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Newsletter of the Faculty of Natural and Agricultural Sciences

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Agriculture at UP still growing after 100 years

"While celebrating a hundred years of agriculture at the University of Pretoria (UP), we are also looking ahead at the challenges and how we can make a difference in the country and in Africa."

These thoughts are shared by the Deputy Dean: Research and Postgraduate Education of the Faculty of Natural and Agricultural Sciences, Prof Edward Webb.

A Faculty of Agriculture was established on 20 January 1917 at the former Transvaal University College (TUC). The Faculty then consisted of three departments: Phytopathology, Soil Science and Livestock-breeding.

...continues on page 3.

A glimpse of the newly renovated food laboratories in the Department of Consumer Science, story on page 6.

Message from the Dean

Prof Jean Lubuma
Dean: Faculty of Natural and Agricultural Sciences

This year is indeed a year of celebrations for the Faculty of Natural and Agricultural Sciences. The **Agricultural** component of the Faculty celebrates its centenary (page 1), the Department of **Consumer Science** (page 6) is 90 years old and **Sci-Enza**, the oldest science centre on the African continent and role model for new and upcoming science centres in South Africa turns 40 this year (page 28). These milestone celebrations are marked by many changes and achievements.

We have much to boast about concerning the outstanding achievements of our staff members. **Five senior NAS researchers** were elected as Fellows of the African Academy of Sciences (page 4), while **Prof Sheryl Hendriks** was appointed to the Malabo Montpellier Panel of leading agricultural and food security experts (page 8)**.** According to the Centre for World University Rankings the University, and specifically, the **Forestry and Agricultural Biotechnology (FABI)'s** broad research earned UP the second position in the world regarding the study of mycology (fungi) (page 30).

Two high-profile appointments were made in the Faculty. **Prof Edward Webb** was appointed as Deputy Dean: Research and Postgraduate Education (page 41), while **Prof Andre Ganswindt** took over the reins of the Mammal Research Institute (page 42).

Through multidisciplinary research, as well as teaching and learning endeavours in the Faculty, we aim to make a difference in the world. Innovative research was conducted by **Prof Nigel Bennett** and **Dr Heike Lutermann** (Department of Zoology and Entomology) in conjunction with overseas co-workers. Their research comprised the way in which naked mole-rats can survive when they are completely deprived of oxygen and how the research results might lead to human lives being saved when someone is the victim of a car accident or suffers a stroke or heart attack (page 36).

Our students also made us proud. **Frederick Malan**, a PhD student in Chemistry was selected to attend the 67th Nobel Laureate meeting in Germany (page 11), while **Oswald Mlonyeni**, a PhD student at FABI was honoured at the Commonwealth Science Conference (page 20). Our students proved that age is only a number. A very young student, **Hjalmar Rall** joined the Faculty at the tender age of 14 to study Physics this year (page 46) and we celebrated **Quintine Mkhondo** who, at the age of 19, graduated with a BSc degree in Mathematical Statistics (page 47) during the Autumn graduation ceremonies.

Many more outstanding achievements by our staff, students and affiliates, of whom we are very proud, can be cited. 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 the Faculty

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The Faculty of Natural and Agricultural Sciences also has a **Facebook page**. Please **like** us.

The Faculty of Agriculture progressed with leaps and bounds from those early years. It changed to the Faculty of Agricultural Sciences in 1969 and then to the Faculty of Biological and Agricultural Sciences in 1994. In 1999 it finally merged with the Faculty of Science to become the current Faculty of Natural and Agricultural Sciences, consisting of 16 departments and more than 20 research entities.

"The Faculty of Natural and Agricultural Sciences, with a specific cluster of agriculture and food sciences, aims to be a leading faculty of its kind in Africa. We focus on research which makes an impact, research that matters. We want to improve the quality of human life in South Africa, the African continent and elsewhere," says Prof Webb, who is also a renowned animal scientist.

Prof Jean Lubuma, Dean of the Faculty of Natural and Agricultural Sciences, echoes these sentiments. "The visibility of agriculture and focus of the Faculty on agricultural sciences are a priority for us, given the growing challenges (Sustainable Development Goals (SDGs)) of sustainable food production and security on the African continent."

"The University's commitment to the United Nations' Sustainable Development Goals resonates in the UP 2025 vision which identified strategic focus areas to further development, including food security and the well-being (economic and health) of people in South Africa and Africa," says Prof Anton Ströh, Vice-Principal for Institutional Planning and former Dean of the Faculty of Natural and Agricultural Sciences.

"The proud history of UP of being recognised among the top 1% on the Thomson Reuters Essential Science Indicators (ESI) Threshold list of all institutions in fields such as Agricultural Sciences, Plant and Animal Science, Ecology and the Environment is a testimony that UP is well-positioned to make substantial contributions to the SDGs. For this particular reason, over the past ten years the Faculty has promoted multidisciplinary research between agricultural, biological, mathematical and physical sciences in order to present the best possible technologies to solve the so called 'wicked' challenges that Africa faces," explains Prof Ströh.

Prof Webb emphasises that "research and undergraduate teaching and learning goes hand-in-hand. We have to train agriculturalists in Africa who are well-equipped to, among others, make a meaningful contribution by focusing on food security. We also need a growing number of undergraduate students who can progress to postgraduate studies and also attract a strong postgraduate cohort locally and abroad. Furthermore is it important to emphasise that research needs to lead to undergraduate training."

According to Prof Webb, "we must predominantly address local research issues in agriculture. As a Faculty which combines agriculture with all the natural sciences we need to emphasise that agricultural science does not function in isolation but has close ties with Biochemistry, Genetics, Microbiology and many more."

Prof Lubuma highlights the importance of the University's partnerships with industry in helping to advance scientific research

while being beneficial to both academic and commercial interests. "The establishment of the Animal Feed Manufacturers Association feed mill laboratory at the Hatfield Experimental Farm is just one of many. We also promote active participation in RUFORUM and other agriculture-related events that may enhance the Faculty's profile in this field." Prof Ströh confirms this by saying "we have already established strong relationships with government and industry partners and individuals, including the CSIR and the Innovation Hub to jointly implement strategies to contribute to the bio-economy of South Africa."

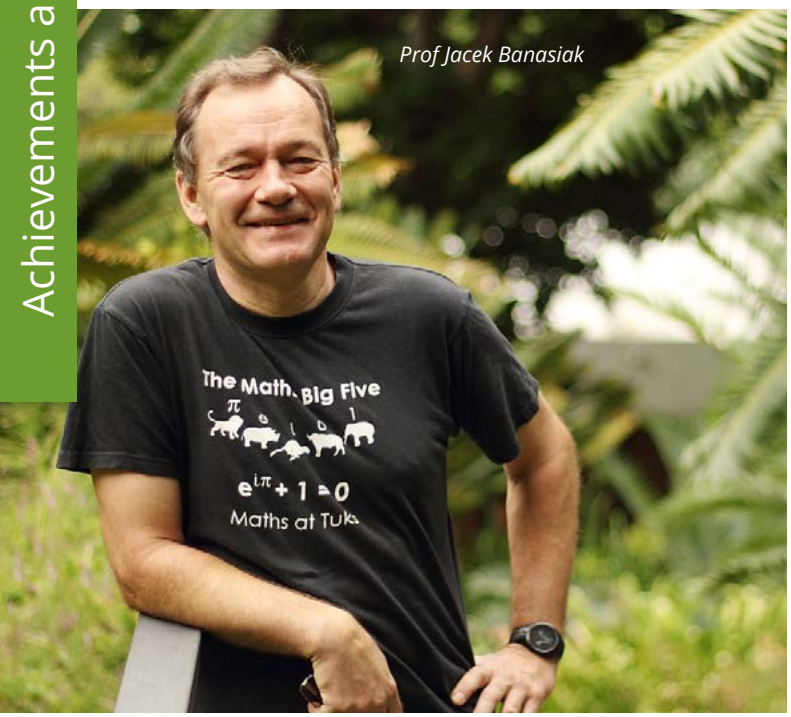
According to Prof Ströh, "the University's experimental farms have always been important research facilities for collaborative and individual research as well as being used for training students from agricultural and veterinary sciences. The University has identified these facilities as spaces for further development to significantly enhance our position to become a major partner in the DST's Bio-economy strategy. The possibilities of the Hatfield Experimental Farm (HEF) in particular have been further explored and identified as a site to reconceptualise our thinking on agriculture and food security. Currently, a major facility, called Future Africa Initiative is being developed on the HEF and it will host African and international scholars of high standing, in an expanding context of a residence to provide facilities for multidisciplinary discussions and research. Conversations will be stimulated to collectively solve the so-called 'wicked' (complex) challenges of Africa. The future vision of the Experimental Farm is presently being discussed at Executive level for approval."

The future lies ahead with endless possibilities and the Faculty of Natural and Agricultural Sciences is ready to face the next hundred years.

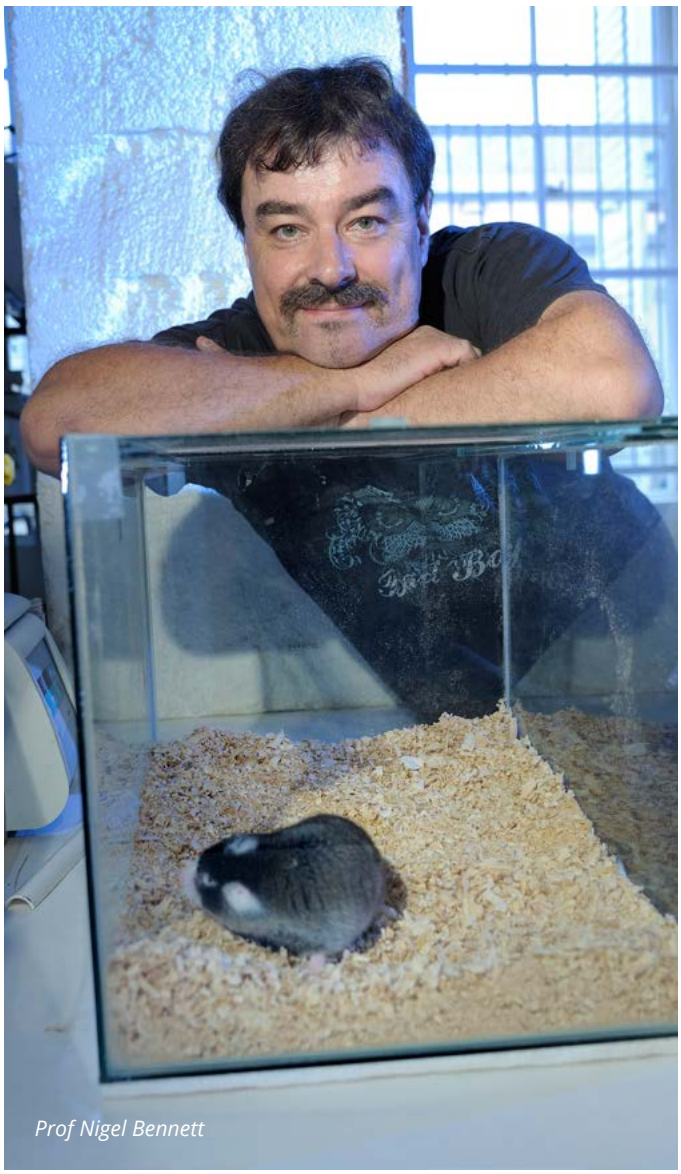
Five NAS researchers elected as AAS Fellows

Five researchers from the Faculty of Natural and Agricultural Sciences have been elected as Fellows of the African Academy of Sciences (AAS). They are Prof Jacek Banasiak (Mathematics and Applied Mathematics), Prof Nigel Bennett (Zoology and Entomology), Prof Don Cowan (Genetics), Prof Brenda Wingfield (Genetics) and Prof Mike Wingfield (FABI). This brings the number of AAS Fellows in the Faculty to seven.

Prof Jacek Banasiak heads the DST/NRF SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences (M^3B^2). He authored/co-authored five research monographs and was also author/co-author of over 100 refereed research papers. In 2012 Prof Banasiak received the South African Mathematical Society Award for Research Distinction, in 2013 the Cross of Merit (Silver) of the Republic of Poland and in 2014 he was awarded the first prize in the competition for the best paper in applied mathematics organised by the Centre for Applications of Mathematics (Gdansk). He is the editor in chief of *Afrika Matematika* (Springer), an advisory editor of *Mathematical Methods for the Applied Sciences* (Wiley), associate editor of *Quaestiones Matematicae*, as well as a member of the editorial board of *Evolution Equations and Control Theory* and the AIMS Library Series of Cambridge University Press. He has been a B1-rated researcher since 2008.



Prof Jacek Banasiak


Prof Nigel Bennett

Prof Nigel Bennett occupies the joint DST/NRF SARChI Research Chair in the field of Mammalian Behavioural Ecology and Physiology, as well as the UP Austin Roberts Chair of African Mammalogy. He has published 320 research articles in international peer-reviewed journals, including *Nature*, *Science*, *Proceedings of the Royal Society of London, Advances in the Study of Behavior* and *Trends in Ecology and Evolution*. He is a Fellow of the Zoological Society of London and the Royal Society of South Africa, as well as the Academy of Sciences of South Africa (ASSAf). He has served as President and Vice-President of the Zoological Society of Southern Africa, is Editor-in-Chief of the London-based *Journal of Zoology*, and editor of *Biology Letters*. He received the Chancellor's Medal for Research in 2003 and 2011, and the Zoological Society gold medal in 2008 as well as the Havenga Prize for Biological Sciences for his research on living material. In 2015 he received the NSTF award for research capacity development over the last five to ten years by an individual. He has an A2-rating from the National Research Foundation (NRF).

Prof Don Cowan

Prof Don Cowan is the Director of both the Genomics Research Institute (GRI) and the Centre for Microbial Ecology and Genomics (CMEG). Prof Cowan is an NRF A2-rated researcher. He shared the first place in the Capacity Building category with Prof Brenda Wingfield in the 2014 NSTF-BHP Billiton Awards. In the same year he was awarded the University of Pretoria Chancellor's Award for Research for 2015. He has published more than 310 research papers, review articles and book chapters, and is a member of the editorial boards of thirteen international journals. He was elected as a Fellow of the Royal Society of South Africa in 2007, member of the Academy of Sciences of South Africa in 2008, and 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 the immediate-past President of the Royal Society of South Africa.

Prof Mike Wingfield

Prof Mike Wingfield is the Founding Director of the Forestry and Agricultural Biotechnology Institute (FABI) and an A1-rated NRF researcher. He was elected as a Fellow of several scientific societies, including the Royal Society of South Africa, the Academy of Science of South Africa (ASSAf), the Southern African Society for Plant Pathology and the American Phytopathological Society. He is one of the few honorary members of the Mycological Society of America. The prestigious African Union (AU) Kwame Nkrumah Scientific Award in the Life and Earth Sciences category was bestowed on Prof Wingfield in Addis Ababa in 2013. Other accolades that he has received include the Johanna Westerdijk Award by the *Centraalbureau voor Schimmelcultures* (CBS) (Fungal Biodiversity Centre, the Netherlands), and honorary DSc degrees from the University of British Columbia in 2012, and from North Carolina State University in 2013. He was also awarded the Distinguished Leadership Award for International Scientists for 2016 by his alma mater, the University of Minnesota, and the esteemed Royal Society of South Africa (RSSAf) John FW Herschel medal for 2017.

Prof Brenda Wingfield enjoys significant national and international recognition for her work in molecular plant pathology and fungal genetics. She has received numerous significant awards for research, including the DST Women in Science Award (category Distinguished Woman Researchers) in 2008, and the African Union Regional Award for Women in Science in 2009. In 2014 she was awarded an A2 rating by the NRF. She was the first female researcher to receive the Christiaan Hendrik Persoon medal from the Southern African Society for Plant Pathology (SASPP) in 2015. In the same year Prof Wingfield was appointed to the DST-NRF SARChI chair in Fungal Genomics and in 2016 she received the Harry Oppenheimer Fellowship Award. She is a programme leader at the DST-NRF Centre for Tree Health Biotechnology.

Prof Brenda Wingfield

Celebrating 90 years of excellence in Consumer Science

Ninety years is a long period in any company, and even more so in an academic department. The question is not only how old a department is, but could it have withstood the test of time in terms of academic quality and relevance.

Prof Cheryl de la Rey, Vice-Chancellor and Principal, keynote speaker at the official unveiling of the newly renovated foods laboratories and 90th year anniversary celebrations of the Department of Consumer Science on 18 April 2017, confirmed and reiterated that this Department did so and even excelled.

Prof De La Rey congratulated the Department with its tireless commitment to the University's vision of being a research-intensive university by increasing its NRF ratings and research outputs as just two examples of its achievements.

The Dean of the Faculty of Natural and Agricultural Sciences, Prof Jean Lubuma also shared his pride in the Department's success and celebrations and explained that the 90th anniversary is indeed worthy of celebration as it is a *'polite number'. The date of the event being 18 April is also a 'polite number' and increases the significance of the celebration.

"The only certainty in life is change and change is indeed part of the DNA of this Department. The Department is yet again going through some changes as it will merge with the Department of Food Science later this year. Furthermore this Department is also the largest and oldest of its kind in the country," Prof De la Rey added.

Apart from celebrating nine decades of achievements, the refurbished food laboratories were also unveiled during this event. According to Prof Alet Erasmus, Head of the Department (HoD) of Consumer Science, "the redesigned facilities have improved the training potential of the Department to match and even exceed the level of quality set by industry. The training capacity of the Foods Division of the Department has increased from 30 students in the two training laboratories to 56 students, where each student now has his/her own work station and does not have to share space as in the past. The experimental research laboratory is multi-functional and provides space for consumer scientists as well as food scientists to work side-by-side doing consumer-led product development. Over a period of time this facility could establish itself as a world class facility in the field of culinary science, expanding ties with partners in industry with whom they already closely liaise."

Two previous heads of the Department, Prof Elizabeth Boshoff (1979 to 1999) and Prof Elmarie de Klerk (2000 to 2014) were also guests of honour at this prestigious event.

The University of Pretoria provided R15 million for the project. In addition the Department also received substantial donations from suppliers such as Culinary Equipment Company (R500 000 worth of industrial food preparation equipment), DeLonghi (various small appliances such as mixers and food processors to the value of R300 000), MacBrothers (a generous discount on all large cooling equipment) and McCater (a donation towards the stainless steel construction of the demonstration station). Contributions of Miele and Whirlpool were also acknowledged.

While the guests visited the laboratories to appreciate the impressive design and novel technologies, food that was prepared and served by students of the Department, refreshed guests' memories of changes in cuisine since the 1920's.

** A polite number is the sum of two or more consecutive numbers, for example 29 + 30 + 31 = 90 (The age of the Department); and 5+ 6+7=18 (Date of the event).*

From left: Prof Jean Lubuma (Dean: Faculty of Natural and Agricultural Sciences), Prof Alet Erasmus (Head: Department of Consumer Science), Prof Elmarie de Klerk (former HoD), Prof Elizabeth Boshoff (former HoD), Prof Cheryl de la Rey (Vice-Chancellor and Principal) and Prof Anton Ströh (Vice-Principal: Institutional Planning).

Dr Thulani Makhalanyane

Dr Thulani Makhalanyane received prize at Mzansi's 100 Awards Ceremony

The Independent Media group of newspapers recently presented its annual *The Young Independents* 100 Inspiring and Aspiring Leaders Awards Ceremony. During this event Dr Thulani Makhalanyane was awarded one of the prizes.

These awards recognise young people who are leaders in their fields while supporting and inspiring communities throughout South Africa. Winners were chosen in five categories, namely Disruptors, Healers, Influencers, Innovators and Trailblazers. In 2017 more than 2 000 young people were nominated. Dr Makhalanyane, a microbial ecologist, was awarded the third prize in the Healers category, which includes medical practitioners, academics, and environmental workers.

Dr Makhalanyane obtained his PhD from the University of the Western Cape in 2013 and is currently Deputy Director of the Centre for Microbial Ecology and Genomics, and Senior Lecturer in the Department of Genetics at the University of Pretoria. During his career, Dr Makhalanyane has received a number of national and international awards, including the National Science and Technology Forum (NSTF) TW Kambule Award for Emerging Researchers in 2015, and the International Society for Microbial Ecology (ISME) Ambassador's Award in 2016. He co-authored over 35 peer-reviewed papers in leading international journals and three book chapters. More information on the award is available **here**.

Follow **this link** to Dr Makhalanyane's research articles.

Prof Sheryl Hendriks

Leading UP food security expert appointed to international panel

Prof Sheryl Hendriks, Director of the University of Pretoria's Institute for Food, Nutrition and Well-being (IFNuW) was appointed to serve the new **Malabo Montpellier Panel**.

The Panel consists of a group of leading agriculture and food security experts from Africa and Europe, established to support efforts by African countries to sustain and accelerate the current pace of growth in order to achieve the goals set by the African Union of sharply reducing poverty and ending hunger within the next decade. With more than 232.5 million undernourished people in Africa, good agricultural policy and practice lies at the heart of addressing food and nutritional security, and boosting development.

The Panel will stimulate discussion and debate and share ideas on how to boost productivity and to drive growth and employment through high quality analysis. They will present evidence in order to convene senior decision-makers at an annual Malabo Montpellier Forum to assess strategies for meeting global agriculture and food security goals. Dialogue between the Panel, key stakeholders, NGOs and the private sector will promote the sharing of research across borders. The Panel's Co-Chair, Dr Ousmane Badiane said: "With the drought in East Africa and local famines, the work of the Malabo Montpellier Panel has become even more urgent. Unique factors combine to affect food security in each country but we must do what we can to boost agricultural productivity and ensure everyone has access to sustaining food and sustainable livelihoods."

The Panel's inaugural meeting coincided with the G20 '**ONE WORLD, No Hunger' Conference** in Berlin, in April 2017, in which the Panel members played an active role. The conference was hosted by the Federal Ministry for Economic Co-operation and Development (BMZ). The event focused on youth employment in rural areas. The unique conference included the active participation of 130 young people from Europe, Africa and Asia. One of the conference's key elements was the 'Berlin Charter'. The Charter will contribute to the G20 discussions, providing political impetus and guidance for decision-makers from politics, business and civil society in order to boost involvement in efforts that foster rural development and youth employment.

The Charter was drafted by an international advisory committee led by Malabo Panel Co-Chair, Prof Joachim von Braun and Panel

member, Dr Agnes Kalibata. The drafting team consulted widely with non-governmental groups in preparing the draft Charter. The draft Charter was discussed and refined at the conference in Berlin before being officially presented to Federal Minister Gerd Müller. Mr Müller stated in his opening remarks: "In Africa alone, an additional 440 million young people will be joining an already highly competitive labour market between now and 2030, most of them in rural areas. Therefore, there is huge potential to achieve dynamic rural development. If, however, these young people have no prospects for the future, there exists a risk that long-term social harmony and stability will be put in jeopardy and that natural resources will be over-exploited". Prof Von Braun commented: "Agriculture has an enormous potential to drive development and transform rural areas in Africa. Jobs are urgently needed for rural youth in particular. Young entrepreneurs and women, including the next generation of farmers, must be supported with better education and vocational training."

Prof Hendriks views the active engagement of the Panel members in the Berlin conference and the finalisation of the Charter as an example of the influential role the Panel has set out to play in shaping future African development policies and the partnerships with bodies such as the G20 in supporting African-led development efforts.

Malabo Montpellier members attending the inaugural meeting in Berlin, 26 April 2017. Front from left: Ishmael Sunga, Nachilala Nkombo, Dr Agnes Kalibata, Prof Noble Banadda and Dr Wanjiru Kamau-Rutenberg. Back from left: Dr Adebisi Araba, Sir Gordon Conway, H.E. Rhoda Peace Tumusiime, Prof Joachim von Braun (Co-Chair), Dr Ousmane Badiane (Co-Chair), Prof Sheryl Hendriks, Prof Muhammadou Kah and Dr Patrick Caron.

Two more international accolades for Prof Brenda Wingfield

Prof Brenda Wingfield, holder of the SARChI Chair in Fungal Genomics in the Department of Genetics, was recently honoured with two prestigious international awards.

Prof Wingfield was awarded honorary membership of the Mycological Society of America (MSA), the highest honour for an international mycologist. This honorary membership recognises her distinguished and long record of significant contributions to knowledge of fungal biology. According to Georgiana May, MSA President 2016-2017 'the breadth of her research, spanning basic research in systematics, population biology, and genomics of the fungi, and the application of that knowledge to develop molecular diagnostic tools for plant pathogenic fungi is truly awesome'. She added that the extent of her research had not sacrificed productivity as she had published well over 350 papers and chapters in her career that continue to be highly cited and useful to the upcoming generations of mycologists.

She was also elected as a Fellow of the American Phytopathological Society to recognise her research on molecular and genomic characterisation of fungal pathogens on trees and for the educational outreach to the young scientists of Africa. This, together with her distinguished service to the profession of plant pathology and other numerous achievements, makes Prof Wingfield highly deserving of the Fellow Award.

Prof Wingfield enjoys significant national and international recognition for her work in Molecular Plant Pathology and Fungal Genetics. She has received numerous significant awards for research, including the South African Department of Science and Technology's Distinguished Women in Science Award in 2008, and the African Union Regional Award for Women in Science in 2009. In 2014 the NRF recognised her as an A2-rated scientist. She was the first female researcher to receive the Christiaan Hendrik Persoon medal from the Southern African Society for Plant Pathology (SASPP) in 2015. In the same year she was awarded the DST-NRF SARChI Chair in Fungal Genomics.In 2016 she received the Harry Oppenheimer Fellowship Award. She is a programme leader at the DST-NRF Centre for Tree Health Biotechnology. Prof Wingfield was also elected as a Fellow of the African Academy of Sciences (AAS) earlier in 2017.

Prof Brenda Wingfield

Mr Frederick Malan

PhD Chemistry student selected to attend 67th Nobel Laureate meeting

Mr Frederick Malan, a final-year PhD student in the Department of Chemistry was one of only five South African postgraduate students selected to attend the 67th Nobel Laureate meeting in Lindau, Germany, during June 2017.

Mr Malan's attendance of this meeting is sponsored by the Academy of Science of South Africa (ASSAf), in partnership with the National Department of Science and Technology. Mr Malan will be completing his PhD degree this year, under the supervision of Prof Marilé Landman of the Department of Chemistry and Dr Eric Singleton, on the catalytic applications of CpMetal N-heterocyclic carbene complexes.

An elated Mr Malan said: 'The initial disbelief I experienced was quickly followed by intense excitement after realising that I was one of only five aspiring young South-African scientists to have been selected to attend this prestigious meeting. I cannot wait to meet the world's leading and most respected researchers in the field of chemistry. I am looking forward to learning from their experiences and being inspired by their dedication to this field of science. I am humbled and incredibly grateful for the opportunity to be able to represent the Department of Chemistry and the University of Pretoria at this international annual event.'

His PhD research project is ever-evolving and continuously moving towards multi-functionality. 'Through my work, I first aimed at synthesising ionic liquids in more facile ways that make use of fewer synthetic steps, generate less waste, and minimise the use of toxic chemicals. The next phase involved the use of these ionic liquids as ligands in the synthesis of organometallic complexes of both earth-abundant and precious metals known to exhibit catalytic activity in a wide range of organic transformation reactions. These transformations include different C-C, C-N, and C-O functionalisation reactions important to industry, all of which we have successfully catalysed in our labs. Other studies, including quantum-mechanical calculations and electrochemistry on all of these complexes have been conducted in order to allow us to better understand the reactivity patterns of these complexes and allow for optimum catalyst design.'

Mr Malan's other achievements include being awarded a UP Postgraduate Travel grant for a research visit to University of Bern, Switzerland, and NRF Innovation bursaries for his honours, master's and PhD studies. He also won a Next Generation Scholarship bursary for his MSc and the Merck award for best third-year Chemistry student. Furthermore, he was named one of the Top 10 Alumni Graduates of the Faculty of Science at the University of Johannesburg in 2011.

The first Lindau Nobel Laureate meeting was held in 1951 and since then the annual event has become a unique international scientific forum. Around 400 students from around the world are invited for one week in the European summer to meet 30 to 40 Nobel Laureates. Students are encouraged to present their research in a number of sessions focused on the active exchange of knowledge between the young scientists and the Nobel Laureates. Each of the three Nobel Prize science disciplines is covered, one per year, in a cycle: physiology and medicine, chemistry, and physics. The 67th Meeting of Nobel Laureates is dedicated to chemistry.

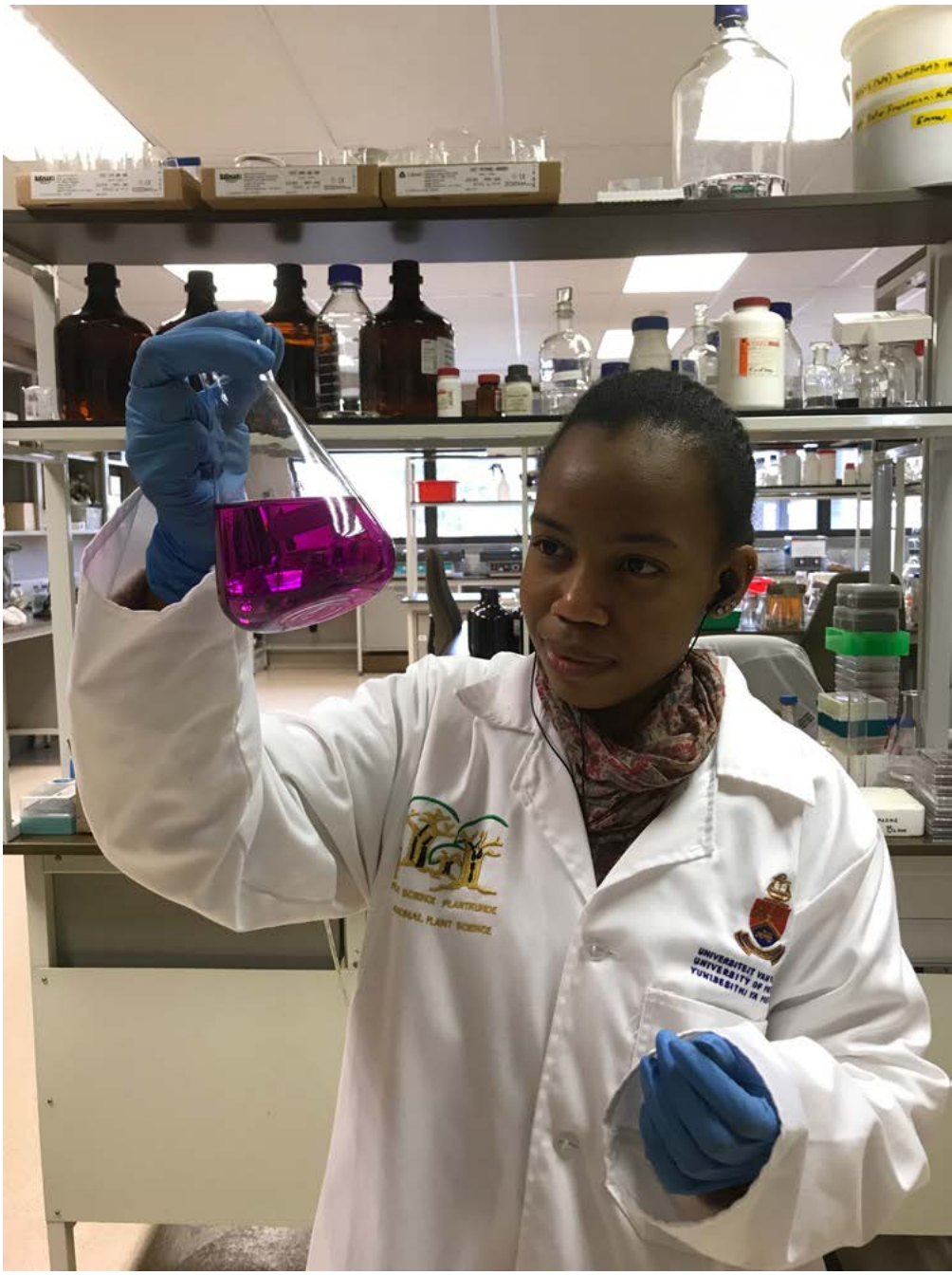
Bright Medicinal Plant Science student inspired to do more

'To have received this prize as a young scientist is an absolute inspiration, a big encouragement to want to do more, and to put in extra effort. It has truly increased my enthusiasm for my work.' These are the words of Murunwa Madzinga, a master's student in Medicinal Plant Science after she recently won the first prize for a poster presentation at the 2017 Indigenous Plant Use Forum (IPUF) conference.

The title of her winning poster is 'Formulation of herbal soap using South African plants with antibacterial and antifungal activity'.

Murunwa's studies in the Faculty of Natural and Agricultural Sciences focuses on the validation of some of the medicinal plants indigenous to South Africa that are traditionally used for treatment of skin infections. In her honours study, she investigated the efficacy of some of the plants used against bacterial and fungal skin pathogens. The extracts showing the best activity were then infused into a herbal soap that was then evaluated against these pathogens.

'Over the years, the occurrence of skin diseases has increased in most parts of the world because of their association with the Human Immunodeficiency Virus (HIV) and Acquired Immune deficiency syndrome (AIDS). More than 80% of people infected with HIV develop skin diseases at some stage of the disease. As South Africa is one of the countries with the largest populations of HIV-infected people and also the country with the largest prevalence of HIV, it can be said that a large percentage of the national population suffer from skin infections at some point. With this research, I would like to contribute to the primary health care system, especially in rural areas where access to and availability of health care is still problematic.'

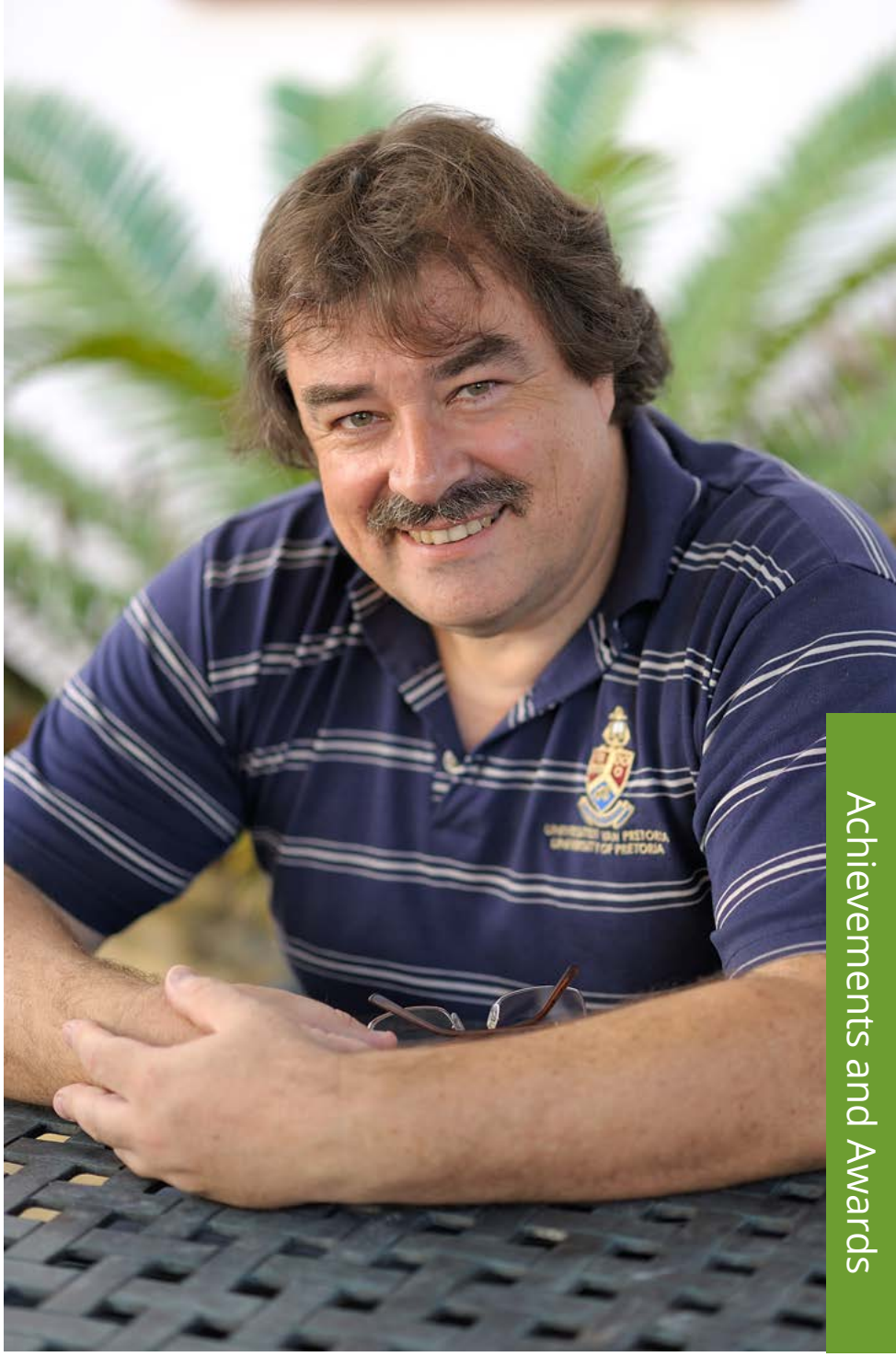


Murunwa Madzinga

'I also want to thank my supervisors, Dr Quenton Kritzinger and Prof Namrita Lall. I would not have succeeded without their help,' says Murunwa.

Other than doing her MSc research and tutoring undergraduate modules, she enjoys reading, hiking and playing with her dogs.

Mammalian Behavioural Ecology and Physiology Chair renewed for third cycle



Prof Nigel Bennett

Prof Nigel Bennett, the current incumbent of the Department of Science and Technology (DST) / National Research Foundation (NRF) Joint Research Chair (SARChI) in the field of Mammalian Behavioural Ecology and Physiology at the University of Prteoria successfully won its bid for the third and last five-year cycle. He has held this Chair for the past ten years.

Prof Bennett's research primarily focuses on African mole-rats as research models for investigating socially induced reproductive suppression and also the ecological constraints that have forged sociality in subterranean mammals.

Prof Bennett occupies the Joint SARChI Chair, as well as the UP Austin Roberts Chair of African Mammalogy. He has published 325 research articles in international peer-reviewed journals, including papers in *Nature*, *Science*, *Proceedings of the National Academy of Sciences, USA*, *Proceedings of the Royal Society of London, Advances in the Study of Behavior* and *Trends in Ecology and Evolution*.

He is a fellow of the Zoological Society of London, the Royal Society of South Africa and the Academy of Science of South Africa (ASSAf). He has served as President and Vice-President of the Zoological Society of Southern Africa and is Editor-in-Chief of the *Journal of Zoology*, London and Editor of *Biology Letters*. He received the Chancellor's Medal for Research in 2003 and 2011 and the Zoological Society gold medal in 2008, as well as the Havenga Prize for Biological Sciences for his research on living material. In 2015 he received the NSTF award for research capacity development over the last 5 to 10 years by an individual, sponsored by ESKOM.

He holds an A2-rating from the NRF and in 2017 he was also elected as a Fellow of the African Academy of Sciences.

The Dean of the Faculty of Natural and Agricultural Sciences, Prof Jean Lubuma, also said that "this is a considerable recognition of what this Chair has achieved to attract and retain excellence in research and innovation at UP, specifically by increasing research capacity through the development of human capital and stimulating the generation of new knowledge, in accordance with the objectives of the SARChI Chairs initiative. We thank you for making this Chair a powerful instrument to strengthen the visibility of Biological Sciences cluster at UP."

Courtney Gehle

UP Young Leader is a Global Changemaker

Courtney Gehle, a 22-year-old honours student in Environmental and Geographical Sciences, has been selected by the European Commission from a global pool of candidates as one of their 16 Young Leaders for Development 2017. She delivered a presented at Europe's leading forum on international cooperation and development, the European Development Days (EDD) summit, which took place in June 2017 in Brussels, Belgium. The 16 Young Leaders, all aged between 21 and 26, came from all over the world, with strong representation from Africa, including representatives from Ghana, Morocco, Nigeria, The Gambia, Botswana, Zambia, and of course, South Africa.

The EDD summit is an annual gathering where ideas and experiences are shared to find innovative solutions to the most pressing global development challenges. It aims at tackling poverty worldwide through economic development. The main theme at this year's summit was investing in development, which is closely linked to the United Nations' 2030 Agenda for Sustainable Development.

These Young Leaders was part of high-level panel discussions, sharing a stage with presidents and other world leaders. Sessions focused on a variety of topics that espouse a commitment to a fairer, more sustainable future, and Gehle presented on the Africa Renewable Energy Initiative and on Trade and Fair Globalisation. Gehle used the opportunity to introduce the human element of what is happening on the ground, especially regarding women and youth, to these high-level policy discussions. She is particularly interested in the human side of development and is focusing her studies on sustainable development, which surely guided her in preparing for her presentation and participation in the panel discussions.

In the days leading up to this year's EDD summit, the European Commission provided the Young Leaders with training in both protocol and public speaking, providing a great opportunity to learn and grow. With almost every international development organisation present at this year's summit, from various United Nations bodies to regional Development Banks and everything in between, it offered the perfect platform to network and build relationships with the international development community.

The EDD summit certainly aided Gehle's current initiative, The Better Tomorrow Movement, which is an online youth empowerment platform that she founded after being selected as a Global Changemaker and attending the Global Youth Summit last year. This initiative was inspired by the dynamic people she met at the summit, and it aims to inspire, empower and support people who are making a positive difference in the world. The initiative also runs an international mentorship programme for young people who want to make their difference. Later this year, Gehle will be attending the Global Youth Summit again, but this time as a peer facilitator.

In between all her international trips, initiatives and studies, Gehle has also started working part-time for the United Nations Industrial Development Organisation's Global Cleantech Innovation Programme. This aligns with her interest in promoting technologies that make it easier for people to be 'green'. She says juggling it all is challenging at times, but that fortunately, her lecturers are used to her shenanigans by now.

Thinking about her future, Gehle says she would love to live and work in other parts of Africa. Her life motto is a quote by Desmond Tutu: 'Do your little bit of good where you are with what you have.' Gehle is certainly on the right path to make a difference in the world.

Master's student in Food Science won Brian Koeppen Memorial Scholarship

Itumeleng Magabane, a second-year MScAgric student in Food Science and Technology was recently awarded the Brian Koeppen Memorial scholarship of the South African Association for Food Science and Technology (SAAFoST).

"Receiving this award is such an incredible honour and I am humbled by the recognition. This award is not only important to me, but also to my supervisors and the Department as a whole. Getting your research noticed and credited creates an incredible feeling of worth and motivation to achieve even greater things. I am grateful to SAAFoST for the award, Prof Elna Buys for the nomination and finally, Prof John Taylor and Dr Janet Taylor (all from the Department of Food Science) for their brilliant research supervision," Itumeleng says.

Itumeleng's research particularly focuses on cereal science and food chemistry. Her research project is on gluten-free bread development with sorghum, which is an underutilised cereal grain in Africa. She states: "I work with dough improvement techniques and the chemistry behind it. We have had the opportunity to work with sorghum varieties with improved protein quality, with greater essential amino acids content and improved digestibility."

She iterates: "By using these bio-fortified cereal grains, we aim to improve the quality of gluten-free bread, whilst also tackling sensitive nutrition related problems such as protein-energy malnutrition. With the current high dependence on wheat for bread and the high wheat import prices, it is absolutely necessary and urgent for food scientists to shift more towards alternative cereal grains."

She was recently selected as a finalist for the McKinsey 2017 'Next Generation Women Leaders' award. Since 2014 she has also been a member of the Golden Key International Honor Society.

Itumeleng concludes by saying: "Enrolling for a degree in Food Science in 2012 was one of the best decisions I have ever made in my life. It has exposed me to so much knowledge; knowledge that is much needed, along with a passion of course, for someone who aims to be an active participant in a better South Africa. I believe even the scientists are just as important in getting us a step closer to that vision."

Itumeleng Magabane

Prof Jacek Basniak

Mathematical Models and Methods in Bioengineering and Biosciences Chair renewed

Prof Jacek Banasiak, the Chair holder of the DST/NRF SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences (M^3B^2) recently received the good news that the Chair was successful in its bid for another five-year cycle.

"I am really pleased about the renewal of the grant and that I will be able to continue working in this field. I recognise, however, that this is not only my achievement, but an achievement of the whole excellent team of Principal Investigators and students, as well as of the first Chair holder, Prof Jean Lubuma, who set a standard for the group. I am proud to be his successor," Prof Banasiak emphasised.

All applications were subjected to an assessment which involved a two-phase peer-review process.

The Dean of the Faculty Natural and Agricultural Sciences, Prof Jean Lubuma, also said that "this is a considerable recognition of what this Chair has achieved to attract and retain excellence in research and innovation at UP, specifically by increasing research capacity through the development of human capital and stimulating the generation of new knowledge, in accordance with the objectives of the SARChI Chairs initiative. We thank you for making this Chair a powerful instrument to strengthen the visibility of the Mathematical Sciences cluster at UP."

Prof Banasiak is the Chair holder since January 2016 and prior to his appointment at the University of Pretoria, he was an Academic Leader: Research at the University of KwaZulu-Natal (UKZN). During his tenure at the UKZN he was also the Head of the School of Mathematical Sciences from 2005 to 2007 and a Senior Professor in the Department of Mathematics and Applied Mathematics.

He authored/co-authored five research monographs and was also author/co-author of more than a 100 peer reviewed research papers. Prof Banasiak was a Visiting Professor at the University of Franche-Comte, France, in 2004 and is currently Visiting Professor at the University of Strathclyde since 2010.

In 2012 Prof Banasiak received the South African Mathematical Society Award for Research Distinction and in 2013 the Cross of Merit (Silver) of the Republic of Poland. In 2014 he was awarded the first prize in the competition for the best paper in Applied Mathematics organised by the Centre for Applications of Mathematics (Gdańsk).

He is the Editor-in-Chief of *Afrika Matematika* (Springer), an Advisory Editor of *Mathematical Methods for the Applied Sciences* (Wiley), an Associate Editor of *Quaestiones Matematicae*, as well as a member of the Editorial Board of *Evolution Equations and Control Theory* and of the AIMS Library Series of the Cambridge University Press.

Top Food Science student won Aubrey Parsons Bursary

"Nothing is impossible in life if you work hard." These were the words of an elated Kgomotso Dhlangamandhla, a fourth-year BScAgric student in Food Science and Technology. She was recently awarded the Aubrey Parsons South African Association for Food Science and Technology (SAAFoST) bursary for academic excellence.

"I am truly grateful for this bursary as my parents would not have been able to afford my studies. This year has been a year of multiple blessings and the fruit gained on my hard labour during my studies. At the beginning of the year I was surprised but honoured by the nomination by Prof Elna Buys, Chairperson of the Department of Food Science for the Audrey Parsons Study Grant, and it was a pleasant surprise when I received the email confirming my successful application. This year has been a wave of blessings and amazing opportunities because shortly before I received that news I received two invitations to conferences being held overseas namely, the International Food and Agribusiness Management Association (IFAMA) hosted in Miami, Florida, USA, in June 2017, as well as the Institute of Food Technologists (IFT) Conference hosted in Las Vegas, Nevada, USA, also during June 2017. I am really excited about both these opportunities and hope to honour the Food Science Department by being a good ambassador for the University."

Kgomotso Dhlangamandhla

According to Kgomotso, "my experience of the honours programme this year has been filled with exciting classes, group work, guest lecturers and research, all of these being new experiences. In my opinion the two main focus areas were our Food Product Development module and our research project. Both these were exciting modules. All product development groups were tasked to use the new rising star ingredient namely spent grain in the production of commercial and craft beer as well as in associated industries."

She explained that "spent grain is the co-product of beer production and has recently been in the spotlight because of its high nutritional properties (high fibre, high protein, low fat). It has never before been used for anything else except animal feed. South African Breweries (SAB) came on board and provided us with resources (spent grain and a cash budget for each team) to develop products aimed at human consumption. Our group decided to develop spent grain sugar cones for our development project. We have found a suitable recipe and are in the process of performing tests on that recipe. My research project, just as interesting to me, is titled: *An investigation into the quality aspects and anti-oxidant properties of Bambara groundnut-grain composite biscuits, using wheat, maize and red sorghum*. Though the empirical phase has yet to begin, we are currently busy with seminar presentations, focusing on a section of the overall project as a step towards the final product."

Kgomotso is also the current Chairperson of TUKSFoST, the student organisation that represents the undergraduate and postgraduate students of the UP Department of Food Science.

International Leadership Award for Prof Mike Wingfield

Prof Mike Wingfield

"Amongst the most productive scientists of his generation, and possibly in every generation in the field of forest health. He is an extraordinary scholar, but also an extraordinary leader, mentor, and friend to many scientists around the world." This was one of the citations about Prof Mike Wingfield when the announcement was made that he was awarded the **Distinguished Leadership Award for International Scientists for 2016**, by his alma mater, the University of Minnesota. The award was presented during a ceremony held on the campus of the University of Minnesota on 2 June 2017.

Prof Wingfield is Professor and Founding Director of the Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria and also the current President of the International Union of Forest Research Organizations (IUFRO), a worldwide network of more than 15 000 forest scientists with its headquarters based in Austria. Furthermore, he is an A1-rated National Research Foundation (NRF) researcher.

Prof Wingfield Mike can be seen rubbing Norman Borlaug's foot together with Prof Bob Blanchette and Prof Jim Bradeen.

This leadership award is bestowed on individuals who distinguished themselves in their post-university work as leaders in their professional careers. Prof Wingfield conducted the research for his PhD at the University of Minnesota and was awarded the degree in 1983.

The Awards ceremony was led by the Provost of the University of Minnesota Prof Karen Hanson, the President of the University Alumni Association, the Dean of the College for Natural Resources **Prof Brian Buhr**, the Head of the Department of Plant Pathology **Prof James Bradeen**, and Prof Wingfield's PhD supervisor **Prof Robert Blanchette**.

After the ceremony and a lecture on global tree health trends presented by Prof Wingfield, he had the opportunity to spend time with many friends, including most of his PhD advisors and many past fellow graduate students.

He was also able to visit the recently completed statue of Prof Norman Borlaug, a past faculty member of the Department at which Prof Wingfield studied, the only Plant Pathologist to receive the **Nobel Prize** and an academic whom Prof Wingfield had the privilege to know. There is an emerging tradition that rubbing the right foot of the statue will bring good luck.

Love and academics

When one thinks of history's influential couples, Pierre and Marie Curie generally come to mind. According to an article titled 'The 10 best power couples', which was published in *The Guardian,* it was Marie's 'all-consuming passion for science' that attracted Pierre. Recent University of Pretoria (UP) graduates Ivan and Susan Henrico have their own story of love and success. At the 2017 autumn graduation ceremonies, Ivan graduated with a PhD in Geoinformatics and Susan with an MA in Geography.

Ivan and Susan both joined the South African National Defence Force in 1997 and completed their basic military training at the SA Army Gymnasium in Heidelberg and the SA Army Women's College in George respectively. 'As part of our one-year course, we both underwent military intelligence training in Potchefstroom, and that is where we met,' Susan says. From there they were both transferred to the Military Academy in Saldanha Bay (1998–2000), which is a faculty of the University of Stellenbosch, and successfully completed their BA (Mil) degrees. They have been working together in the geospatial environment ever since.

Ivan is both inspired and motivated by his wife. 'She is hard-working and encourages me in everything I do,' he says. Susan is likewise motivated by her husband who, according to her, 'is really headstrong and will not let small things get him down'. Ivan's brother, Alfred Henrico, has played an important role in inspiring Ivan by showing him that everything is possible if you put your mind to it and are willing to put in the hours. Furthermore, they are inspired by their children, who in turn look to them for inspiration.

With regard to achieving success, Ivan and Susan share the same sentiments and agree that anyone can achieve anything with the necessary passion and commitment: 'Hard work, commitment and enjoyment are basically the secret formula. If you are passionate about your endeavours, all the bumps and hiccups in the process become manageable.' They also share a common dream to be guided by the grace of God to set a good example for their two beautiful children, Tiaan (13) and Janke (9), and to inspire them to do whatever they do to the best of their ability.

Both Ivan and Susan have faced challenges that they overcame. Ivan really had to believe that he had the ability to successfully complete his PhD, and Susan learnt that instead of giving up when faced with difficulties, one should rather be inspired by them. Both believe in living a balanced life. They work hard, but never neglect the most important part of their lives, which is their family. Ivan says that his wife, who completed her master's degree cum laude, is smarter than he is, while Susan said that it was Ivan who taught her not to shy away from problems, but to tackle them head on and everything would fall in place. Ivan plans to continue with his postdoctoral research for the next three years, to publish more articles and maybe enter academia, while Susan plans to complete a PhD and transfer what she has learned to others in the geospatial environment.

Ivan and Susan Henrico

Pierre and Marie Curie passed on the scientific gene to their children and grandchildren, some of whom became distinguished scientists. Ivan and Susan Henrico would also like to leave their children with a legacy that they will be proud of. They plan to accomplish this by continuing to live by their motto: 'Your work is to discover your work and then to put heart and soul into it' (Anon).

Osmond Mlonyeni honoured at Commonwealth Science Conference

Osmond Mlonyeni, a doctoral student at the University of Pretoria (UP), was selected as one of the top three presenters at the student and postdoctoral session at the Commonwealth Science Conference, held in Singapore in June this year.

Mlonyeni received a travel grant worth up to £6 000 (approximately R100 000) 'to support collaborative visits and mentoring from scientists from another Commonwealth country'. Mlonyeni, a geneticist, is from the Forestry and Agricultural Biotechnology Institute (FABI) at UP and is researching the Sirex Wasp symbiosis, which he is conducting under the supervision of Professor Bernard Slippers.

'It was a privilege to be selected among the highly qualified and equally deserving scholars. Similarly, it was also a confirmation of the quality of research undertaken at FABI, where we are conducting research that matters and has impact. The grant will create opportunities to further develop the research project itself, as well as my research network and skills as a scientist,' said Mlonyeni.

The conference was attended by 400 leading scientists from across the Commonwealth. Osmond Mlonyeni, who was selected to attend by one of the organisers, The Royal Society — following his nomination by the African Academy of Sciences (AAS) and the Academy of Science of South Africa (ASSAF) — was one of 12 speakers to give an oral presentation at the student and postdoctoral session about their research and its impact.

Mlonyeni studies the genetic code of microscopic worms known as nematodes as part of the Tree Protection Cooperative Programme (TPCP). The species he is interested in, *Deladenus siricidicola*, is used to combat a devastating wasp pest in pine forests. As there are many different variants of this nematode, with some being more effective than others under different circumstances, his goal is to find signature patterns within their DNA that would indicate which nematode works best for which conditions.

For more information on this project, please visit the University of Pretoria's Research Matters website.

Osmond Mlonyeni

Geoinformatics student selected as a YouthMapper Leadership Fellow

Mr Frikan Erwee, a BSc Hons Geoinformatics student was selected as part of the first group of YouthMapper Leadership Fellows. Frikan was selected out of a pool of 80 students internationally that applied to be part of the YouthMappers leadership programme, and only 20 students were selected.

As part of the fellowship, Frikan attended the YouthMappers Leadership Fellows workshop in Kathmandu, Nepal, during May. Frikan said that before the trip to Nepal, he did not know what to expect, but was honoured to be selected.

The week was filled with activities aimed at improving technical ability like data capture and research communication. Teams also identified specific tools for the toolkit that will be worked on until 1 September. This kit will hopefully help to build current and new chapters. The kit will also focus on education of the usage of open mapping technologies. In their downtime, the fellows could explore and experience the beautiful city of Kathmandu. They also had the opportunity to visit a small village and see the Nepal countryside. Some of the fellows even got to overcome their fear of water during a rafting trip.

The workshop was hosted by the Kathmandu Living Labs. They shared their inspiring story about their response to the 2015 Nepal earthquake disaster. Frikan believes that the workshop and the output to come is evidence that Youthmappers as a network does live by their tagline: "*We do not just build maps, We build mappers*".

Mr Frikan Erwee

Dr Sollie Millard (STATOMET) and Ms Renate Thiede

Science affords you the opportunity to ask questions

"Why pursue a career in Science? Because you have the opportunity to ask questions and Science is curiosity and question driven... Science is also real fun. So if you find the research field that interests you and can answer your questions, you will most definitely enjoy your job!"

These inspiring thoughts were shared by Prof Lucy Moleleki at the Annual Outstanding Achievers Function for students of the Faculty of Natural and Agricultural Sciences (NAS) in May.

Prof Moleleki, Acting Head of the Department of Microbiology and Plant Pathology was the guest speaker at this prestigious function. She also shared her academic journey as well as what her current research projects entails. Prof Moleleki was recently awarded the GDARD Biotech Capacity Development Award and was a finalist for the 2014/2015 NSTF TW Kambule Award.

Ms Renate Thiede was honoured with the Vice-Chancellor and Principal's Medal for excellent undergraduate academic achievement as the best student in the Faculty. Furthermore she won the STATOMET Prize for the best student in Mathematical Statistics at 300-level.

The Dean's Academic Merit List for current undergraduate students with an average of 80% or more was also announced during this event. This year the list included the top first-year, second-year and third-year students, as well as the top students from the BSc – Extended Programme. The winners of these categories are: Ms N Verster (Top first-year student), Ms NKD de Franca (Top second-year student), Ms B van den Berg (Top third-year student) and Mr LKG Nzima (Top BSc Extended Programme student). Mr Nzima also won the Prof Nthabiseng Ogude Award for the best first-year student in the BSc Extended Programme.

The Actuarial Science students showed their prominence by winning nine of the twelve places in the category for first-year top achievers on the Dean's Merit List.

The Dean especially mentioned all the candidates who received their doctoral degree during the recent Autumn Graduation Ceremony.

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 in its midst and is very grateful to all the sponsors of the prizes and trophies.

Sci-Enza and JuniorTukkie win at Scifest 2017

Sci-Enza, the University of Pretoria's Science Centre was honoured with the Best Exhibition: Best Newcomer Award at this year's Scifest Africa.

Scifest is Southern Africa's National Science Festival, established in 1996 with the aim to promote public awareness, understanding and appreciation of science, technology, engineering, mathematics and innovation. This year marked the twenty-first anniversary of Scifest Africa which was hosted in Grahamstown during March. The theme for this year was "Tour de science" which ties in with the International Year of Sustainable Tourism for Development.

Sci-Enza and JuniorTukkie together with other science organisations participated in the festival through interactive exhibitions, science shows and workshops. The theme of the Tukkies team's exhibition was the 'History of maths', aimed at making maths more appealing to the public through math puzzles, games and art. They informed learners in Grade 11 and 12 about the admission requirements of the University of Pretoria and assisted Grade 9 learners with subject choices for Grade 10. They also worked towards recruiting members for JuniorTukkie.

Scifest concluded with an award ceremony to acknowledge the great work that was done by the exhibitors.

The Sci-Enza and JuniorTukkie team

NAS shines bright again at Academic Achievers Awards

The academic and research staff members in the Faculty of Natural and Agricultural Sciences (NAS), were once again the brightest stars at the University of Pretoria's Academic Achievers Awards function this year.

Each year UP hosts a gala function to pay tribute to academics who have shown exceptional achievement in the preceding year.

According to the Vice-Chancellor and Principal of UP, Prof Cheryl de la Rey, "the event is one of the highlights on the University's calendar where we celebrate excellence in the core functions of the University and pay tribute to our academic stars and NRF-rated researchers". She added that, despite the turbulent times recently experienced by higher education in South Africa, a key success factor to survival and growth is dedicated staff members who are committed to excellence in research, teaching and learning.

The Faculty can boast with five out of the ten UP Academic Achievers, namely Prof Roumen Anguelov (Mathematics and Applied Mathematics), Prof Jaco Greeff (Genetics), Prof Zander Myburg (Genetics), Prof Jolanda Roux (Plant and Soil Sciences) and Prof Fanus Venter (Microbiology and Plant Pathology).

Two academic staff members from the Faculty, Dr Vinet Coetzee (Genetics) and Dr Brett Hurley (Zoology and Entomology) were also recognised as Exceptional Young Researchers.

Prof Nigel Bennett (Zoology and Entomology) was awarded the Vice-Chancellor's Award for Exceptional Supervisor. This award recognises the contribution of members of UP's academic staff who excel as supervisors of postgraduate research students. The award is made on the grounds of exceptional performance measured in terms of the students' academic achievement. Evidence of excellent mentorship and guidance provided to young researchers and academic scholars are also taken into consideration.

From these incredible achievements of staff members in the Faculty of Natural and Agricultural Sciences it is evident that the Faculty is one of the leading science faculties on the continent.

Vice-Chancellor's Award for Exceptional Supervisor: Prof Nigel Bennett

Exceptional Young Researcher: Dr Vinet Coetzee

Excellent Academic Achiever: Prof Roumen Anguelov

Excellent Academic Achiever: Prof Jaco Greeff

Excellent Academic Achiever: Prof Zander Myburg

Exceptional Young Researcher: Dr Brett Hurley

Excellent Academic Achiever: Prof Jolanda Roux

Excellent Academic Achiever: Prof Fanus Venter

PhD student in Medicinal Plant Sciences wins coveted prize

At the annual conference of the Indigenous Plant Usage Forum (IPUF), Carel Basson Oosthuizen, a PhD student in Medicinal Plant Sciences in the Department of Plant and Soil Sciences was recently awarded the prize for the best paper. The title of his paper was 'Natural coumarins against persistent mycobacterial biofilms'.

Carel Oosthuizen

The work presented by Carel is part of his doctoral research, which was undertaken to evaluate the efficacy of natural products or compounds from plants that are able to inhibit mycobacterial biofilms. *Mycobacteria tuberculosis* is a bacterium that causes tuberculosis in humans, and because of the ability of these bacteria to clump together in a slimy environment it is very difficult to treat them with antibiotics. The result is that the bacteria continue to live in the human body for an extended time. By using chemical compounds isolated from plants, these biofilms can be disrupted which may lead to ultimately aid in the treatment of tuberculosis. Carel's research also includes computational biology and computer-aided simulations to describe exactly how these compounds work and where specifically inhibition occurs.

Carel is a true Tukkie who also completed his undergraduate studies and his MSc degree in Medicinal Plant Sciences at UP. This was not the first time that his presentations skills were acknowledged as he also received the prize for the best master's presentation in 2014.

His further studies were made possible by the Innovation Doctoral Scholarship that he received from the National Research Foundation. He has also been invited to complete part of his postgraduate studies with regard to biofilms and their mechanism at the University of East Anglia in England and the University of Albany in the USA. He has presented his research at three international and three national conferences, where it has sparked a lot of interest. He has published four peer-reviewed articles in top scientific journals and two chapters in books on the use of plants in the treatment of tuberculosis. Together with his supervisor, Prof Namrita Lall, he holds a South African and international patent for the use of a plant extract as an adjuvant treatment for patients suffering from TB. Through this project, Carel received seed funding from the Technology Innovation Agency for the further development and commercialisation of the invention.

Commenting on his achievement, an elated Carel said: 'Receiving a prize like this and being recognised for my contribution to science has a tremendous positive impact on how I, as a young scientist, approach my work. It motivates and inspires me to do more. I am extremely passionate and excited to find out novel targets for Mycobacteria. The diversity of indigenous South African plants presents us with great potential to discover new drugs and treatments for all kinds of diseases such as tuberculosis, cancer and various skin ailments.'

Prof Lyn-Marie Birkholtz

SARChI Chair in Sustainable Malaria Control renewed

The DST/NRF South African Research Chair in Sustainable Malaria Control was recently approved for another five-year cycle. This truly transdisciplinary Chair is hosted in the Department of Biochemistry (Faculty of Natural and Agricultural Sciences) and forms part of the University of Pretoria's Institute for Sustainable Malaria Control (UP ISMC, Faculty of Health Sciences).

The Chair was initially awarded to UP in 2013 as leading institution in the country with a focus on all aspects of malaria research, directly influencing the South Africa Department of Health Malaria Elimination Strategy.

The Chair harnesses expertise in malaria biology in South Africa to enable sustained malaria control in the African context. Prof Lyn-Marie Birkholtz has been the incumbent in the Chair since its inception and she also leads the Parasite Control Cluster within the UP ISMC. This research programme undertaken by Prof Birkholtz's team is nationally and internationally trend-setting and uniquely transdisciplinary: the research focuses on the interplay between parasite biology and drug discovery, associated with host-parasite interactions to predict therapeutic outcomes. In this way, the research aims to deliver novel interventions which are useful to the malaria control and elimination agenda.

The Chair's programme has been very successful, not only regarding research deliverables, but also regarding infrastructural and human capacity development at UP. Highlights of the Chairs' research include contributing to the first African-borne clinical candidate antimalarial to be useful in elimination agendas. The Chair leads the South African Malaria Transmission-blocking consortium which is a national platform with the CSIR and Wits, focussing on describing the potential of new chemical compounds to be useful to malaria elimination strategies. Collectively, the work undertaken by the consortium is examining whether new antimalarial candidates that may cure an infection could also be used to block the transmission of the malaria parasite from humans to mosquitoes. Malaria elimination becomes a reality only once this transmission cycle is broken. With the Chair renewal, the next five years will see an expansion of these capabilities to establish a regional centre of excellence in malaria parasite biology and drug discovery. The Chair closely associates with other Chairs, including Prof K Chibale (Chair in Drug Discovery at UCT) and Prof M Coetzee (Chair in Medical Entomology and Vector Control, Wits). This culminated in a Community of Practice on Malaria Elimination, funded by the NRF.

The Chair's programme expanded to a total of 31 members, including 24 postgraduate students, three current postdoctoral fellows, four staff scientists and one young co-investigator mentored in the Chair's programme. In this way, a new generation of scientists are trained in parasite biology and drug discovery on the African continent.

Sci-Enza celebrates its 40th birthday

Sci-Enza, the first interactive science centre in Africa, is celebrating its 40th birthday this year. One of the attractions of the centre is a camera obscura which offers spectacular panoramic views of the Jacaranda City and the campus of the University of Pretoria (UP).

The foundation for the current Sci-Enza was laid in 1977 when the Department of Physics opened an interactive Science Lab on the ground floor of the Physics Building (now the Mineral Sciences Building). The founder of this initiative was Prof Lötz Strauss, a passionate physicist and lecturer who realised that students need to have more informal interaction with scientific equipment in a nonthreatening space (as opposed to formal training laboratories) where they could explore and learn without supervision.

This 'Open Lab' as it was called in the early years became very popular as there were more than thirty hands-on exhibits, a reading corner with scientific books and magazines, and duplicate setups of the first-year physics practicals so that the students could familiarise themselves with the apparatus and repeat the curriculum experiments. Technical assistants of the Department of Physics volunteered to assist in the 'Open Lab' to supervise, explain, maintain and develop new exhibits.

In 1980 the informal name 'Open Lab' was changed to 'Exploratorium' and on 29 April 1980, the Exploratorium was officially opened. A full-time post for a science centre manager was also approved during this year. The centre became popular amongst all students on campus (not only the science and engineering students) and members of the public, teachers and learners wanted to visit the Exploratorium as well.

Under the championship of Prof Lötz Strauss, the centre grew exponentially in its stature as an essential centre of learning and primary exposure to science and technology. A bigger space for this popular centre was needed and the Exploratorium was included in the design for the new Natural Sciences 1 Building. The Exploratorium moved to the ground floor of NW1 during 1987.

In 1990 a camera obscura was built on the roof of the Natural Science 1 Building as an extension of the science centre. This unique facility offers spectacular panoramic views of the Jacaranda City and the campus and has become a popular tourist attraction on campus.

In 1995 the San Francisco Exploratorium trademarked the name 'Exploratorium' and the University of Pretoria had to rename the science centre. For the period 1999 to 2004 the science centre was known as the Discovery Centre/Ontdekkingsentrum. In 2001 the Centre moved to new, much larger premises in the Technical Services Building and became a truly integrated science, engineering and technology centre.

In 2005 the name of the centre changed to Sci-Enza, a combination of the word science and the isiZulu word 'sebenza', meaning 'work' or 'to do'. This is a unique name which fits all the activities of the centre and the diversity of visitors.

Thirty-five science centres have grown in South Africa from the humble beginning of Sci-Enza in 1977. These centres are all members of the South African Association of Science and Technology Centres (SAASTEC) which represents South Africa within the International Network of Science Centres. Sci-Enza played a major role to assist and mentor new and upcoming science centres in South Africa, Zimbabwe, Botswana, Namibia and Kenya.

An average of 17 000 school learners have visited Sci-Enza every year since its relocation to the current facility. This represents about 280 school groups per

Credit: Ms Rudi Horak

year. The programme for booked visits consists of a popular science show and demonstrations, hand-on experience and a visit to the camera obscura. Sci-Enza receives about 20 000 casual visitors per year. This group comprises students, school learners, parents and grandparents accompanying children, and other members of the public who attend public talks and workshops. The centre has a well-equipped auditorium, three workshop venues, a reading corner, more than 200 interactive exhibits and models and a puppet theatre. Sci-Enza is also actively involved in several outreach projects, programmes and exhibitions such as the MJ Reading Room in Mamelodi, National Science Week, Sasol TechnoX, SciFest, Science is Fun Holiday programmes, teacher workshops and special events like the Bloodhound Super Sonic Car promotions.

Sci-Enza has grown up and become a science centre that is locally and internationally recognised and respected. This would not have been possible without the support of various vice-chancellors and the University management, as well as the deans of the Faculty of Natural and Agricultural Sciences and the heads of the Department of Physics over this period.

Ms Rudi Horak, former manager of Sci-Enza

Ms Puleng Tsie, current manager of Sci-Enza

Happy 40th birthday Sci-Enza!

UP researchers on top of the world about fungi research

The University of Pretoria (UP) was recently ranked second in the world in the study of fungi (or mycology) by the **Centre for World University Rankings (CWUR)**.

Prof Wilhelm de Beer, from UP's **Forestry and Agricultural Biotechnology Institute (FABI)**, says that this accolade came as a pleasant surprise: "We don't even have a mycology department at UP, but this proofs that FABI's broad research on plant health, invasion biology, and forest diseases, which all deal with fungi in some way, makes a global impact."

CWUR evaluated papers published by an institution in a specific research area in order to arrive at these rankings. UP researchers published 346 papers from 2006 to 2015 dealing with mycology, 330 of which were published by FABI. Equally impressive, out of UP's 100 most-cited papers over this period, 27 were written by FABI researchers and 21, in some way, dealt with fungi.

Since the establishment of the Tree Protection Cooperative Programme in 1990 and the DST-NRF Centre of Excellence in Tree Health Biotechnology in 2005, researchers at FABI have been working with the South African forestry industry to get diseases and pests under control. As their names suggest, these programmes' research focus are on the health of trees and forests overall, but the study of fungal diseases is central to this work.

In fact, FABI's collection of fungi has just reached a total of 50 000 living specimens, making it by far the largest collection in Africa, and one of the largest collections in the world. Accommodated in a walk-in cold room in the FABI building, this collection not only includes more than 500 new species discovered and described by FABI researchers over the last 20 years, but also collections from around the world that come from the many international collaborations in which FABI researchers are involved.

Referring to the academic publishing record behind the CWUR ranking, **Prof Bernard Slippers** of FABI says, "this body of work exists because of our cooperative programme of research with all of the forestry companies and various agricultural companies in this country."

"That's how this research group started," he adds, "and the programme has only lasted for 28 years because we are solving their problems."

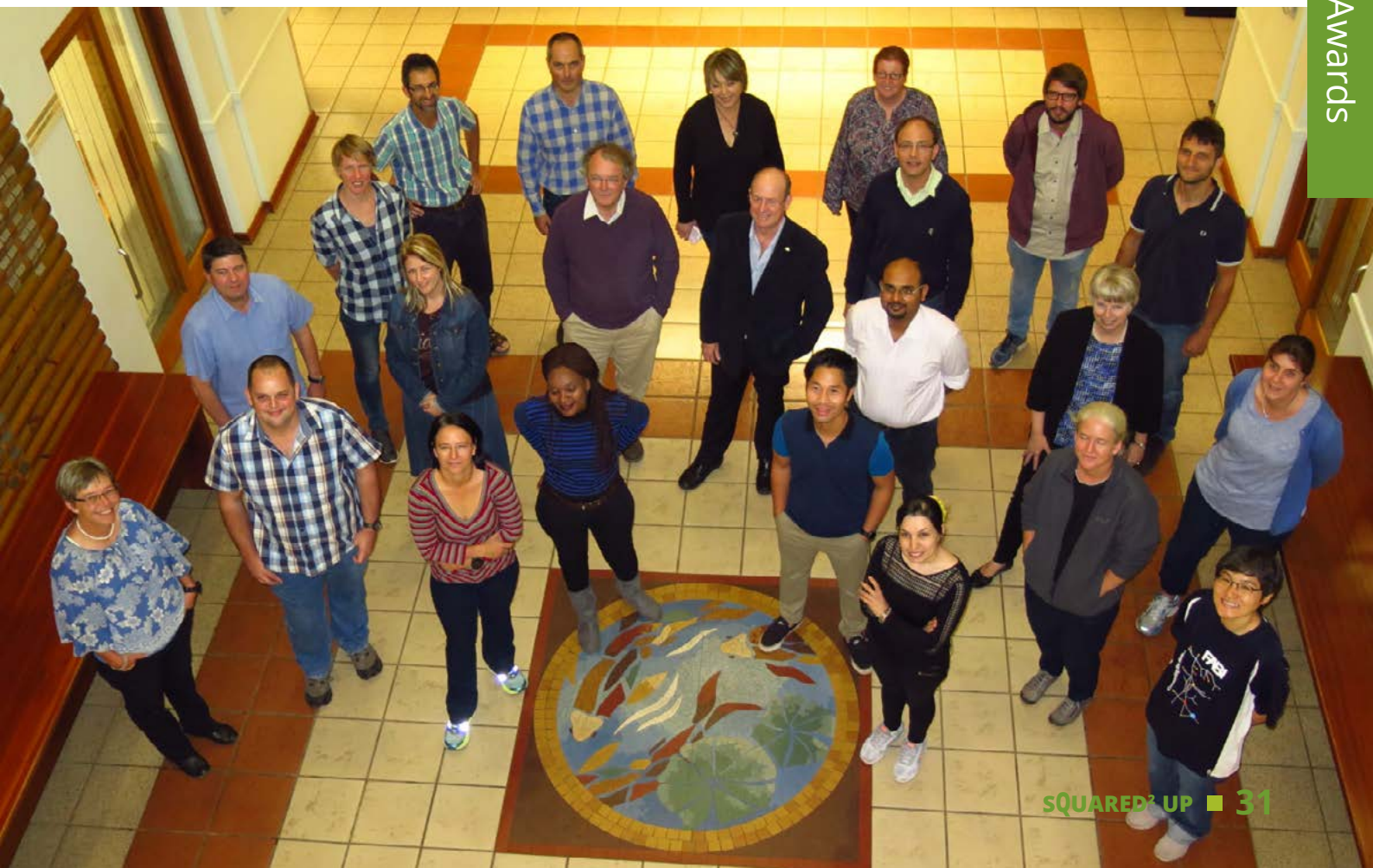
He gives the example of *Fusarium*, a fungus that causes pitch canker disease on pine trees, damaging or killing young plants and even mature trees. For years, FABI has done research from basic biology and fungal genetics to supporting breeding programmes and nursery management systems. The result is an effective management system and disease-resistant tree lines that greatly improve pine health in South Africa's commercial nurseries and plantations.

FABI's symbiotic relationship with the South African forestry industry also entails a tree disease diagnostic service. Prof De Beer explains: "Anybody involved in forestry in South Africa can send us diseased material for diagnosis. We believe in responsible diagnosis: if the disease is serious, our field extension officers visit the plantation, trying to understand the bigger picture and making recommendations to mitigate the problem."

This all means that FABI stays in direct contact with every single role player in forestry in South Africa – both large and small companies, as well as government departments and industry bodies. Being directly funded by industry puts the research group in a uniquely strong position to respond to disease threats and outbreaks, and provides them with a constant source of research material and real-world problems to solve.

In return, according to Prof Slippers' calculation, for every R1 invested in FABI by a forestry company, FABI on average produces research to the value of R8. That is an 800% return on investment, not including the savings provided by healthier plants and stronger growth.

Through this well-considered research strategy, what was started as a one-person forest health research programme by Prof Mike Wingfield has grown into a world-class and world-renowned institute studying all aspects of forest health. FABI now boasts with more than 100 researchers working on tree health, including three NRF A-rated researchers and several others with NRF ratings, collaborating with leaders in mycology and related disciplines from all over the world.



CMEG student is awarded a Gauteng Biotech Fundi Award

Storme de Scally, a MSc student at the Centre for Microbial Ecology and Genomics was awarded the Best Performing Student at the 2017 Gauteng Biotech Fundi Awards.

This award was granted to the student with the highest overall academic average among all UP students who had received the Gauteng Department of Agriculture and Rural Development (GDARD) bursary in 2015.

"Winning the award came as a great surprise; I was invited to the award dinner with the expectation that the theme of the evening was to celebrate all past GDARD bursary awardees. I feel lucky to have received both the bursary and the award among so many academically strong students. The award allowed me to pay for my studies during my honours year, and therefore afforded me the opportunity to pursue another postgraduate degree. I am extremely grateful for the award," Storme says.

She is currently studying the effects of ocean acidification on Southern Ocean marine microbial communities, and has already published a peer-reviewed scientific article within the field of microbial ecology.

"Ocean acidification, the decrease in seawater pH due to increased atmospheric carbon dioxide levels, negatively impacts several marine species. Microbial communities, including bacteria and fungi, are essential members of marine ecosystems and mediate biogeochemical cycling processes (e.g., cycling of carbon, nitrogen and phosphorus). Therefore, determining how ocean acidification may affect the composition, abundance and function of microbial communities is crucial to understanding the impacts of climate change," she explains.

Storme de Scally

De Scally is a member of the International Society for Microbial Ecology (2016), South African Society for Microbiology (2015) as well as a member of the Golden Key International Honours Society since 2013.

She completed a BSc Microbiology in 2014 and an honours degree in Genetics in 2015, both cum laude. She has already published in *Soil Biology and Biochemistry* as well as a chapter as co-author in *The Biology of Arid and initial Soils.*

Other achievements include being a recipient of the SASSB Best MSc Oral Presentation 2017, NRF Scarce Skills Bursary 2016-2017, ISME 16 Travel Grant 2016, SASM 2016 Best Oral Presentation 2016, GDARD Biotechnology Bursary 2015, Honours Merit Award Bursary 2015 as well as being part of the Dean's Merit List 2014.

Prof Jacquie van der Waals won SASPP award

Prof Jacquie van der Waals was awarded the Applied Plant Pathology Award at the annual Southern African Society for Plant Pathology (SASPP) Congress in January 2017. She is an associate professor in the Department of Plant and Soil Sciences and also the founder and manager of the Potato Pathology Programme @ UP.

The primary focus areas of her research group are the detection and monitoring of potato pathogens in South Africa, drafting integrated management strategies and establishing the effects of climate change on diseases. The three primary diseases they focus on are blackleg, powdery scab and Rhizoctonia. Their research will further the understanding of the biology, epidemiology and spread of the respective pathogens, while providing South African and international growers with advice on sustainable potato production.

At the annual Potatoes South Africa research symposium in July 2015, she received the award for Best Researcher Presentation. Early in 2016 she was nominated by Focus on Potato, a web-based resource of the Plant Management Network of the American Phytopathology Society's editorial committee to record a webcast on blemish diseases in table potatoes. She was an invited keynote speaker at the European Association for Potato Research (EAPR) Pathology and Pests Section Meeting in August 2016 in Scotland. She received a C2 rating from the NRF.

Prof Van der Waals has strong collaborations with researchers in Scotland, The Netherlands, Israel, Poland and Zimbabwe and also works closely with numerous South African colleagues at UP, UOFS and the Agricultural Research Council.

The Potato Pathology Programme @ UP not only conducts research into potato diseases, but also houses a diagnostic clinic for plant diseases, specifically potato diseases.

Prof Jacquie van der Waals

Prof Manyala leads SARChI Chair in Carbon Technology and Materials

Prof Ncholu Manyala is the current incumbent of the South African Research Chair Initiative (SARChI) in Carbon Technology and Materials. He is directing his research efforts towards graphene and other **nano-material applications**. To this end he has established a graphene synthesis laboratory in the Department of Physics in the Faculty of Natural and Agricultural Sciences.

On the larger scale Dr Heinrich Badenhorst from the Department of Chemical Engineering is responsible for the **bulk carbon materials** group.

The SARChI Chair in Carbon Technology and Materials was established in 2006 within the Institute. Under the guidance of Prof Brian Rand, a world leader in carbon materials research and a NRF A-rated scientist, the Chair has grown and expanded its focus from mainly nuclear materials into new and exciting areas.

Prof Manyala obtained his PhD from the Louisiana State University, working on low temperature transport and the magnetic properties of strongly correlated materials. While at Louisiana State University, he published two papers in this field in *Nature* and one in *Nature Materials*.

Prof Manyala has published more than 50 papers on this subject. He is a member of the International Society of Electrochemistry, the South African Microscopy Society and the South African Institute of Physics. He received a C2 rating from the NRF.

Prof Ncholu Manyala

The activities of the laboratory are divided between the departments of Physics and Chemical Engineering. The focus of both nano-carbon and bulk carbon is on renewable energy, such as energy storage devices, including supercapacitors and batteries and also solar and thermal energy applications. The Chair has accumulated several achievements during the past years. Under its flagship several outstanding researchers were recruited from several countries across Africa.

Three master's students, one honours student and three PhD students successfully completed their studies in 2015 and 2016. In 2016, the academics involved also recruited two postdoctoral fellows, seven PhD students, five master's students as well as one honours student, who are all set to complete their studies in Chemical Engineering and Physics in 2017 and 2018. Furthermore, the Chair was able to assist in securing several sponsorships for members of their teams from the UP Research fellowship, the National Research Foundation (NRF), the South African Research Chairs Initiative (SARCHI), the South African Nuclear Energy Corporation (NECSA), the South African Water Research Council, the Organisation for Women in Science for the Developing World (OWSD), the Council for Scientific and Industrial Research (CSIR) and MasterCard.

With the Chair's guidance and mentorship, the team published several research articles of the highest quality. In this way they have played a key role in the output of twenty-two research articles, all published in 2016. Furthermore the Chair and his team contributed to several highly publicised conferences such as the Global Nanotechnology Congress and Expo in Dubai, the 5th International Conference on Advanced Capacitors in Japan, the Gordon Research Conferences: Batteries in the USA and the SASEC Conference, as well as the International Annual Carbon Conference at the Penn. State University, USA. With an awareness of the importance of partnership and discovery in science in the world, the Chair and his team have partaken in a number of local as well as international collaborations with academics such as Prof A T Johnson (jr) of the University of Pennsylvania, Dr Joseph Kirui of the University of Venda, Dr Fredrik Wallin and Prof E Dahlquist, Mälardalen University, Sweden, Prof F Waanders and Prof T Majozi, of the North-West University and the University of the Witwatersrand, South Africa.

The Chair and his team were able to source additional funds to a considerable amount, besides the normal funding from the NRF. This culminated in a total of R 1 817 000 during their quest in order to provide their groups with the best equipment and environment conducive to the production of excellent research.

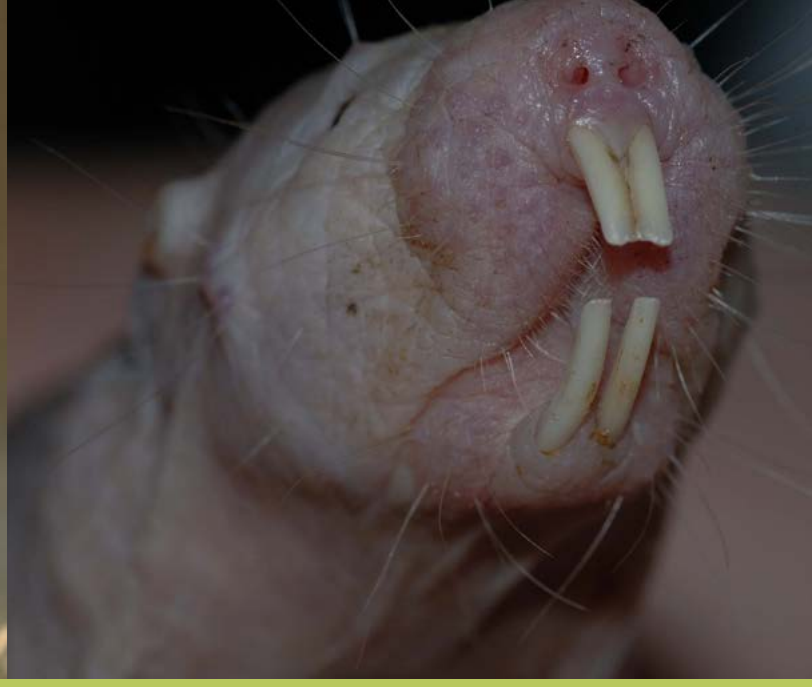
Father and daughter graduates together

This year's Autumn Graduation Ceremony was a celebration for many graduates. However it was of special significance for a father and daughter in the Faculty of Natural and Agricultural Sciences.

Ms Tasneem Khan, graduated with a BSc Human Physiology degree together with her father, Mr Faizel Khan, who graduated with a BSc Geoinformatics degree. Both of them started their studies in 2014 and are currently busy with postgraduate studies. Tasneem is doing an honours in Biochemistry and her proud dad is studying towards an honours in Geoinformatics, with electives in Archaeology.

Mr Faizel Khan and his daughter, Ms Tasneem Khan

Naked mole rat (Prof Thom Parks)



Naked mole rat (Dr Heike Luterman)

Death is temporary – the resurrection of the naked mole rat

Imagine putting 100 mice in a shoebox, taping the box shut and burying it a metre underground. The result should be obvious – 100 dead mice. In fact, if any animal is deprived of oxygen for too long the result is fatal – any animal except one, that is.

When the naked mole-rat is completely deprived of oxygen, it stops breathing, its heart rate drops and it subsequently dies. However, its death is temporary and if within a certain time it is given oxygen again, it comes back to life.

While it is incredible that these tiny mammals from East Africa can survive chronic oxygen deprivation in the underground environments in which they live, the fact that they are able to bring themselves back to life is almost unbelievable.

*Prof Nigel Bennett and Dr Heike Lutermann, of the University of Pretoria's Department of Zoology and Entomology, are involved in an exciting study on this topic that has been featured in *Science*. Visiting researcher and another lead investigator in the study, Prof Thom Park of the University of Illinois in the USA, says: 'This was a challenge so big that it took three labs on three continents to solve it.' Prof Gary Lewin of the Max Delbrück Centre for Molecular Medicine at the University of Berlin, Germany, was the other lead investigator in the study.

While this discovery is going to necessitate rewriting the world's zoological textbooks, it also brings exciting prospects to the realm of human health. Understanding how one mammal is able to survive without oxygen could lead to human lives being saved in times of crisis, such as when someone is in a car accident or suffers a stroke or a heart attack.

While naked mole-rats are adapted to the high levels of carbon dioxide in their underground clay castles, this study observed the results when mole rats had no access to oxygen at all. During these periods, the naked mole-rat reduces its heart rate to the extent that it almost appears to have stopped. It keeps it pumping just enough to circulate blood. The scientists are not yet fully certain how these animals manage to reduce their heart rate to such an extent.

Oxygen deprivation is inevitable when more than 70 naked mole-rats live together underground in an area not much bigger than a rugby ball. Prof Park explains that generally oxygen does not diffuse very well through soil, particularly the clay soil in which naked mole-rats live. With so many individuals living in a confined space, oxygen is very quickly depleted and far too much carbon dioxide is produced. Describing the environment as hostile, Prof Bennett adds that the humidity in these conditions is nearly 100%. Roots of plants also produce carbon dioxide. Yet naked mole rats survive these hypoxic conditions without any long-term damage.

Through this international collaboration, the researchers discovered that when the naked mole-rat is deprived of oxygen, it uses internal pathways to survive that no other mammal uses. It alters its metabolic systems to function more like a plant than an animal, releasing fructose into the blood, which is then taken to the brain. Its brain contains cells that can utilise fructose, enabling cellular functions to continue. Aerobic energy production stops and the animal operates on anaerobic systems, relying on fructose for energy instead of glucose. Once oxygen is restored, they switch back to their usual pathways.

If scientists can understand the biochemistry of the naked mole-rat and unlock the mechanisms that switch the pathways during oxygen deprivation, increasing and activating the number of brain cells that are able to utilise fructose, they might be able to apply this knowledge to humans, improving our chance of survival in extreme situations.

The naked mole-rat is fascinating and defies most characteristics of a mammal. These hardy little animals have been recorded to live for over 30 years and studies suggest they are immune to cancer. They are also the only cold-blooded mammal. Their social structures give scientists much to grapple with, resembling social insects like bees rather than mammals.

These researchers are now planning to conduct a comparative study between social and solitary species to find out if these traits are common to all subterranean mole-rats.

In a world where trees are being chopped down to make space for development and with ever-increasing levels of carbon dioxide in the atmosphere, we may all soon be living in a hypoxic environment. Naked mole-rats might very well be the key to our survival.

Prof Bennett concludes: 'If this tiny animal is able to live for over 30 years with very little oxygen, imagine if we understood these pathways and applied them to humans...'

** Prof Nigel Bennett holds the Austin Roberts Chair of African Mammalogy and the SARChI Chair of Mammalian Behavioural Ecology and Physiology.*

From left: Dr Heike Lutermann, Prof Nigel Bennett, Prof Gary Lewin, Prof Thom Park and Karlien Debus, a Belgian postdoctoral fellow with the Max Delbrück Institute in Berlin

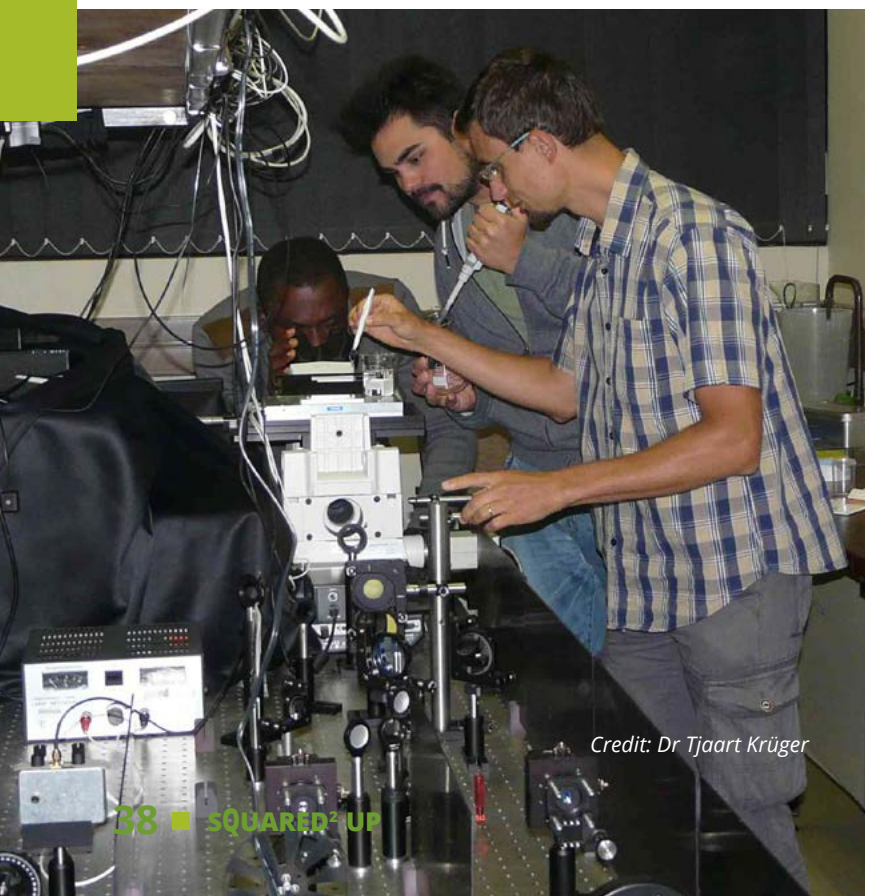
New single-molecule spectroscopy facility in Department of Physics

Early in 2014 Dr Tjaart Krüger, Senior Lecturer and Head of the Biophysics and Photonics Research Group in the Department of Physics, was awarded R1,5 million by the NRF to build a new piece of equipment. The award was made from their National Equipment Programme and UP contributed a further R940 000 towards the project. At that point Dr Krüger's laboratory contained only an optical table. He decided to build the new equipment from scratch – for the fun of it, the experience and the opportunity it offered for student training, but, more importantly, to introduce to the world an altogether new type of single-molecule spectroscopy and a facility with a high degree of versatility. Moreover, a lot of money can be saved by building your own specialised equipment. Dr Krüger explains that he had come across only one company that sold single-molecule spectroscopy equipment, but that its versatility was limited and the price was at least five times more than he would have to spend on developing his own.

Now, after three years during which tremendous help was received from talented students who put a lot of time into the development of their own software, the equipment is finally working. It consists of more than 100 components purchased from more than 15 different suppliers. The key components are a special type of laser, a state-of-the-art microscope and three single-photon detectors, all of which are finely synchronised to the level of the arrival time of individual photons. The laser, which was acquired through the National Laser Centre at the CSIR's Rental Pool Programme, is a broadband supercontinuum pulsed laser. It produces pulses of any colour in the visible and near-infrared regions of the electromagnetic spectrum. The pulses last only a few picoseconds (10^{-12} s), which means that one can assume that when the laser interacts with a sample of interest, the absorption of the photons will be instantaneous.

This cutting-edge experimental setup is the first of its kind in Africa. It is sensitive enough to measure individual photons that are emitted from individual molecules. Together with Dr Krüger's research group and an international network, the team will use the equipment to obtain incredibly detailed information about interactions and energy transfer processes between the building blocks of biological cells. At the moment Dr Krüger focuses mainly on the light-harvesting proteins of photosynthetic organisms to understand the fascinating design principles of these miniature solar cells and determine how living cells protect themselves against intense light and other stress conditions. He is currently involved in encouraging members of the South African scientific community to use the equipment to study important diseases at the level of single proteins and single DNA. Collaborating with colleagues in the Department of Physics, the team have started to explore the fascinating properties of individual semiconductor and metallic nanostructures and plan to proceed to investigate their interactions with proteins – a study that has potential applications in solar energy and medicine. The equipment will also be used for some fundamental physics applications, such as investigating the peculiar phenomenon known as quantum entanglement.

Dr Tjaart Krüger and his team with the new single-molecule spectroscopy equipment



Credit: Dr Tjaart Krüger

Why is it called single-molecule spectroscopy? As indicated by the name of the equipment, Dr Krüger and his team can examine one molecule at a time, which gives them access to a vast amount of information about virtually any biological process at the most fundamental level. By time-tagging individual photons emitted from individual molecules the instrument is equipped with exquisite sensitivity and selectivity. This technique enables them, for example, to quantify molecular dynamics, properties and interactions in material, health and life sciences. Such a wide field of research requires a flexible instrument that can be adapted to suit individual needs to analyse a multitude of parameters down to the single-molecule level. 'Our equipment brings together disciplines such as physics, chemistry, biology, electronics, and information technology. Being exposed to our multidisciplinary setting opens numerous doors for students, since most work environments outside academia are multidisciplinary,' says Dr Krüger.

Dr Krüger gave the assurance that the commissioning of the equipment does not mean that the team would stop developing it. 'We have built it in such a way that basically only our imagination is the limit. We will continue to develop new ideas and create many exciting research projects. We already have a few ideas that we would like to patent,' he said.

NAS researchers unravel gene networks driving wood formation in trees

For millennia wood has played an integral role in the development of human civilisation, providing a source of energy and raw materials for building, furniture, industry and art. Today, planted forests produce an important renewable feedstock (wood) that forms the basis of a multi-billion dollar forest products industry, providing timber, pulp, paper, textiles and a myriad of other bio-based products. As we begin to move away from a fossil carbon economy, wood as a sustainable source of biomaterials and bioenergy, is increasing in importance. How trees produce vast amounts of wood and how to change the properties of wood to suit various end uses are questions that have been difficult to pursue in trees, due to their large sizes and long life cycles. The advent of genomics technologies allowing the profiling of thousands of genes, even in difficult to analyse tissues, such as wood from mature trees, promises to overcome these hurdles.

A team of researchers in the Department of Genetics (Dr Eshchar Mizrachi, Dr Nanette Christie and Prof Zander Myburg), together with collaborators in Belgium, Canada and the USA, are reporting one of the first large-scale, integrated analyses of 10 000s of genes profiled in the developing wood of plantation trees. In their paper, published in the prestigious journal *Proceedings of the National Academy of Sciences of the United States of America* (Mizrachi et al. PNAS, 17 January 2017) the international team describes how they have used network-based approaches (connecting genes with similar expression and functions) to unravel the molecular basis of wood formation. In particular, the team pioneers a new approach, known as systems genetics, which leverages the power of genetics in large numbers of trees. For their project the team, led by Prof Myburg, sampled genetic materials from developing wood of 156 *Eucalyptus* trees and profiled the expression of nearly 30 000 genes in each tree, allowing them to identify gene networks important for structural and chemical properties of different woodtypes. This information can now be used for molecular breeding or genetic engineering of trees in an effort to develop a new generation of woody biomass crops, supporting a thriving and sustainable bio-based economy.

This work was supported by the Department of Science and Technology (DST), the National Research Foundation (NRF) and by Sappi through the Forest Molecular Genetics (FMG) Programme at UP.

Paper URL:
http://www.pnas.org/content/early/2017/01/12/1620119114.full
Twitter: **http://www.pnas.org/cgi/content/long/1620119114v1**
Prof Myburg profile: http://www.fabinet.up.ac.za/zmyburg
FMG: http://www.fabinet.up.ac.za/index.php/research-groups/forest-molecular-genetics
https://twitter.com/FMG_UP

Dr André van der Vyver

UP expert instrumental in international chillies warehouse receipt project

A modern, sophisticated manner in which marketing chillies through independent testing on receipt and storage, based on world class standards, thereby guaranteeing quality and quantity to buyers, was recently introduced in Pakistan. Dr Andre van der Vyver from the University of Pretoria's Department of Agricultural Economics, Extension and Rural Development and an USAID contracted and world renowned warehouse receipt expert was instrumental in this process.

According to Dr Van der Vyver, the warehouse owner/operator will now be also able to issue a warehouse receipt which is acceptable to banks as collateral against a loan application of the product owner, based on these guarantees.

Dr Van der Vyver, who assists the industry in an advisory capacity, has executed many similar projects in Africa and is assisting the industry to create a warehouse receipt system which will open up many opportunities for farmers but also for banks to offer more finances to agriculture. The project is facilitated by the Pakistan Agriculture Coalition (PAC).

In the Chilli Pilot Project, only top quality chillies were accepted from farmers, then tested and graded by SGS, a world leading inspection, verification, testing and certification company. Tests included testing for aflatoxin levels. The company Agility managed the warehouse and issued the necessary guarantees. National Foods agreed to buy the product at a premium price. The broker, Habib Commodities administered the trade which was executed through the Pakistan Mercantile Exchange (PMEX). Both buyer and seller opened client accounts at PMEX. The *Zarai Taraqiati Bank Limited* (ZTBL) in Pakistan agreed to accept the warehouse receipt issued by Agility/PMEX as collateral against a loan application from the farmer, the owner of the product. The farmer continued to store the product, expecting prices to increase, before selling to National Foods.

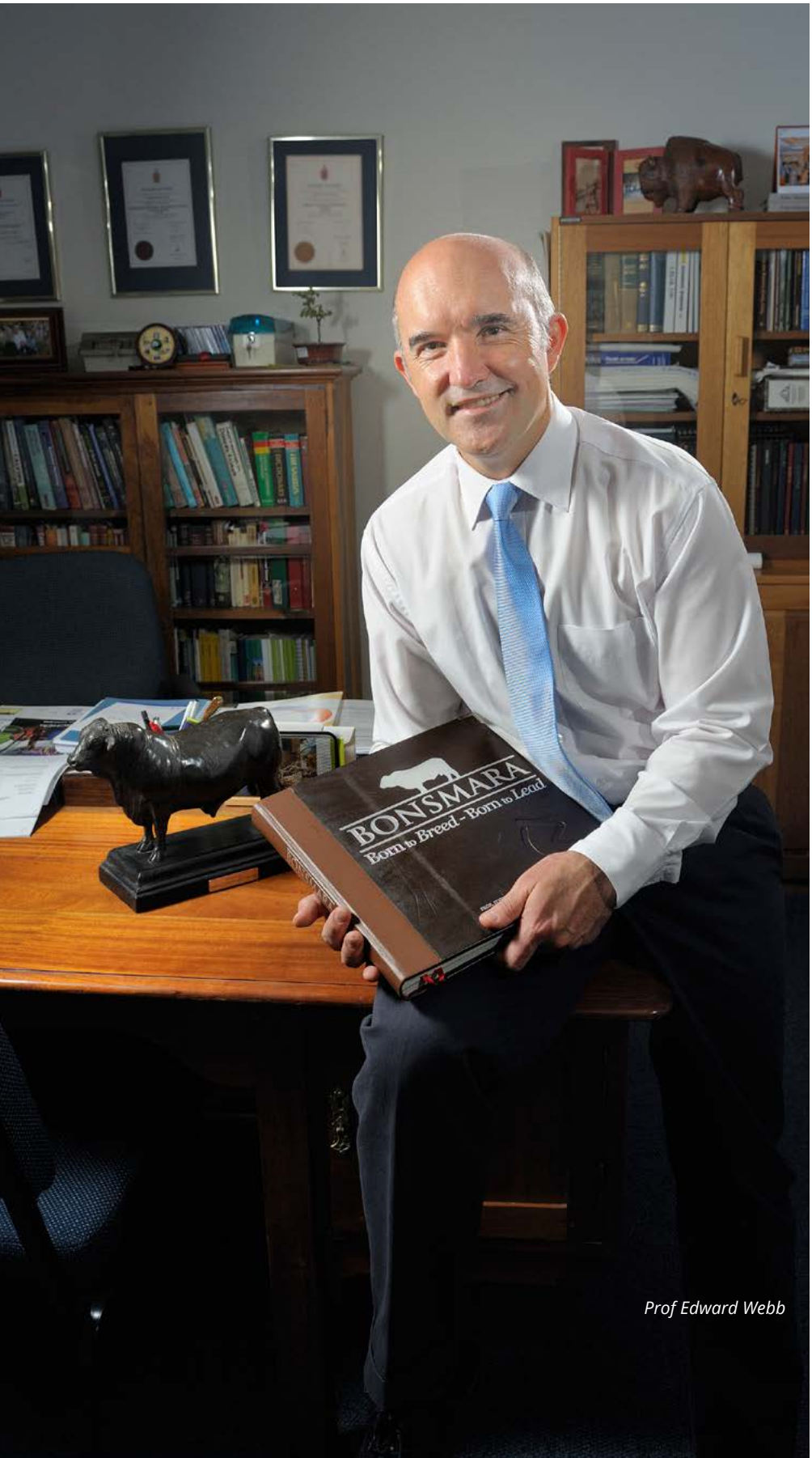
Dr Van der Vyver also explained that some lessons were learnt in the process – "mitigating the risks of the financier is crucial. Firstly, it requires unequivocal quality and quantity guarantees by the warehouse operator. Equally important, is ensuring that the product could always be liquidated, meaning that there is a buyer at the going market price, even if prices are declining. If successful, the result will be that the interest rate could be kept relatively low and the loan amount as percentage of the value of the product, relatively high. Initially, the documentation process was cumbersome – to streamline the process in future, it will require all role players to purposefully sit around a table and agree to simplify the process. "

Background to the Chilli Pilot Project:

Kunri, a town in Sindh's Umarkot district is known as the chilli capital of the world. It produces approximately 100 000 tons of chillies which are almost all sold on the local market – Kunri's Mirch Mandi. Two types of chillies are produced, longi (the round chilli), and hybrid (the finger shaped chilli). Longi is not as hot as hybrid and therefore more suitable for large consumption in food spices. However, hybrid chillies have gained popularity among farmers since it is more profitable to grow. Today, they are produced in roughly equal amounts. However, in a modern day world, concern with food safety such as aflatoxin levels, the chilli industry is suffering more and more from a deteriorating quality image. This is largely due to the unsophisticated manner in which it is sold (auctioned) in the mandi – on an open floor where the mixing away of poor quality chillies (sometimes rotten) with good quality is the norm, impacting on the overall image of the industry.

Kunris Mirch Mandi market

Prof Webb appointed as Deputy Dean of Research and Postgraduate Studies



Prof Edward Webb

The University of Pretoria (UP) is pleased to announce the appointment of Professor Edward Webb as Deputy Dean: Research and Postgraduate Studies in the Faculty of Natural and Agricultural Sciences (NAS), with effect from 1 April 2017.

Professor Webb was the Acting Deputy Dean: Research and Postgraduate Studies from July 2016 to March 2017. He is a Professor in Production Animal Physiology/Functional Anatomy/Meat Science. He previously held the position of Head of the Department of Animal and Wildlife Sciences.

He was awarded the Professor AM Bosman gold medal for the best master's dissertation and a medal from the South African Society for Animal Science for the best PhD thesis. He also received a Flemish Community Fellowship award for postdoctoral research at the University of Ghent.

He obtained a PhD in Animal Science, an MSc (Agric) (cum laude), a BSc (Agric) Hons Animal Science (cum laude) and a BSc (Agric) Animal Science from the University of Pretoria.

He has supervised a number of master's and doctoral students and has published widely in the area of animal science, including book chapters and articles in peer-reviewed journals.

Professor Webb served as president of the South African Society for Animal Science for two terms and currently serves as board member of several research advisory committees in the livestock industry. He often presents keynote papers at symposia of major role-players in the agricultural industry. He has a C1 rating from the National Research Foundation.

Renowned behavioural endocrinologist new Head of MRI

Prof Andre Ganswindt, a behavioural endocrinologist by training and the founder of the Endocrine Research Laboratory was appointed as Professor and Director of the Mammal Research Institute (MRI) at the University of Pretoria (UP) from 1 August 2017.

Prof Ganswindt has a close relationship with the MRI. Formerly he was a research associate at the MRI and later on he was appointed as Director of the MRI. Prior to his appointment as Director of the MRI, he was the Acting Head of the Department of Anatomy and Physiology in the Faculty of Veterinary Science at UP.

"Given the MRI's unique strategic location, with a rich mammal fauna right on its doorstep, as well as its long history of excellent training and research output, it has established itself as one of the premier institutes for conducting African mammal research globally. However, to retain its reputation, the MRI must ensure its continuous excellence in research and teaching; a difficult task given the scale of complexity for some of the globally relevant research topics of our time (e.g. climate change, infectious diseases, urbanisation of wildlife, or human-animal conflict), especially when considering the current financial and political challenges of the University," Prof Ganswindt replies when asked about his vision for the MRI.

He also explained that "having been at the University of Pretoria for over 10 years, I am convinced that we have the academic excellence in our institution to successfully meet these challenges and our regulations for the operation of institutes actually provide an excellent framework to host an interactive critical mass of people from various departments and faculties, thriving synergistically towards a certain goal. However, in my opinion, the currently biggest obstacle is the limited interaction of the various individual and institutional stakeholders within the University, leading to sub-optimal use of financial and logistical resources by doing research in isolation."

Prof Andre Ganswindt

"To sustain the leading role of the MRI in mammal research in Africa and beyond, I envision a stronger in-house collaboration under the roof of the MRI, especially between the existing mammal-oriented research groups within the Faculty of Natural and Agricultural Sciences, as well as between relevant entities from different faculties, like Veterinary Science. A major role of the MRI will therefore be to facilitate the provision of an institutional identity to all the contributing individuals and groups in the University. As the majority of the various identified stakeholders already developed an individual national and international collaboration network, the envisioned approach would simultaneously create an ideal network of locally and globally recognised experts focussing on many aspects of mammal-oriented research with exponential opportunities for basic and applied science, professional development, and relevant theoretical and practical training for undergraduate and postgraduate students," Prof Ganswindt concluded.

After he received his PhD in Biology in 2004, and a one-year postdoctoral appointment at the German Primate Centre, Prof Ganswindt joined the University of Pretoria as a postdoctoral fellow in 2006 and became a research fellow in 2009. In 2013 he became a permanent staff member (Associate Professor) in the Department of Anatomy and Physiology and was appointed as the Section Head of Physiology in 2014. In 2013 he was also appointed as a research associate at the National Zoological Gardens of South Africa and he currently still holds that position.

Prof Ganswindt possesses a B2-rating from the National Research Foundation and was Vice-Chairperson of the International Society for Wildlife Endocrinology (ISWE) from 2012 to 2015. He was appointed as upcoming Chairperson of ISWE (2018-21). Up to now he has published 62 peer-reviewed articles (Web of Science h-index: 13) and three chapters in books, and presented papers at 51 national and international conferences and workshops. Prof Ganswindt is an associate editor of the *Journal of African Zoology*, and acted as a reviewer for various national and international funding institutions as well as 43 different scientific journals. He is currently supervising and co-supervising five MSc and eight PhD students, and is mentoring two postdoctoral fellows.

As a behavioural/wildlife endocrinologist he addresses proximate and ultimate questions concerning regulative endocrine mechanisms which, in combination with other factors like social or ecological changes, influence and control animal behaviour. In this regard he also focuses on developing and validating non-invasive techniques to monitor gonadal and adrenal endocrine function in various species of mammals, reptiles, and birds. By using these techniques, Prof Ganswindt learned more about the basic principles of mammalian reproductive strategies and factors determining fertility and reproductive success in particular. In addition, he is also trying to identify intrinsic and extrinsic factors which potentially influence the social and reproductive behaviour of animals and to determine their potential as physiological stressor.

Academic giant passed away

Dr Frikkie Liebenberg

It was with the utmost sadness that we learned of the heart-breaking news of the passing away of our colleague and friend, Dr George Frederick (Frikkie) Liebenberg.

Dr Frikkie Liebenberg joined the Faculty of Natural and Agricultural Sciences on 1 November 2010 as a temporary full-time Research Officer in the Department of Agricultural Economics, Extension and Rural Development. On 1 April 2013 he was appointed as a Senior Lecturer, a position he held until his call to higher service on Friday, 10 March 2017.

Dr Liebenberg was one of those extra-ordinary and rare agricultural economists who could painstakingly work with huge datasets and paid attention to detail. A significant part of his career was focused on documenting historic statistics on South African agriculture.

One of his legacies is the recommendation for corrections to official agricultural data and his long-standing plea to the Department of Agriculture, Forestry and Fisheries and the Department of Statistics South Africa for a comprehensive and all-inclusive census on South African agriculture across the spectrum of small to very large farms.

Since joining our Faculty, he established a strong team of researchers, involving mainly master's and doctoral students. He also worked closely with researchers from the University of Minnesota.

He is survived by his two children, a daughter, Nienke (14), a son, Nieko (8), three brothers and two sisters.

He will be sorely missed by the Faculty, and especially by his colleagues in the Department of Agricultural Economics, Extension and Rural Development.

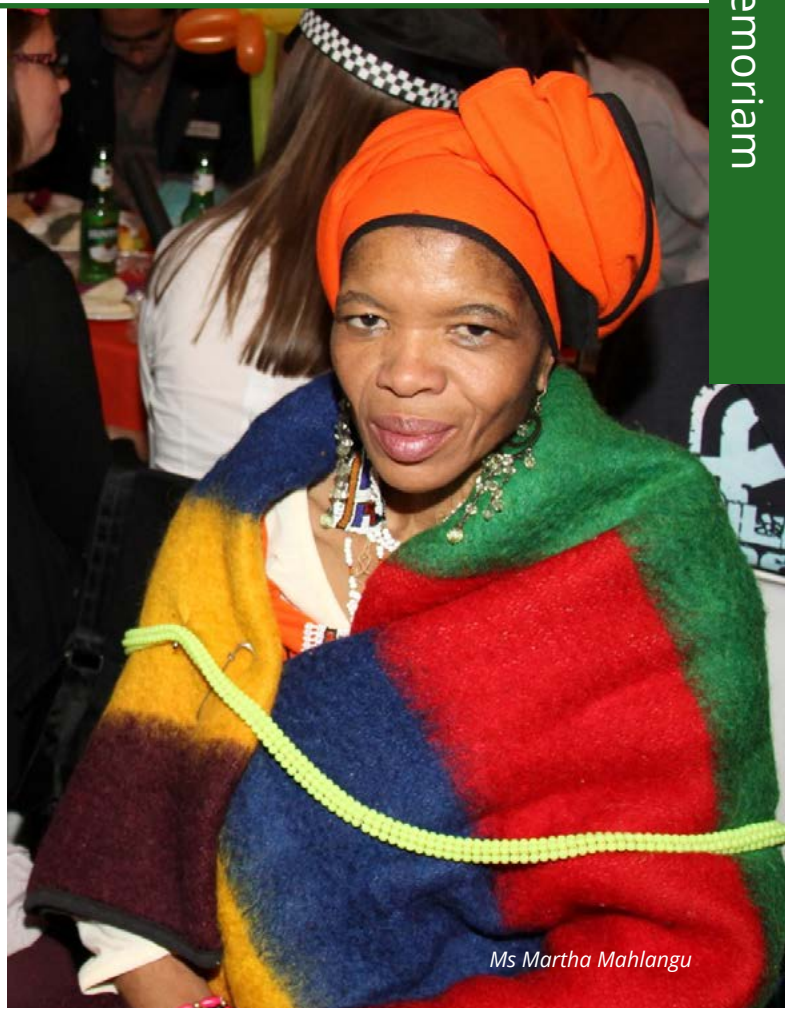
May the departed soul of this academic giant Rest in Peace.

Passing away of Ms Martha Mahlangu

It was with great sadness that the staff of the Forestry and Agricultural Biotechnology Institute (FABI) learned of the sudden and unexpected death of our receptionist and long-time FABI team member Ms Martha Thandi Mahlangu on 26 June 2017. Since joining the Institute on 15 January 2004, Martha was an integral part of the FABI team. She is survived by her daughter Hazel (29) and son Thabiso (19).

Martha will be remembered by FABIans for her friendly smile and sense of humour – always laughing and enjoying a good joke. But she was also passionate about people in need and was always ready to assist others.

FABI director, Prof Mike Wingfield expressed his condolences with Martha's family, saying that she was a very special person who served us loyally for many years and who had a great love and passion for all the members of the FABI team. "She was always prepared to help and to do that extra bit to make our lives easier. We will miss her smiling face and unique sense of humour greatly."



Ms Martha Mahlangu

A final goodbye to Prof Hans P Binswanger-Mkhize

Prof Hans Binswanger-Mkhize, an extraordinary professor in the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria (UP), has passed away after having spent almost a month in hospital.

After a long career at the World Bank in Washington DC, prior to which he had been a research associate at Yale University and the University of Minnesota, he had served as an honorary professor at the Tshwane University of Technology before joining the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria (UP) in 2012. In addition to his position as an extraordinary professor at UP, he was an extraordinary professor at the China Agricultural University and a visiting professor at Integrated Research and Development in Delhi, India.

Prof Binswanger-Mkhize was a world-renowned agricultural development economist, a fellow of the American Association for the Advancement of Sciences and the American Agricultural Economics Association, a recipient of the Elmhirst Medal of the International Association of Agricultural Economists, and is listed in *Who's who in Economics*.

He published more than 100 journal articles on topics such as the economics of technology generation and its impact, food security, agricultural mechanisation, the evolution of farming systems in Africa, the prospects for African and Indian agriculture, farmer behaviour under risk, agricultural supply response, the impact of rural finance on agricultural investment, production relations in agriculture, the world history of land accumulation and land reform, the political economy of agricultural and agrarian policies, agriculture and food policy, land policy and land reform, community-driven development, rural development strategy and approaches to combating HIV and AIDS.

According to Thompson Reuters, Prof Binswanger-Mkhize was one of the most cited agricultural economists in the world. He made a significant contribution to staff and student development in our department and played a major supporting role in the collaborative master's programme in Agricultural and Applied Economics. We consider it a privilege to have been associated with him.

Prof Binswanger-Mkhize will be sorely missed by all in the Department.

Prof Hans Binswanger-Mkhize

Final farewell to Dr Nic van der Berg from Physics

Dr Nic van der Berg passed away on Thursday, 1 March 2017.

Nicolaas George van der Berg was born on 10 February 1946 and matriculated in 1964 at the Hoërskool McLachlan, Joubertina. He received a BSc in 1967 at the University of Port Elizabeth. He obtained both his BSc (Hons) in 1969 and MSc in 1972 at Unisa. In 1988 he obtained his DSc at the University of Pretoria.

From 1968 to 1971 he was employed as a Technical Assistant at Unisa. In 1972 he accepted a position as Research Assistant in the Department of Physics at the University of Pretoria, where he retired in 2011 as a Senior Lecturer.

After his retirement until his passing away Dr Van der Berg remained at UP as a Part-time Lecturer. He was an expert in Solid State Physics, with specialisation in the various forms of microscopy. He published more than 50 peer-reviewed articles in international journals and was involved in the training of numerous postgraduate students.

Dr Van der Berg is survived by his wife, Henda, and their two sons, Hendrik and Johan.

Dr Nic van der Berg

Fourteen year old joins UP


Hjalmar Rall

At just 14, when most teenagers are still at high school, top achiever Hjalmar Rall is getting ready to join other 18 year olds in undergraduate studies, and he has chosen the University of Pretoria (UP).

Hjalmar, from Riebeek Kasteel in the Western Cape, is pursuing his dreams to become a scientist and will study BSc Physics. South Africa has a number of good universities, yet Hjalmar chose UP. When asked why, his response is quick, short and to the point. 'It's the best there is,' he says with a smile.

When talking to Hjalmar one gets a sense of what Patanjali, the Sage of the Sutra meant when he said, 'When you are inspired by some great purpose, some extraordinary project, all your thoughts break their bounds. Your mind transcends limitations, your consciousness expands in every direction and you find yourself in a new, great and wonderful world. Dormant forces, faculties, and talents become alive, and you discover yourself to be a greater person by far than you ever dreamed yourself to be.'

Hjalmar does not have a secret formula to success, but strongly believes that when you enjoy doing something you are bound to succeed. Many people only realise this many years into adulthood, but at 14 Hjalmar already thoroughly understands the concept. His success lies in doing fun things. 'As long as it's not boring, I do it,' he says.

As someone who is motivated by challenges, he is looking forward to even bigger challenges at UP and is excited to discover a world that no one has ever discovered before. 'I want to ask even bigger questions and find out what else there is to do, particularly in theoretical physics and astrophysics,' he adds.

After completing his degree he plans to further his studies and there can be no doubt Hjalmar's future is bright and filled with possibilities as infinite as space.


Hjalmar Rall, Prof Jean Lubuma (Dean: Faculty of Natural and Agricultural Sciences) and Quintine Mkhondo

Quintine Mkhondo graduates at 19

Quintine Mkhondo

Quintine Mkhondo, an extraordinary student from the University of Pretoria (UP) has graduated at the age of 19. He received his degree in Actuarial Science and Financial Mathematics during the University's Autumn Graduation Ceremonies earlier this year, and his achievement is just another example of how the University of Pretoria nurtures young minds of all backgrounds and produces outstanding graduates.

Quintine was born in Soshanguve and grew up in Bushbuckridge where he was raised by his grandparents. Quintine was an exceptional student, skipping both grade 5 and grade 9 due to his advanced academic performance. In grade 10, Quintine became interested in mathematics and problem-solving and decided that he wanted to pursue a degree in actuarial science after attending a career fair during his matric year. He matriculated from Hoedspruit Independent College in 2012 at the age of 14, hoping to pursue higher education at the University.

Quintine knew that he wanted to study actuarial science, despite the alleged difficulty of the degree. A prerequisite for admission to this world-class programme at UP, was that he had to improve his marks in mathematics. In order to do this, Quintine enrolled in the UP Extended Programme in Mathematical Sciences on the Mamelodi Campus. This period of study was difficult for him, as he did not have any bursaries, and was living away from home for the first time at the young age of 15. However, he passed all his modules and transferred to the Hatfield Campus to complete his degree.

'My journey at the University of Pretoria forced me to grow up at a much faster rate than the normal South African teenager, but I don't regret a minute of it,' says Quintine. 'I have grown in so many different aspects of my life, and learned to work hard and never give up on what I want to achieve.'

Quintine's time at UP has not always been easy. His course-load was very challenging, and required him to approach his studies with self-discipline and motivation. He took on his most challenging course-load in his third year, which happened to coincide with the unrest on campus at the end of 2016. This required him to stay focussed on his studies despite many distractions. Regardless of all these challenges, Quintine was able to pass all his subjects and now believes that with hard work and discipline he can face any challenge before him.

'The only time you lose is when you give up,' continues Quintine. 'Endurance is the hardest part. I feel like the challenges I've faced have brought out a new, stronger version of myself.'

Quintine is the first member of his family to receive a university degree. His family could not be prouder – they are hosting a big party in Soshanguve, the township north of Pretoria where Quintine was born. Quintine considers receiving his degree from UP as one of the greatest accomplishments of his life. 'I am very happy for choosing to study at the University of Pretoria. The University has helped me develop character and valuable skills that will, without a doubt, set me up for life,' he adds.

Quintine is currently enrolled at UP for his honours degree in Mathematical Statistics and is working as a teaching assistant on campus. He hopes that one day he will work as an analyst for one of the major banks in South Africa or own his own private investment company. 'By achieving this degree, I am hopeful that I can inspire my family and other people who live in Soshanguve to work hard and achieve,' he concludes. 'I hope that they look at me and see that I am getting my honours, and if they work hard, they can achieve their goals as well.'

Kgomotso Dhlangamandhla represents UP at international conference

A fourth-year BScAgric student in Food Science and Technology at the University of Pretoria (UP), Kgomotso Dhlangamandhla, was selected as one of twelve promising students from around the world (UK, America, South America, South Africa, China and Australia) to attend the 2017 **Institute of Food Technologists Student Association (IFTSA)** conference and expo. She also had the opportunity to participate as part of team in the **IFT17 Go With Purpose Global Challenge**.

The challenge to the three teams, each with a mentor, was given in the form of prompts based on current trends within the food industry. Kgomotso explains: 'My team, NovaFoodies (derived from the association of our mentor with the company Novozymes), chose the prompt which required us to find protein sources (alternatives to soy protein), to be used in a protein bar. We were allowed to explore the expo floor and attend any sessions we considered useful, before we decided on three alternative protein sources. We picked potato protein, watermelon seed protein and cricket protein. A complete presentation with our suggested reformulation of the bar will be presented via a virtual conference at the global summit on 1 November 2017.'

She elaborated, saying: 'I learnt so much, and I think I'm still processing much of it now. I hope to see the day that all UP food science students take part in such a challenge hosted in South Africa by our very own South African Association for Food Science and Technology (SAAFoST). I plan to adopt what I learned from my experience at IFT in my own career and aspire to develop a culture among young food scientists in South Africa to stimulate science-based ideas to go beyond trends and deeper into innovations focused on the greater good of all consumers. We should be the true developers of the world's food future, a point emphasised by one of the lead roles in the new movie *Food Evolution.'*

The movie was shown for the first time on African soil at the SAAFoST conference in Cape Town in September. As an elated Kgomotso concluded: 'I'm so excited to be a proud UP food scientist!'

Read more about the challenge here:
http://www.ift.org/community/students/competitions/ift17-global-challenge.aspx

IFT17 Global Challenge participants and mentors posing with the IFT board and IFT Student Association leadership. Kgomotso Dhlangamandhla (back row, third from right).

Photo credit: IFT

TuksChess wins USSA Chess Championship 2017

Thapelo Maboko, an MSc student from the Forestry and Agricultural Biotechnology Institute (FABI) showed that he not only is an aspiring scientist, but also a skilled chess player. He was a member of the TuksChess team that won the University Sports South Africa (USSA) Chess Championship 2017 held in Johannesburg at the University of the Witwatersrand during July this year.

Godfrey Kgatle, a PhD student in Microbiology and Plant Pathology and also attached to FABI is the Chairperson of TuksChess. He officiated as the team manager for the event, organising the selection and registration of the team, sourcing sponsorship and managing all logistics for their participation in the tournament.

The USSA Chess tournament was attended by 198 men and 99 ladies from 23 institutions from across South Africa, with the TuksChess team comprising ten men and six ladies. This was an individual tournament with each person playing nine games. At the end of the tournament, players from the same institution's points were added up. TuksChess's ladies' team won their section while the men's team was placed third overall.

Godfrey also points out that a chess player can burn up to 6 000 calories during an intense chess game. This provides a firm reason why chess is classified as a sport!

The men's team consisted of Tebogo Mokoena (C), Rohan King, Lebogang Mokoena, Roland Bezuidenhout, Alex Maredi, Langutani Nyanandi, Thapelo Maboko, Nawa Mumbwe, Karabo Moremi and Carpediem Madiba. The ladies' team comprised Rolayo Olunkale, Tsakani Masilana, Rene de Beer, Marvellous Mukwasi, Cora Mak and Sune du Toit.

On the individual level, Roland Bezuidenhout (2nd), Alex Maredi (7th) and Rohan King (19th) were placed in the top 20 of the Open/Men's section, while Sune du Toit (2nd), Cora Mak (3rd), Rene de Beer (10th), Tsakani Masilana (16th) and Marvellous Mukwasi (18th) were placed in the top 20 of the ladies' section.

Roland, Alex, Sune, Cora and Rene were selected to play in a South African Closed Chess tournament after which they might have the opportunity to represent South Africa later this year in the international USSA chess tournament. The SA Chess team will consist for four men and two women.

Over-all the team was of the opinion that the tournament was well organised, that the team spirit was high and that this is one experience they will treasure for their lifetimes. The tournament was more than just chess as a game of brains. It was also a means of developing interpersonal skills and long lasting contacts and friendships with the other players. Players from different disciplines, such as medicine, science, education, engineering, commerce and actuarial science had a common goal and hopefully they have formed long-term friendships and contacts.

TuksChess would like to take this opportunity to thank their sponsors (University of Pretoria-SRC, Tukkies Student Sports Committee, Coffee Buzz, JuniorTukkie, FABI, Sci-Enza, TuksRes, TuksSports) for making this trip possible. A further thank you is extended to TuksChess Alumni and legends Leonard Mahlare and Craig Bornhiem who visited and supported the team during the tournament. A major thanks to the hosts, Wits Chess and the USSA committee for organising such a wonderful tournament.

Godfrey Kgatle

NATHouse aims to make a difference in students' lives

NATHouse, the student body that represents undergraduate students in the Faculty of Natural and Agricultural Sciences (NAS) not only aims to be instrumental in ensuring the academic success and personal well-being of NAS undergraduate students, but they also facilitated exciting initiatives such as the Best First Year Lecturer Award in 2016.

According to Nosihle Msomi, 2016/2017 Chair, NATHouse is also rewarded for their commitment and hard work. "The Executive Committee of 2015/2016, under the leadership of Alexis Schultz, had a very successful term and was awarded with certificates of Excellence in Service, Best Academic Support Programme and Best Personal Development Programme," she said.

The committee comprises twelve executive committee members who assist in providing students with academic support and ensuring that students develop a balanced lifestyle through the various sport teams that are available to the students. Furthermore, they provide opportunities to give back to the community by hosting various community outreach projects. By facilitating social networking, NATHouse unites and helps fostering relationships between students from different departments in the Faculty. An important objective for NATHouse is to promote transformation as stated in the University's vision and mission and ultimately to improve communication and interaction between students and the Faculty.

The Best First Year Lecturer Award was one of the exciting initiatives that NATHouse facilitated, whereby students were able to nominate and vote for the lecturer they considered to be the most inspiring and motivational to the students. NATHouse considers expanding the award to include the Best Senior Lecturer. Other initiatives that they have in store for both students and staff members include, but are not limited to, the "Tops for Wheels" campaign, a Mamelodi Campus Lunch Hour concert, better social and sporting events, and even a faculty ball!

Read more about the newly elected NATHouse committee for 2017/2018 in the next edition of this newsletter.

The 2016/2017 Executive Committee, from left: Suzan Maboane (Branding), Melissa Bekker (Vice Chairperson and Treasurer), Thabang Lesufi (Community Engagement), Michelle Schultz (Marketing, Sponsorship and Social), Nosihle Msomi (Chairperson), Dr Quenton Kritzinger (NATHouse guardian), Boshibe Rashokeng (Sports and Mamelodi Liaison), Masego Dilebo (Academics), Dineo Mogashoa (Transformation), Yusuf Chinyengetere (Vice Chairperson and Sports), Khanimamba Hlungwane (Academics, Personal and Professional Well-being Officer) and Portia Lekhanya (Secretary and Communications Officer). Absent: Jared Clack (Community Engagement).

Lecture on Curriculum Transformation in African universities hosted at UP

From left: Prof Roumen Anguelov (UP), Prof Jean Lubuma (Dean: Faculty of Natural and Agricultural Sciences), Prof Overtoun Jenda and Prof Jan Verschoor (UP).

The Mathematical Sciences cluster in the Faculty of Natural and Agricultural Sciences cluster recently hosted a general lecture on curriculum transformation, with Prof Overtoun Jenda from the Auburm University, USA, as guest speaker. The venue was the Plant Sciences Auditorium at the University of Pretoria (UP).

The title of the lecture was *Towards STEM Curriculum Transformation in African Universities.* It emphasised the importance of Continual STEM (Science, Technology, Engineering, and Mathematics) curricula development as it is needed to deliver graduates capable of relating to local societal and industrial needs as well as skills to effectively compete in the global scientific community. On the one hand, the lecture addressed the challenging balance between curriculum transformation needs while, on the other hand, maintaining curriculum standards and rigor.

Prof Jenda obtained his Bachelor's degree in Mathematics from Chancellor College, at the University of Malawi. In 1977 he moved to the USA to pursue his graduate studies at the University of Kentucky, earning his PhD in 1981 under the supervision of Professor Edgar Enochs. He then returned to Chancellor College, where he was a lecturer (assistant professor) for three years. He moved to the University of Botswana for another three-year stint as a lecturer before moving back to the University of Kentucky as a visiting assistant professor in 1987. In 1988 he joined the Algebra research group at Auburn University.

UP and UNIVEN share experiences of sensory evaluation of food

From left :PhD student Isiguzoro Onyeoziri, Prof Riëtte de Kock (UP), Ms Tabea Mokhele (UNIVEN), master's students Josephine Baloyi and Khuthadzo Mukheli at the UP Sensory Laboratory.

Ms Tabea Mokhele, an alumna of the University of Pretoria (UP) and now a sensory and product development laboratory technician at the Department of Food Science and Technology, University of Venda (UNIVEN) recently visited the Department of Food Science at UP.

The purpose of her visit was to gain insight into the latest trends, methodologies and software used in sensory evaluation research. The Sensory Research Division at UP is part of the international academic consortium using the state-of-the-art Compusense Cloud software as a service platform. This software makes provision for secure internet-based consumer and sensory testing and analysis.

Ms Marise Kinnear, senior research assistant and a number of postgraduate students explained their research and demonstrated how the software is used for fast and effective project planning, test design and online data collection. MSc Food Science student Ms Khuthadzo Mukheli used emotion profiling, with social media based emoticons, as an implicit technique to gain insight on the food likes and dislikes of consumers. This research is conducted in collaboration with Kansas State University.

Sensory evaluation is central to the research of MSc student Josephine Baloyi focusing on the improvement of the texture of sorghum biscuits. Mr Isiguzoro Onyeoziri, a PhD student utilises the UP trained sensory panel to carefully describe the sensory properties of extrusion cooked millet porridges that have the potential to improve the health and well-being of consumers in West Africa (USAID funded Feed the Future Food Processing Lab). Ms Mokhele remarked that she was inspired to also implement the sensory methods and learning at UNIVEN and look forward to future collaboration.

Statistics and data analysis in spotlight as future career choices

In the digital world of today, it seems we would barely be able to function without social media, smartphones and other digital processes that have become intrinsic parts of our daily lives. For students considering their future career path, a career in statistics and data analysis would seem to guarantee future success. In surveys showcasing the top jobs in 2016, data statisticians ranked at the top of the list in terms of hours, stress levels and pay. Even George Bernard Shaw said, 'It is the mark of a truly intelligent person to be moved by statistics.'

The Department of Statistics in the Faculty of Natural and Agricultural Sciences recently hosted a statistics awareness day for Mathematics teachers and learners to demonstrate the importance of statistics in the school curriculum and in everyday life. The event also aimed at highlighting the exciting prospects for learners who pursue a career in statistics and data analysis.

Staff from the Department and guest speakers shared their insights into the role of statistics and the need for analytical thinkers in South Africa. They described statistics as a prime tool for making good decisions and making life simpler.

Prof Greg Lee of the Wits Business School discussed the business trends of today, noting how everything is impacted by analytics. Analytics have become so advanced that artificial intelligence is no longer the stuff of science fiction. Cognitive analytics and systems like IBM's Watson have advanced to the point where computers are able to learn, think and make decisions. In the future many jobs will become redundant, replaced by such systems. Prof Lee stresses, however, that statistics play a key role in serving and developing these systems, making it a wise career path to pursue.

Statistics and data analysis are not just about business trends and the corporate sector, but can also serve areas of great need, such as the conservation of wildlife and protected areas. Dr Alta de Waal of the Department of Statistics discussed how statistics and analysis assisted her in her effort to protect the country's rhino population. Dr De Waal, in collaboration with the CSIR and the Kruger National Park, developed a model to predict poaching trends in the reserve. With an area of nearly 20 000 km², it is almost impossible to predict where in the park poaching is most likely to occur. However, by taking into consideration the causal impacts and factors that lead to poaching – including vegetation and water, the phases of the moon, time of day and month, season, and areas within the park in relation to border fences, communities and gates – Dr De Waal was able to develop a model to predict the areas that are most likely to be targeted. This assisted SANParks in making sure resources are used optimally.

Some of the Mathematics teachers attending the UP statistics awareness day

Statistics are also being used in the area of fashion. Jean Tranter, Head of Analytics at the Foschini Retail Group highlighted how consumer trends are better understood with the application of statistics. One of the key areas of focus for Tranter and his team of data scientists is the use of statistics to determine the type of relationships they should be developing with their customers, where they are considered on an individual basis in terms of their shopping trends.

These interesting discussions about the value of statistics in various businesses were followed by panel discussions, led by the esteemed mathematician and former Vice-Chancellor and Principal of the University of the Witwatersrand, Prof Loyiso Nongxa, and Deputy Dean of the Faculty of Education, Prof Max Braun. These discussions focused on the value of statistics within the analytical sciences and in industry, as well as the teaching aspect of statistics today.

Prof Max Braun and Dr Batseba Mofolo-Mbokane with some of the other participants at the statistics awareness day

IFAD President, Kanayo F Nwanze

Prof Stephanie Burton, UP Deputy Vice-Chancellor: Research and Postgraduate Education

IFAD Rural Development Report presented at event co-hosted by UP

Government policies that bring rural young people into the economic mainstream are essential for South Africa's sustainable development, according to a global report by the International Fund for Agricultural Development (IFAD).

The report was presented by IFAD President, Kanayo F Nwanze at an event that was co-hosted by the University of Pretoria earlier this year. He emphasised that with almost a quarter of South Africans aged between 15 and 24, and more than half of them unemployed, policies that expand employment – especially in agriculture – are essential.

'Who is going to grow the food for us tomorrow? We need our young people to take their creativity, their energy and their capacity for hard work and apply it to growing and processing food,' said Nwanze. 'But it doesn't just happen, it depends on the choices that are made, firstly by governments, but also by the private sector, by civil society, and by institutions like IFAD.'

The Rural Development Report 2016, IFAD's flagship publication, is a rallying call to policymakers and development practitioners to win the global war against poverty. It brings together leading thinkers to analyse the experiences of rural development in over 60 developing countries, including South Africa. This extensive research provides a solid foundation on which leaders and institutions can base their policy choices and investments. Researchers from UP are also already using the report as a core resource in their agriculture and rural development programmes.

Nwanze said this focus on rural development is critical because three quarters of the world's poor live in rural areas and the incomes of 2,5 billion people worldwide still depend directly on rural small farms.

According to Hans Binswanger-Mkhize, an Extraordinary Professor at UP who contributed to the writing of the report, inclusiveness is essential for poverty reduction and this is where South Africa is lacking.

'Inclusiveness is about providing everyone, without exception, with livelihood opportunities and the ability to participate in the economy,' he said. 'In South Africa's rural areas, this has absolutely not happened.'

Tsakani Ngomane, Outcome Facilitator on Rural Development from the South African government's Department of Planning, Monitoring and Evaluation, said that the Rural Development Report resonates well with the objectives of the Government's National Development Plan 2030. 'But what is clear is that even though we have the right policies, it is not happening in an inclusive manner,' she said.

The report is set in the context of a rapidly changing world, with a growing demand for food, increased migration to cities and the impact of climate change and environmental degradation. It provides insight into regional and country-specific challenges, historical legacies, and how factors like employment, youth populations, land reform, access to finance, gender equality and social protection influence the success of poverty eradication

From left: Dewald Uys, Belinda Bevis, Adri du Plessis, Gosiame Phaladi, Adelaide Machaba and Nyiko Mabunda

Food Science students experience *Fast Forward to Slow*

Earlier this year, Food Science students registered for a Food Product Development module in the Department of Food Science and postgraduate students with research projects featuring flavour science, made their way to the Bytes Conference Centre, Midrand for the annual South African Association for Flavour and Fragrance Industries (SAAFFI) Conference.

This year's theme was *Fast Forward to Slow,* and this was clearly evident from the themes of the speakers that were hosted. The day started with a warm welcome from the Tuks student volunteers all dressed in SAAFFI sponsored flamboyant shirts, who manned the registration desk. Delegates were offered a wonderful selection of breakfast items, after which the formalities began with an introduction by the events Chair, Marcel van Rooyen of Millchem (Pty) Ltd. One of the first speakers, Nadine de Freitas from Les Nouvelles Esthetiques day spa, gave a talk on the importance of wellness, not only on a personal level but also in the workspace, giving insight into how ultimately employee wellness assists in optimal company performance. For a little exciting interaction, attendees were divided into teams and given tasks to complete as part of the conference's workshop section, which amongst others included indoor putt-putt and a food centred quiz. The day was a success and provided great opportunities to network and liaise with delegates from the food industry and to get a glimpse into the world of flavour and fragrance scientists. "From the moment we heard of the event, all of us were very excited. However, nothing we imagined could have prepared us for the insightful content that was presented to us," said one of the students who attended.

The students want to extend their gratitude to the sponsors for the time they had and for the wonderful goodie bag they received. In conclusion, they would like to thank SAAFFI for hosting them, and broadening their minds as students. They will remember that sometimes, in order to fast forward one has to slow down.

Chemistry and Spiders made science fun

Mr Godfrey Kgatle during the Science Show

"Chemistry and Spiders" was the theme of the Science is Fun school holiday programme that was hosted by Sci-Enza during April this year.

The programme was aimed at learners from Grade 1 to Grade 6. During the course of the programme, different themes were presented on the different days while the programme lasted. The learners experienced science in a playful manner by participating in fun activities. Typically each day started with a science show or a talk presented by an expert in his/her field. It was followed by a series of workshops to enhance their understanding of what was presented during the science show or the talk. The learners were divided into a senior and a junior group so that the workshops could be appropriate to the level of understanding of each group.

The first day's theme was 'Spiders' and Ms Astri Leroy gave talk about South African spiders and other Arachnids. After the talk the learners had the opportunity to see living spiders and 'glow-in-the dark' scorpions! This was followed by a workshop on facts and myths about spiders for the juniors. They also learned more about spiders by playing a domino game. While craftily making their own spiders they learned about the anatomy of the spider.

'Glow-in-the dark' scorpions

The theme of the seniors' spider workshop was the life cycle of spiders. They learned about spider predator-prey behaviour by playing a spider game.

Regarding the chemistry theme, the learners watched an amazing Chemistry Science Show performed by Mr Godfrey Kgatle. After the show, the learners were separated into senior and junior groups. The seniors learned about the properties of water by doing experiments. They also learned about the periodic table by playing a chemistry card game. The juniors learned about acids and bases by measuring the pH level of common household products. They also conducted various experiments regarding the chemistry of candy. Both the groups attended a slime making workshop and they also built molecules with play dough.

Close to 80 learners attended during the course of the Science is Fun programme.