP), Mrs Stella Mugisha (Unisa) and Prof Riette Maritz, (Unisa).

From left: Prof Jacques Belair (Université de Montréal,Canada), Prof Eduard Lungu (University of Botswana), Mr Benjamin Lephodisa (University of Botswana), Dr Justin Munganga (Unisa) and Prof Roumen Anguelov (Head: Department of Mathematics and Applied Mathematics, UP).

Visiting professors from Iowa State University share expertise

Food safety research, challenges and cooperative extension were the topics that Professors Cathy Strohbehn and Lakshman Rajagopal shared with faculty staff members and postgraduate students attending the mini symposium on Food Safety Challenges and Opportunities during the last week of February.

The mini-symposium was hosted by the Department of Consumer Science and, the Institute for Food, Nutrition and Well-being (IFNuW).

Prof Cathy Strohbehn is an extension specialist and Hospitality Management Professor at Iowa State University (ISU), Ames, USA, who has received several accolades for international collaboration in recent years. She shared her valuable expertise regarding extension and outreach in the USA which is a tax supported entity to provide credible *useful and relevant* information to consumers and practitioners. This is done by the Nutrition and Wellness Team that provides food safety resources and training to the retail, local food systems and school health in close collaboration with state agency and trade association partners.

Prof Lakshman Rajagopal, also from Iowa State University, shared various examples of food safety research done in the foodservice field in the USA and at ISU. He provided meaningful inputs and accentuated the fact that building on existing research projects created an opportunity for new topics such as the *handling of leafy greens in different foodservice environments* and thereafter developing visually-based training materials to train foodservice workers in other languages.

The role of IFNuW was highlighted by Prof Sheryl Hendriks who also endorsed the Food Safety thematic area which was further supported by various presentations from faculty members from the departments of Consumer Science, Microbiology and Food Science.

An overview of food safety in South Africa was presented by Prof Lise Korsten. The institutional gap in food safety was highlighted. Various Institutional Research Theme projects in the different departments were discussed and the research opportunities and possible collaboration highlighted. Prof Elna Buys of the Department of Food Science accentuated the fact the food safety research in South Africa was essential to validate food safety processes and systems in South Africa. Dr Gerrie du Rand reported on a study regarding consumers' perceptions of food safety as it relates to fresh produce in both the formal and informal sectors.

Professors Strohbehn and Rajagopal were visiting UP as an outcome of the Memorandum of Understanding that UP shares with ISU. Iowa State University has longstanding ties with the Department of Consumer Science at UP and collaborates on various initiatives and research projects including staff and student exchange thus strengthening the international profile of UP. Although some of their colleagues have visited UP before, this is the first visit of these two scholars to South Africa, and they welcomed the opportunity to share their expertise regarding food safety and research with staff, as well as undergraduate and postgraduate students in the Department of Consumer Science. In addition to various information sharing sessions within the Department of Food Science, the visitors also visited the student residences and the Foodservices of UP at TUKS MONATE. Mr Hennie Fisher and the final-year Hospitality Management students also presented a special four-course vegetarian dinner to honour the ISU guests. The menu for this event featured dishes that celebrated various South African cultures while showcasing some of our indigenous flora in ground-breaking new ways, using ingredients specifically sourced from UP's own herb garden.

The ISU visitors were also treated to a visit to a large retailer to gain an understanding of how logistics and safety procedures are applied in the South African context. Their visit culminated with a visit to a small artisanal cheese farm outside Delmas.

The knowledge and expertise that Professors Strohbehn and Rajagopal shared with UP staff and students in outreach and extension, food safety and work in local foods will serve us well, and promises great potential to unlock new research opportunities and further collaboration between our two institutions.

Let us afford our visitors the last word: "After wrapping up our first trip to South Africa and the University of Pretoria, we both come away with a sense that our two institutions have many similarities. The exchange was very useful not only in terms of professional development, but also personally gratifying. A continuation of relationships with you and other UP staff was facilitated by having the opportunity for face to face discussions. Thank you seems an inadequate expression of our appreciation; please recognize we value your friendship and collaboration."

Mrs Mariette Smith (Consumer Science), Mr Amukelani Muthambi (Consumer Science), Mrs Bertha Jacobs (Consumer Science), Dr Esther van der Spuy (Consumer Science), Prof Lakshman Rajagopal (ISU), Prof Catherine Strohbehn (ISU), Dr Gerrie du Rand (Consumer Science) and Prof Alet Erasmus (HOD Consumer Science)

International project on understanding impact of large-scale land acquisitions

The one million Euro AFGROLAND project was launched recently at a project team workshop. This ambitious project (African Food, Agriculture, Land and Natural Resource Dynamics), in the context of global agro-food-energy system changes was awarded through a competitive international bidding process and is funded through the Belmont Forum. The project seeks to analyse how globally driven agro-food-energy system changes impact on African agriculture and food security.

The transdisciplinary and inter-institutional project involves researchers from UP's Centre for the Study of Governance Innovation (GovInn), Institute for Food, Nutrition and Well-being (IFNuW) and the Department of Agricultural Economics, Extension and Rural Development together with colleagues from CIRAD (France) and the University of Bern's Centre for Development and Environment (CDE) in Switzerland. The project will investigate the economic, social and environmental impacts of changes in land use patterns driven by global development trends through case studies in Kenya, Madagascar and Mozambique.

Project leader, Dr Ward Anseeuw, explains that the innovative project capitalises on the Belmont Forum model of pooling national research funds across countries to enable a significant investment in policy and social science research. Each country team is funded by their respective national research system (for South Africa funding comes from the National Research Foundation).

The project hopes to provide much-needed insight into agrarian and food system changes to inform global policy governance.

Front, from left: Bettina Wolfgramm (CDE, University of Bern), Eve Fouilleux (CIRAD), Camilla Adelle (UP), Sandra Eckert (CDE, University of Bern and Sara Mercandalli (CIRAD). Back, from left: Sheryl Hendriks (UP, IFNuW), John Annandale (UP Plant Production and Soil Sciences), Markus Giger (CDE, University of Bern), Ward Anseeuw (CIRAD/GovInn), Magalie Bourblanc (CIRAD), Perrine Burnod (CIRAD) and Michael van der Laan (UP Plant Science). Absent from photo: Lorenzo Fioramonti (UP, GovInn) and Johann Kirsten (UP, Agricultural Economics, Extension and Rural Development) and local African partners.

Ion Mini Cooper on African safari visits Hatfield Campus

High throughput sequencing of information is flourishing at the University of Pretoria (UP) with providing research support for all Life Science related projects. Researchers from the faculties of Natural and Agricultural Sciences, Health Sciences, as well as Veterinary Science have benefitted greatly from the excellent data quality and support offered.

A fun event, hosted by the Facility earlier this year, was a visit from the Ion Mini vehicle and representatives from Life Technologies. The Ion Mini is a custom fitted Mini Cooper that contains a fully functional high-throughput sequencer, data server and related instrumentation. With the addition of electricity and gas from a specialised trailer, the vehicle can be used to generate high-quality sequencing data in any location, even in the field far away from amenities. Researchers from Life and Veterinary Sciences also attended a seminar on the innovative offerings for sequencing related services offered at UP.

Furthermore, attendees had the opportunity of taking creative photos of a miniature model of the Ion Mini in a unique surrounding, giving them an opportunity to win some exciting prizes. The spectacle of the car parked on the beautiful lawn in front of the FABI Building attracted several other interested bystanders. The car toured through Africa for a few months, but this rare visit is a big endorsement of the outstanding sequencing service provided by the Ion Torrent Sequencing Facility.

Researchers and students admiring the innovative Ion Mini from Life Technologies.

UP Centre for Natural Hazards re-launched

A new model of the University of Pretoria's Centre for Natural Hazards in Africa (formerly known as Aon Benfield Natural Hazard Centre, Africa) was re-launched at the end of last year, with the objective of accommodating the changes in its strategy.

The Centre was established in July 2008 and is a multi-sponsorship collaboration between the University of Pretoria (UP) and partners from the industry. The partners include Aon Benfield, MMI Holdings and Munich RE.

The Centre conducts excellent work in the field of natural hazards and risk modelling. However, under the new sponsorship model, the Centre will be able to expand and extend its focus to include a broader spectrum of natural hazards that are relevant to the whole continent of Africa. It will also continue to play its dual role of research and education in the field of natural hazards. Furthermore, it will serve as a hub of information for the engineering, disaster management and insurance industries.

Prof Andrej Kijko, Director of the Centre is of the opinion that the current status of neighbourhoods in Haiti and Indonesia that were recently destroyed by natural hazards, such as earthquakes and tsunamis, be maintained, due to a lack of professional insurance. He said this was what prompted the Centre to cooperate with the insurance industry, which plays a vital role in disaster recovery by managing funds and directing these funds to those who have been affected.

He also believes that the expansion of the Centre into Africa is indicative of its growth. The Centre has been called upon to calculate the extend of the earthquake hazard and risk of future earthquakes in northern Africa, to develop a synthetic seismic event catalogue for the whole of eastern Africa and to assess possibility of a seismic hazard for Harare, Zimbabwe. The Centre also took great strides in the tsunami hazard assessment for Chile and the Mediterranean region. 'These projects, amongst others, were completed with great success. We were privileged to have played a small role in these financial expansions into Africa and we are looking forward to do so much more in the years to come,' Prof Kijko said.

According to the Vice-Chancellor and Principal of the University of Pretoria, Prof Cheryl de la Rey, the reconceptualisation of the Centre is aligned with the key principles of the University's long-term strategy, UP 2025, which takes cognisance of the national priorities of South Africa. 'The Centre will still be committed to the promotion of research by postgraduate students and will also involve various other academic departments. The Centre has developed expertise in relation to the needs of the mining industry and the insurance, risk and disaster management industries. Therefore, the goals of the reconceptualised Centre take it to the future, not only for the University of Pretoria, but also for the country and the African region as a whole,' Prof de la Rey said.

According to her, it is important for South Africa and the whole of the African region to have expertise that focuses on managing natural hazards, for instance drought or floods.

The Chief Executive Officer of Aon, Simon Chikumbu, said they have been undertaking a number of projects together with the Centre in South Africa and even beyond its borders. He said that Aon Benfield would also like to focus on flooding and hail in the non-seismology areas. 'We have done quite a lot with regard to seismology cases and we would like to move into other areas, including considering societal hazardous issues. We have, for instance, recently seen how 2 000 families at Kya Sands, Johannesburg were displaced, following the massive destruction of shacks by fire. These people did not have insurance and I think that is where we would like to assist in future,' he said.

In South Africa, the Centre has also done significant work regarding the assessment of the effect of mining and acid water on the largest dams in the country.

The Centre, in partnership with academics from 12 different universities and institutions from five countries, has published 14 research papers in some of the most prestigious journals around the world.

In fulfilling its academic duties for the past six years here at the University, the Centre has hosted 18 postgraduate students, inclusive of PhD students. The students are from a wide variety of backgrounds, for instance geology, insurance and actuarial science, physics and geo-informatics.

Main sponsors of the Centre. From left: Prof Anton Ströh (Deputy Vice-Chancellor: Institutional Planning), Mr Simon Chikumbu (CEO, Aon RE Africa), Prof Andrzej Kijko (Director of UP Natural Hazard Centre), Mr Rudolf Britz (Chief Actuary, Momentum), Prof Cheryl de la Rey (Vice-Chancellor and Principal of the University of Pretoria0, and Mr Colin van der Meulen (Chief Risk Officer and Chief Actuary, Munich Re).

Mathematicians share ideas

The Department of Mathematics and Applied Mathematics hosted the 39th Symposium of Numerical and Applied Mathematics (SANUM) earlier this year. The symposium has a long standing tradition as an event in the scientific milieu in South Africa.

Following in this tradition, the scope of SANUM 2015 included the following: Ordinary Differential Equations, Modelling, Associated Numerical Analysis; Partial Differential Equations; Numerical Analysis; Biomathematics; Image Analysis, as well as Optimisation and Optimal Control.

Special sessions were also presented in specific research fields, namely Optimisation and Control with Applications; Risk Analysis and Quantitative Finance, as well as in Approximation Theory and Applications.

The plenary speakers, all high profile researchers from South Africa and abroad, entertained the 76 participants on a variety of topics: Prof Montaz Ali (University of the Witwatersrand), Prof Jacek Banasiak (University of KwaZulu-Natal), Prof Claude Brezinski (University Lille, France), Prof Abba Gumel (Arizona State University, USA), Prof Andrzej Kijko (University of Pretoria), Prof Alfred Stein (University of Twente, Netherlands) and Prof Andre Weideman (University of Stellenbosch).

The formal proceedings were concluded with a gala lunch at the Sheraton hotel, where postgraduate students received prizes in the following categories:

- Best PhD Presentation: First prize: M Fasondini (UFS), Second prize: C Dufourd (UP)
- Best MSc Presentation: First prize: L Janse van Rensburg (UP)
- Best Poster Presentations: First prize: MH Tshokotsha (US), Second prize: A Lau (UP)

A hearty word of congratulations to the local organising committee, chaired by Prof Roumen Anguelov and Prof Nic van Rensburg and in particular, to Dr Inger Fabris-Rotelli who was the main administrator of the symposium.

Mr M Fasondini received the prize for the best PhD presentation from Prof Jean Lubuma, Dean: Faculty of Natural and Agricultural Sciences (left).

UP lecturer part of UNESCO event

Dr Patricia Forbes of the Department of Chemistry was one of the trainers at the recent "Lighting Up Africa with Lasers, Optics and Optical Fibres" (LUPA) workshop held in Carthage, Tunisia during March 2015. This is an official UNESCO International Year of Light event.

The aims of the workshop, which was organised by Prof Mourad Zghal of the University of Carthage, were to promote optics and photonics research via hands-on active learning. Prof Philip Russell, of the Max-Planck Institute for the Science of Light, Germany and President of the Optical Society of America, gave a plenary lecture on enhanced light-matter interactions in photonic crystal fibres. A number of invited presentations, as well as tutorial and practical sessions which covered topics, including the history of optics research, novel laser developments and data transmission, using fibre optics.

Dr Forbes presented a tutorial and experiments based on the SpecUP, an educational spectrophotometer which she developed together with UP student, Towan Nothling. Forty five people, including students and academics from twelve different countries attended the event, and SpecUP kits were taken home for use at universities in Egypt, Ivory Coast and Turkey, following the event.

Comments received by students after using the SpecUP included: "I really enjoyed this activity. I never thought that hands-on experiments will give me this much satisfaction". "It was an interesting experience and I never knew that building a spectrophotometer could be this simple". "It would be great if we could have this experience for all chemistry majors here in Tunisia. We need more hands-on experiments".

The network of SpecUP users now spans across South Africa, Tunisia, Namibia, Lesotho, Botswana, Kenya, Ivory Coast, Egypt, Turkey and Italy.

Dr Patricia Forbes (second from left) with other trainers at the LUP workshop.

Successful Workshop on Pollinators hosted at UP

Assorted pollinators

A workshop on 'Pollination and Threats to Pollinators', funded by the National Research Foundation (NRF) and the Royal Society (UK), was recently hosted by the University of Pretoria (UP).

The workshop was organised by Prof Sue Nicolson (UP Department of Zoology and Entomology) and Prof Geraldine Wright (Institute of Neuroscience, University of Newcastle). Excellent presentations were delivered by six speakers from the United Kingdom, one from Israel, one from Germany, six from other South African universities, and seven from UP (mainly members of the Social Insects Research Group).

The broad topics covered were mechanisms of attraction and reward of pollinators, ecology of plant-pollinator interactions, landscape issues and threats to pollinators, especially honeybees.

The primary objective of these workshops (known as SA-UK Scientific Seminars) is to promote collaboration between South Africa and the United Kingdom. It is expected that several new collaborative research projects on pollination will result due to this workshop. In addition, a special feature on pollination for the journal, *Functional Ecology*, will be written.

Credits: Chamanti Laing

Credits: Steven Johnson

Credits: Anton Pauw

Credits: Petra Wester

Credits: Chamanti Laing

Eskom and Sasol invest in atmospheric research at UP

The University of Pretoria (UP), with support from Eskom and Sasol, recently launched the Laboratory for Atmospheric Studies (LAS). The laboratory is based at UP and will be a national centre of excellence, with an international reputation, that provides infrastructure and world-class education for studies in the atmospheric sciences.

The launch was attended by a number of prominent academic and industrial experts from different universities in the country, Eskom and Sasol, the South African Weather Service (SAWS), and the National Association for Clean Air (NACA), among others.

This laboratory was developed as a result of the Eskom-Sasol research collaboration in pursuit of developing scarce skills in scientific studies. This partnership will also promote data and information sharing among the companies.

At various levels, the parties have collaborated on numerous research initiatives, intended to address environmental issues of common interest, including ash and brine research, impacts of atmospheric emissions on ecosystems, monitoring of and reporting on mercury, ambient air quality, and wet and dry deposition rates of sulphur and nitrogen compounds.

Prof Hannes Rautenbach from the Meteorology Unit at UP, said this University is the first to bring experts from different fields, such as meteorology and chemistry together to broaden the scope of atmospheric studies. He said UP is ideally situated to host a focused entity for conducting research in atmospheric circulation, atmospheric processes and air quality.

"With Eskom and Sasol as partners, the Laboratory for Atmospheric Studies at UP will be a national centre of excellence, with an international reputation, providing infrastructure and world-class education for studies in the atmospheric sciences. It is expected that the resources produced will be utilised by both organisations and also meet the urgent regional need for skills," he explained.

Prof Stephanie Burton, Vice-Principal: Research and Postgraduate Studies at UP, said that collaboration with other universities and with government and private sector organisations is important to the University. According to her, UP is recognised for its external industrial partnerships. "It is quite interesting to see the University engaging in creative activities, such as this national research facility for air quality that we are launching today."

Prof Burton said the facility will be relevant particularly in the 21st century because of an ever-growing awareness of the fragile nature of the environment and our planet. She said these global issues can be addressed by means of global and collaborative responses.

"It is large consortia of research teams forming networks across the world that are able to address the 21st century problems we are faced with, especially in the field of atmospheric studies. It is very important and exciting for us that the University can play a role in a global initiative and make a difference nationally," said Prof Burton.

The LAS is located in the University's Geography Building. It has state-of-the-art computing facilities and can accommodate up to 20 students at a given time. It is open for use by people from all over the world, thereby contributing to the ever-evolving field of atmospheric studies.

From left: Prof Hannes Rautenbach (Meteorology Unit, UP); Dr Steve Lennon (Group Executive: Sustainability, Eskom), Prof Stephanie Burton (Vice-Principal: Research and Postgraduate Studies) and Mr Rudi Heydenrich (Senior Vice-President: Research and Technology, Sasol).

Ebola virus outbreak: South Africa's response

The personal experiences of two UP students – by Terence Scott (PhD student)

"We land at the airport and as the doors of the plane open, a wave of heat and humidity hits us, despite it being winter. Our shoes meet the tarmac and we are escorted by the airport staff to the terminal. As we enter, two people stand at the door in Personal Protective Equipment (PPE) – a white coverall suit, protective nitrile gloves and goggles – handing out flyers regarding the risks of Ebola and how transmission can be prevented. As we move towards passport control, we are provided with a waterless hand sanitizer to use before and after touching the fingerprint machines. Everyone is solemn and quiet. The last step before officially entering the country is to undergo a temperature check. Another man standing in full PPE blocks the doorway. A sombre look darkens his face – he knows the importance of his job. As we move through passport control, the airport is a ghostly place, with only 30 people in the whole airport – including those on our flight. Military personnel stand guard at the door as the airport is in full lock-down. Welcome to Sierra Leone.

Two students – Stewart McCulloch and I, Terence Scott, from the Department of Microbiology and Plant Pathology, University of Pretoria were selected to form part of the 6th South African Ebola Mobile Laboratory team deployed to Sierra Leone during the outbreak. The opportunity arose due to collaboration between Prof Wanda Markotter's Viral Zoonoses Group (VZG) and Prof Paweska from the National Institute for Communicable Diseases, Centre for Emerging Zoonotic Diseases (CEZD). The CEZD were coordinating South Africa's response to the Ebola outbreak and were stationed in Freetown, Sierra Leone – the worst affected area in the world – to set up a diagnostic laboratory in order to determine whether patients were Ebola positive or negative. This work decided the fate of many individuals, determining whether they would go to an Ebola treatment facility, or be released to another hospital. Accurate diagnoses were essential; one misinterpretation could be a death sentence for the affected person and anyone they come into contact with. An Ebola positive person being sent to a 'clean' hospital would mean the exposure of at least dozens more individuals, whereas an Ebola negative person being sent to an Ebola treatment facility would likely result in death.

The work required constant focus and attention as we were stationed in the 'hot room' – a specialised room for the containment of the virus. We often spent more than six hours each day in protective suits with a separate, powered airflow system providing us with filtered air, inside of the special containment room under negative pressure and secured with a double door system. Some days were harder than others. After testing the day's samples, we phoned the hospitals to inform them of the results. One day, as we phoned, we discovered that a patient we had just found to be positive, had died of Ebola just before our phone call. Many other people died, and we saw the brave burial teams on several occasions, collecting bodies in order to prevent further transmission of the virus.

Being part of the outbreak response network as a member of the South African Mobile Laboratory team was an experience that I will never forget. It illustrated how people come together and work in the most difficult situations. After our five week tour, we arrived back in South Africa. The collaborative efforts of various different teams from all around the world brought hope to the people in Sierra Leone, and the friendliness of the people with whom we worked was amazing in such a time of hardship."

South African Mobile Laboratory Team 6 (from left): Terence Scott (UP), Stewart McCulloch (UP), Gunther Meier (CEZD), Prabha Naidoo (NICD) and Mark Goosen (NICD)

How to excel in teaching big classes

How to connect to large classes – different perspectives was the topic of the recent SCITAL Forum (Science Teaching and Learning Forum) of the Faculty of Natural and Agricultural Sciences. Two experts in teaching large groups of students, Prof Jan Verschoor (Department of Biochemistry) and Dr Cor-Jacques Kat (Department of Mechanical and Aeronautical Engineering) addressed the audience.

Two members of the Faculty of Natural and Agricultural Science's student house (NATHouse), Dipuo Tekane and Orielia Egambaram, also shared their views on the attributes of a good lecturer.

Dr Kat focused on five principles of good teaching: passion, presence, impact, inspiration and confidence. Prof Verschoor equated the quintessence to the "spirit of teaching" and linked it to the five elements air, fire, earth, water and ether. Prof Verschoor also used the word QUINT as a reminder for his message: Q = Quality, U = Unity, I = Integrity, N = New, and T = Titillating.

According to the two student representatives, a good lecturer supplies students with pre-lecture notes, has passion for the subject and for students and also uses visual aids cleverly.

The Deputy Dean: Teaching and Learning in the Faculty, Prof Marietjie Potgieter, also mentioned that teaching and learning at UP are currently receiving renewed emphasis and commitment. More funding is being made available and more recognition is given (Teaching Excellence and Innovation Excellence awards will now be annually).

The SCITAL Forum (Science Teaching and Learning Forum of the Faculty of Natural and Agricultural Sciences) is a professional community which brings together staff with a particular interest in teaching and learning tertiary mathematics and science.

From left: Prof Marietjie Potgieter, Dr Cor-Jacques Kat, Prof Jan Verschoor, Prof Ansie Harding and Dr Lizette Fletcher.

Science communicator greets UP

Mrs Irene Schoeman has resigned from UP after working seven years as a science communicator at Sci-Enza Science Centre in the Faculty of Natural and Agricultural Sciences. She reached hundreds of students, learners and the general public through her enthusiasm and passion for science, and helped them experience science in a new way. Mrs Schoeman initiated and organised exciting events such as Science Cafés; Citizen Science initiatives; "Speed date a Scientists"; science shows and talks; puppet shows; outreach programmes and hundreds of workshops.

She also presented her work at two International and six National Science Centre conferences and was selected by the Department of Science and Technology to go to Miami, USA for a study visit on Science Centre Capacity Building during 2012. During 2013 she also represented South Africa in Kenya at their National Science Week.

Mrs Rudi Horak (Manager: Sci-Enza), Mrs Irene Schoeman, Mrs Helga Nordhoff (Manager: UP with Science) and Prof Marietjie Potgieter (Deputy Dean: Teaching and Learning).

Prof Debra Meyer

Goodbye to Ambassador for Science

"Parting is such sweet sorrow, that I shall say good night till it be 'morrow...." Quoting Shakespeare, Prof Debra Meyer, former Head of the Department of Biochemistry at the University of Pretoria (UP) emphasised that she will still foster ties with the University of Pretoria, even after her farewell.

Prof Meyer was appointed as the Executive Dean of the Faculty of Science at the University of Johannesburg from the beginning of 2015. She was the Head of the Department from January 2012.

The newly appointed Dean of UPs Faculty of Natural and Agricultural Sciences, Prof Jean Lubuma, confirmed that there will be collaboration between the two universities (UP and UJ) and that Prof Meyer will be appointed as an Extraordinary Professor at UP.

Prof Stephanie Burton, UP Vice-Principal: Research and Postgraduate Studies emphasised Prof Meyer's capacity to lead and innovate in research, teaching and learning, as well as in science education. Prof Burton, also a biochemist, lauded Prof Meyer for being a role model who plays an enormous role in empowering women as scientists.

Prof Jan Verschoor, former Head of the Department of Biochemistry, saluted Prof Meyer for, among others, her role as an ambassador for science through her endeavour to popularise science.

She has been the recipient of several awards and accolades including the NSTF/NRF TW Kambule distinguished black researcher award in 2004 and again in 2010. Prof Meyer also received the Academy of Science for the Developing World's TWAS Promising Young Scientist Award in 2005. In 2007 *Rapport* and *City Press* recognised her as one of ten South African "Women of Prestige". Prof Meyer was also a visiting scientist at Harvard University's Viral Immunology Department in 2004 and at the University of California, San Francisco in 2010. She has been an NRF-rated scientist since 2004.

Prof Meyer is also a familiar person on television – she was the weather presenter on SABC 2 for more than twelve years. She also initiated *Debra Deel*, a television programme on kykNET, which aims to make science more accessible to the public at large. The first series was screened in 2014 and a follow-up series in which she again features as the programme presenter is planned for the near future.

From left: Prof Norman Duncan (Vice-Principal: Academic), Prof Wolf-Dieter Schubert (Acting HoD: Biochemistry), Prof Debra Meyer, Prof Jan Verschoor (Department of Biochemistry), Prof Jean Lubuma (Dean: Faculty of Natural and Agricultural Sciences) and Prof Stephanie Burton (Vice-Principal: Research and Postgraduate Studies).

Crypto Giants raise Mathematics awareness

Crypto Giant members, together with the founder of the Under Twenty Mathematicians (UTM) programme, Prof Jean Lubuma, Dean of the Faculty of Natural and Agricultural Sciences, participated in a Mathematics awareness initiative that targets high school learners.

The aim of the project is to identify schools with a lack of information about tertiary education opportunities and careers in Mathematics, and to identify learners who can be groomed into pursuing a career in Mathematical Sciences.

The implementation phase of the project kicked off early this year in Soshanguve with the matric candidates of Reitumetse High School. The team hosted grade 9 to12 learners of future comprehensive schools from Limpopo. The sessions started off with Prof Lubuma introducing the Under Twenty Mathematicians programme and other opportunities that are available to the learners, should they decide to pursue a career in Mathematics at the University of Pretoria. He also mentioned other initiatives, for example the "Take a Girl to Work Day". Dr Mokhwetha Mabula introduced the learners to the Mathematics competition and to the Siyanqoba Regional Training Programme, which are both hosted by the Department of Mathematics and Applied Mathematics.

The Crypto Giants then took to the floor to motivate the learners to fall in love with Mathematics while they are still at school and ultimately to pursue a career in Mathematics. The topics presented to the learners, included the following: The importance of Mathematics; The applications of Mathematics; Careers in Mathematics; Life and challenges at tertiary institutions; and Study techniques.

Not only were these topics dealt with, but the learners also received guidance on some of the challenges which they might come across during their matric year.

The sessions were fruitful and the learners were very enthusiastic about the journey that lies ahead. The team would like to thank the principals and the educators of the respective schools for their time. Most importantly, they would also like to thank the learners for lending them their time and ears. The best is yet to come.

We would also like to acknowledge the support of the South African Agency for Science and Technology Advancement (SAASTA) and we are looking forward to continue the partnership.

Grade 12 learners from the Reitumetse High School in Soshanguve learning more about the Under Twenty Mathematicians programme

Yvonne Mashaba

UP student selected as Ambassador of the Talloires Network

Yvonne Sihle Mashaba, a final-year masters student in Agricultural Economics at the University of Pretoria (UP), was selected as a Student Ambassador of the Talloires Network in April. The Talloires Network is an international association of institutions, committed to strengthening the civic roles and social responsibilities of higher education.

In October 2014, Yvonne applied to be invited to the Annual Talloires Network Leaders Conference to be held in Cape Town. In November she was delighted to receive the good news that she had been selected from about 40 students from around the world to attend the international conference in December 2014. At the conference she was invited to apply for the role of student leader and ambassador of the Talloires Network.

"I applied for this [position] in March 2015 and was ecstatic to receive the email in April, advising that I was one of eight international student ambassadors selected," said Yvonne. For Yvonne this role brings an opportunity to contribute by letting her voice as a student be heard and to ensure that her input in the Talloires Network becomes important, "especially in the successful implementation of policy changes at universities engaged in community services," she said.

For more information on the Talloires Network, please visit http://talloiresnetwork.tufts.edu

UP celebrates World Water Day

Postgraduate students enrolled for the honours module in Environmental Management and Risk Assessment in the Department of Geology celebrated UNESCO's World Water Day in March this year.

A total of 26 students accompanied Dr Matthys Dippenaar, lecturer of the module, to Lower Fountains. Receiving part of its urban water supply from natural springs in the vicinity of the Groenkloof Nature Reserve, the excursion showed the students the importance of water resource protection and of promoting public awareness. The springs have been supplying the capital for 160 years without a drop in yield or water quality, with the vast nature reserve surrounding the source protecting the groundwater feeding the springs from contamination and pollution.

A word of thanks is extended to the City of Tshwane for participating in this event, making World Water Day 2015 celebrations a joint venture between UP and Tshwane.

More information is available at www.up.ac.za/water.

Postgraduate students celebrating UNESCO's World Water Day.

NAS students won StatsSA competition

The Department of Statistics in the Faculty of Natural and Agricultural Sciences (NAS) is home to two winners of the prestigious Statistics South Africa (StatsSA) postgraduate paper competition. The competition invites postgraduate papers from all African countries. Ms Seite Makgai and Ms Brenda Omachar are postgraduate students in the Department and won the competition based on the exceptional research done for their respective masters' dissertations. The prize of the competition is a full sponsorship by StatsSA to attend the 60th World Statistical Congress of the International Statistical Institute in Rio de Janeiro, Brazil in July 2015.

Ms Brenda Omachar and Ms Seite Makgai

Hospitality students show off their culinary skills by cooking in a tent

Although preparing food for more than 90 people is always a challenging task, this is precisely the kind of challenge that the fourth year B Consumer Science Hospitality Management students have grown to relish, having catered for numerous functions of this scale over the past few months.

In April the group was faced with the prospect of preparing and serving a three-course fine dining meal in a tent at *Canvas and Tent* at the Denel Business Park in Centurion as part of their formal training, instead of working in the comfort of their familiar large scale kitchen on campus with the dining room not a stone's throw away. This required an intense planning and consideration of all possible eventualities, including a number of logistical challenges, which required an exceptional sense of responsibility and keen leadership. Some of the elements of the dishes were prepared in advance in the foods laboratories of the Department of Consumer Science, while other elements were prepared in *Canvas and Tents'* hangar deck tent, where the students had the opportunity to debut the Turkish company Ozti's field kitchen to military representatives from across the African continent.

The student chefs relished the opportunity to try out the various pieces of cooking equipment forming part of the field kitchen. They cooked pumpkin fritters on the portable flat top, roasted a rolled leg of lamb in the oven and cooked delicious creamed samp and marogo in the deep frying pans. While the assembled guests waited outside in anticipation, the hangar tent (pumped full of smoke) was opened to loud music and even louder applause from the guests.

The students appreciated the unique learning opportunity presented by this event, leaving with a sense of pride about providing an enjoyable meal to an appreciative audience and a very impressed client. Everyone involved in the project is to be congratulated on making the first off-site event for 2015 a huge success.

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Learners getting interested in Agricultural Economics

Early this year seven UP with SCIENCE learners who were eager to learn about the field of Agricultural Economics or should one say 'Foodonomics', met with some of the Agricultural Economics departmental staff members. These staff members were excited to share their knowledge and act as mentors to shape young minds and to create individuals passionate about science. The ultimate objective was to expose and recruit talented students for careers in Agricultural Economics.

On the first day of the excursion Alex, Christo, Evadné, Juline, Lesego, Nadia and Sibongile were shocked to see the rapid rate of global population growth. According to the world population clock there are currently seven billion people on earth and within 200 years this figure will double. A pressing question from the seven students was – who will feed all these people? This provided the ideal platform to show what an agricultural economist does. Agricultural economists are concerned with the whole food production system from field to fork and they aim to ensure that resources in the food chain are used as efficiently as possible.

UP with SCIENCE learners were enabled to explore new technologies available to agriculture to increase food production to feed the growing population.

Producing enough food for an additional 2.4 billion people in 2050 using scarce resources and adapting to climate change while at the same time combating hunger on the one side and satisfying the sophisticated needs of consumers on the other side is indeed the main challenge faced by world agriculture.

In the light of this challenge the learners were introduced to a world faced with producing with less while keeping in mind the sophisticated demands of wealthier consumers such as organic and naturally produced. A tunnel sponsored by the Renlyn Group, and inputs sponsored by Sakata, enabled the learners to explore new technologies available to agriculture in order to increase food production to feed the growing population. Furthermore the learners took the initiative to run two trials in the tunnel, one organic and one conventional line which increased their understanding of the differences between the production methods in terms of input costs, yields and the possibility of a potential premium for organic produce.

According to Melissa van der Merwe from the Department, the aim of this project was to get these UP with SCIENCE learners interested in and passionate about agriculture and the economics thereof. This introduction to an agricultural supply chain considered different methods of production, the calculation of profit margins and potential asking prices as well as packaging, labelling and marketing issues for fresh produce. The students also considered the differences between conventional and organic produce. It is our hope that this appetiser will entice these bright young minds to sit down for a full meal of 'Foodonomics' by enrolling for a degree in Agricultural Economics

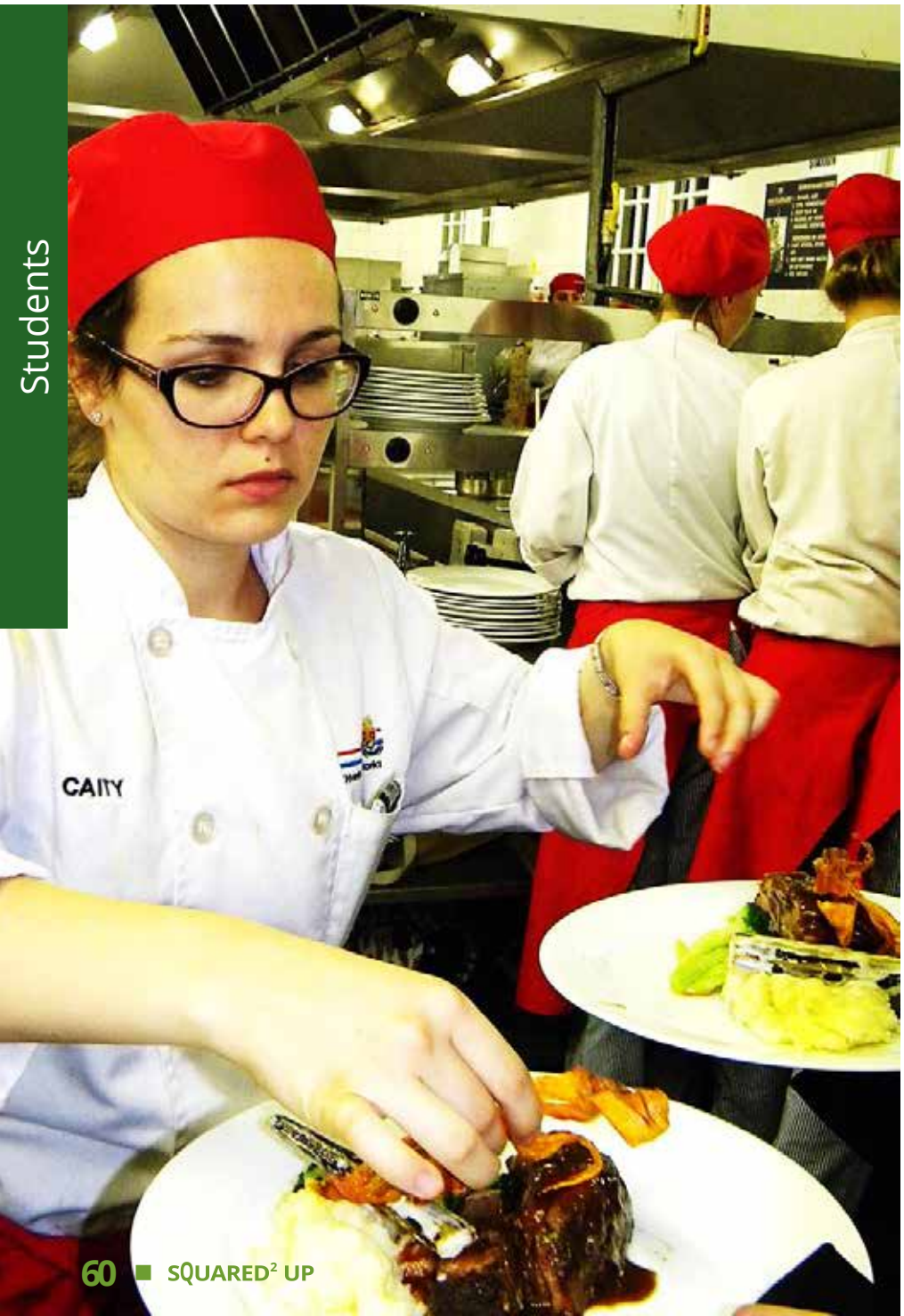
UP with SCIENCE is a science enrichment programme for senior secondary school pupils presented by the University of Pretoria. A number of learners are selected annually to take part in a three year programme (from Grade 10 to Grade 12) which includes Saturday classes once a month and a winter school once a year. The programme is aimed at increasing young people's knowledge of, interest and skills in science.

Another successful wine and dinner pairing by NAS students

When final-year culinary arts students complete their Bachelor's degrees in Consumer Science (Hospitality Management) in the Faculty of Natural and Agricultural Sciences they are sufficiently trained and experienced to deal with almost any event.

These students recently hosted another magical dinner – characterised by good food, excellent wines and conviviality – this time with Saronsberg.

It is said that all things visible and invisible originate from the sources of life, being fire, earth, water and air. Taking their cue from nature, all the dishes appeared to have been painted onto the plates by Mother Nature herself. These elements, although disparate in their make-up, manifest in different forms to contribute to nature's overall cycle of perfection.



The guest chef involved in the most recent event was an alumnus of the Department, Ms Jeannie Schreuder. She worked with Miss Mia Swiegers, the event organiser, to meticulously craft a menu that married each course with a different wine produced by the Saronsberg Wine Estate to aptly reflect nature's different elements.

Water was the element they chose for the starter – flowing rivers, tranquillity, freshness and cleansing. These characteristics were very convincingly captured in the trout ceviche, which paired with Saronsberg Voigner 2013 to enhance the just-caught freshness of the dish.

Moving onto dry land, the second course aimed to reflect the nurturing fertility of the earth through a variety of different mushrooms and a quail's egg. This course was paired with Saronsberg Grenache 2012, where delicate fynbos and spice undertones perfectly highlighted the earthy flavours of the dish.

After this gentle introduction, the pace was picked up considerably. Flames are quick and powerful, and could easily overpower if not approached carefully. The main course – braised short beef ribs – introduced bursts of flavour through spicy ginger and chilli, complimented by broccoli with a spicy bordelaise sauce and 'burnt' leeks imparting a complex smoky flavour. This dish was very well paired with Provenance Shiraz, which had a deep, dark red colour and smooth tannins layered with a fruity finish.

To soothe the palate and conclude the evening on a calmer note, the dessert that was inspired by air, the element of freedom, movement, lightness and space. All the elements in the dessert used air to carry hints of sweetness: mascarpone mousse and dark chocolate Semifreddo; toffee apple macaroons, and a light and joyful Italian meringue transported guests to cloud nine. Pairing all these light, sweet treats with Saronsberg Brut MCC ensured that guests ended the evening on an elegant note, albeit perhaps a little lightheaded from all the bubbles.

The event was held at EAT@ UP, the dining facility of the Department of Consumer Science. This serves as a training venue where all students in the Foods programmes are introduced to the highly competitive challenges of the restaurant and fine dining industry. Students frequently plan and execute special events for clients as part of their training. Over time, certain clients have become very loyal supporters who make reservations long in advance to benefit from the excellent service that the Department offers.

The fourth-year Hospitality students once again worked as a team to present a winning meal, understanding that a unified whole always relies on various elements in perfect harmony to create a thing of beauty.

Talk on how water crossing international borders is managed

Issues related to international water law and trans-boundary aquifers were discussed and explained by Shammy Puri at a recent talk co-hosted by the University of Pretoria (UP)'s Department of Geology, the UP Water Institute, the Ground Water Division (GWD) of the Geological Society of SA (GSSA), and the South African Chapter of the International Association of Hydrogeologists (IAH).

The talk was well attended by more than 50 attendees and resulted in interesting discussions related to how water crossing international borders is managed as there is no international legal authority in this regard.

Shammy Puri serves for a second four-year term as Secretary General of the International Association of Hydrogeologists. His scientific, technical and policy experience on groundwater resource management derives from nearly four decades of professional work. His breadth of practical experience derives from being responsibie for a wide range of programmes, including the world's largest water well drilling programme in the Rum-Saq Aquifer, preparing a strategy for restructuring of the coal sector in Ukraine and as global co-coordinator of the Internationally Shared Aquifer Resources Management Programme (ISARM) under which an atlas of 273 aquifers was published.

Karen Villhoth, Shammy Puri, Collen Monokofalo, Terry Harck (Secretary: IAH-SA), Jude Cobbing (past chair: IAH-SA), Fortress Netili (Treasurer: GWD-GSSA) and Matthys Dippenaar (Chair: IAH-SA and Senior Lecturer in Geology at UP).

PhD student shares experience working at FERA

Joel Dube, a PhD student under supervision of Prof Jacquie van der Waals in the Department of Plant Science, was the recipient of the Waterhouse British Society for Plant Pathology (BSPP)-Southern African Society for Plant Pathology (SASPP) Fellowship. As part of the fellowship he had the opportunity to visit the Food and Environmental Research Agency (FERA) in York, England.

Joel shares his experience:

"My one month fellowship visit was hosted by Dr James Woodhall, a researcher at FERA in York. The main objectives of the fellowship were to gain practical experience on DNA extraction methods from soil samples, as well as to get hands on experience in using and developing real time polymerase chain reaction (PCR) and loop mediated isothermal amplification (LAMP) assays to diagnose some of the potato pathogens of interest for my studies in South Africa.

Joel Dube

During my visit, I learnt about designing new real-time PCR and LAMP assays. Whilst real-time PCR is an established tool in most plant pathology laboratories, LAMP is a rapid isothermal amplification technique which has the potential for use in the field. LAMP is a somewhat novel molecular diagnostic tool and consequently relatively few assays have been developed for potato pathogens. Therefore, as part of my visit to FERA, I learnt how to design LAMP assays and to go through the validation process for new assays.

I also learnt about various DNA extraction methods, particularly for extracting high quality DNA from bulk soil samples. This method involves automated isolation of high quality DNA from soil, capturing DNA, but also removing PCR-inhibiting compounds, such as humic acid. For LAMP assays I learnt about a rapid DNA extraction method, which is applicable in the field.

My visit to FERA has empowered me as a scientist, as I have learnt new techniques and strengthened the ones I had, all which I can implement back home in South Africa. Working together with UK scientists and gaining knowledge in new and novel techniques has boosted my confidence and knowledge, which will help me in any further research I am going to engage in during my studies in South Africa.

Other than my proposed research at FERA, I was privileged to learn about next generation sequencing, using the MiSeq, and even participated in an experiment from the library preparation to the actual run. I also had the opportunity to take part in a field trip to Driffield where we collected soil samples, as well as infected plant material. I was also fortunate to attend the 2014 Fruit Focus event during which I was privileged to take a tour of the East Malling Research facilities and interact with other scientists, while exchanging ideas.

FERA is situated in the magnificent city of York, which provided the perfect outdoor experience when not in the lab. It was truly a blessing to tour the city and experience its medieval history. I also had the opportunity to visit other cities, such as Leeds, Manchester and London where I explored a great deal of British history.

I would like to thank everybody at FERA, particularly James Woodhall for his unwavering dedication and hospitality during my visit, as well as Kate Perkins and Eder Samoza, for their impeccable assistance in the laboratory.

Finally, I am grateful to the BSPP for granting me this rare opportunity to enhance my laboratory skills and keeping me up to date with recent technology, all of which will help me advance science in South Africa and help progress in my career."

Winning young scientist grateful to UP staff

A Grade 12 learner and prospective student in Microbiology at the University of Pretoria (UP), Bernard Smit from Hoërskool Waterkloof has been honoured with two special awards at the 2015 Intel International Science and Engineering Fair (ISEF) in Pittsburgh. But his road to success started much earlier… and with the help of quite a few of the UP staff members.

Bernard's story started last year while he was still in Grade 11. He was a finalist in his school's Science expo and was busy preparing to participate in further competitions. His project entailed that he wanted to prove that an electrical current can be generated when magneto tactical bacteria (bacteria containing magnetite residue) are pumped through an induction tube. He isolated these bacteria himself and also developed the required electrical circuit. He was successful in generating a measurable electrical current

In the light of further participation on provincial and national level in the Eskom Expo for Young Scientists, Mr Alan Hall at UP's Micro-analytical Laboratory was contacted in order to obtain electron microscope photos of the bacteria. Mr Hall referred Bernard to the Department of Microbiology and Plant Pathology in order to obtain help with the nurturing of the bacteria. Bernard did all the experimental work himself, but was not afraid to consult with experts when encountering problems. The result of all this was that won several gold medals during the Eskom Expo, as well as a grant from UP for his studies next year in the Faculty of Natural and Agricultural Sciences. Eventually he was designated to represent South Africa at the International Science and Engineering Fair (ISEF) in Pittsburgh during May 2015.

As one of twelve South African participants Bernard was an exceptional achiever at ISEF. He won two special awards – one from the American Society for Microbiology for an exceptional microbiology project and one from the China Association for Science and Technology for the project "best reflecting originality and innovation in all scientific disciplines". In addition to this, he achieved an overall second place in the category Microbiology. The abovementioned is an exceptional achievement when considering the fact that there were more than 1 500 international participants. As if this was not sufficient enough, Bernard was invited by a specialist in the area of magneto tactical bacteria, Dr Christopher Lefevre from France, to co-author and publish an article about this research with Dr Lefevre.

Several staff members from UP contributed inputs of immeasurable value to help Bernard with his projects: Prof Walter Meyer of the Department Physics provided specialised advice and equipment. Mr Alan Hall and me Antoinette Buys from the Microanalysis Laboratory) rendered valuable help with electron microscopics and Prof Marion Meyer from the Department Plant Sciences helped with equipment. In the Department Microbiology and Plant Pathology, Prof Fanus Venter, Prof JJ Joubert and Dr Elritha van Zyl were also helpful. We are proud of this voluntary team effort.

The report and photos regarding the IWIS awards can be accessed at: http://mybroadband.co.za/news/industrynews/126538-south-african-teenagers-win-special-awards-at-isef.html

Bernard Smit