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Newsletter of the Faculty of Natural and Agricultural Sciences

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The med-fly, Ceratitis Capitata (Photo: Andre Coetzer).

Read article on page 26.

UP an integral part of the future of Africa

"A space that will bring together 300 young, talented people who will live and work together and undertake doctoral research while taking a leadership journey. They will be a generation that will produce science for policy-making and policy implementation." These words of Vice-Chancellor and Principal of the University of Pretoria (UP), Prof Cheryl de la Rey summarised the essence of Future Africa at the recent ground-breaking ceremony at the Future Africa Campus on the University's Experimental Farm.

She explained: "What we are talking about is a new model of doctoral education that is coupled with leadership development, and an endeavour to close the gap between natural and social sciences, and between universities, science and policy implementation."

She emphasised that, while the ceremony marked the turning of the sod and the focus was on the construction of the space that UP created, it serves as a means to help realise the bigger vision.

"Ground-breaking seemed to be the most appropriate description for this event because we are marking the beginning of what is truly a ground-breaking project," said Prof De la Rey. She stated that the project is distinctive, unique and pioneering in the endeavour to be responsive to a changing African context, while at the same time recognising the global repositioning of higher education at the cutting-edge of science."

In 2010 UP began a process of long-term strategic planning which is in alignment with the current long-term strategy referred to as UP 2025. In the process of developing this strategy, UP conducted a number of environmental scans and, through these, a number of trends were recognised that were likely to shape the future of the institution, science and scholarships.

The trend that significantly influenced UP's strategy was the widely recognised realisation that the challenges and major problems currently facing the world, and particularly Africa, can be resolved through integrated approaches to science. "Only through pooling our respective expertise in new ways will we increase our likelihood of successfully tackling issues such as water, energy, food security, health and well-being, climate change and so forth," said Prof De la Rey.

In September 2015, South Africa, together with the rest of the world, adopted the Sustainable Development Goals (SDGs). Prof De la Rey highlighted that tackling these goals successfully will require integrated approaches to research from the university sector, particularly by closing the divide between social and natural

Continued on page 3

Message from the Dean

The power of multidisciplinary research

The trends which are likely to shape the future of the University of Pretoria are science and scholarships and the widely recognised realisation that the challenges and major problems currently facing Africa can be resolved through a multidisciplinary approach to science. Only through pooling our respective expertise in new ways will we increase our likelihood of successfully tackling issues such as water, energy, food security, health and well-being, climate change and so forth. The recent ground-breaking ceremony at the Future Africa Campus on the Hatfield Experimental Farm, an exciting model of multidisciplinary doctoral education and research which is combined with leadership development, will help realise the University's vision. Read more about this on page1.

Through multidisciplinary research, as well as teaching and learning endeavours in the Faculty, we aim to make the world a better place. A very interesting research endeavour in the Department of Genetics, led by **Dr Vinet Coetzee**, is a facial screening project which identifies the specific facial features associated with conditions in African infants and children to assist with early diagnosis of Down syndrome in African children (page 25). Who ever thought that by introducing insects into our diet could provide a solution to a multitude of problems, including the shortage of viable agricultural land that is required for traditional agriculture, such as raising livestock and planting crops. Read more on page 37 about what **Dr Yusuf Abdullah** from the Department of Zoology and Entomology has to say about this.

As always, we are very proud of the outstanding achievements of our staff who demonstrate the power of multidisciplinary research. **Prof Pedro Crous** is the latest A-rated researcher in the Faculty (page 4). **Prof Mike Wingfield** was awarded the Distinguished Leadership Award for International Scientists for 2016 by his alma mater, the University of Minnesota (page 6). **Prof Brenda Wingfield** was awarded the highly prestigious Harry Oppenheimer Memorial Fellowship Award to the value of R1,5 million (page 8). Furthermore, **Prof Dave Berger** received the Special Award in Crop Science and Food Security at the 2015/2016 National Science and Technology Forum (NSTF) Awards ceremony (page 14).

Being people centred, the Faculty continuously seeks opportunities to recruit and appoint highly recognised researchers and academics. These new appointments include **Prof Jacek Banasiak** as the incumbent of the DST/NRF SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences, where the walls between mathematicians and biologists are continuously broken down (page 39). **Prof Wlady Altermann**, with his excellent academic record and highly-esteemed industry connections, was appointed as the new Head of the Department of Geology (page 40).

Our students follow on the legacy of multidisciplinary research in an excellent manner. **Courtney Gehle**, a third-year BSc Geography student, recently had the opportunity to be part of the United States (US) Leadership Programme and visited Paris and the US (page 54). **Thokozani Sikhosana**, an MSc Biochemistry student, was selected as the Southern Africa Network for Biosciences (SANBio) student ambassador for Southern Africa (page 19). Furthermore, **Pelly Malebe**, a PhD candidate in Biochemistry, was selected as the Next Einstein Forum (NEF) Ambassador for South Africa and represented the NEF and her country at the 2016 global gathering (page 10). With the conference theme being *Connecting Science to Humanity*, it reemphasises the power of multidisciplinary research.

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 our Faculty

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

sciences. "By closing the divisions between universities and the way in which universities interface with policy, policy-makers and policy-implementers, this project endeavours to meet all of those needs," she added.

In recognition of these challenges, the International Council of Science recently launched the Future Earth project. This is a major international research platform, providing a space for knowledge and support to fast-track transformation into a more sustainable world. It has succeeded in bringing together several programmes, focussing on environmental change and is activated to focus on research in three broad themes: the dynamic planet, global sustainable development and transformations towards sustainability. Future Africa will provide a critical link between UP research and these global efforts.

Prof De la Rey made reference to the chairperson of the African Union Commission, Dr Nkosazana Dlamini-Zuma, who, while visiting UP, recommended that the University take up the challenge of creating a new horizon for the future of Africa by getting involved in Agenda 2063, Africa's long-term development strategy. "One of the ways in which we are heeding the call is the realisation of this concept that we call Future Africa, whereby we are making a significant investment in the future by producing a new generation of scientists who will be much better prepared to undertake research relevant to African development in a more integrated and solution-oriented way," said Prof De la Rey.

She emphasised that, while the ceremony marked the turning of the sod and the focus was on the construction of the space that UP created, it serves as a means to help to realise the bigger vision. The space that is being created will bring together 300 young, talented people who will live and work together, undertaking doctoral research while taking a leadership journey. They will be a generation that will produce science for policy-making and policy implementation.

She emphasised that the success of this project depends on partnerships. "Future Africa has been an anchor project for South Africa's contribution to the Future Earth initiative. Without these partnerships and dialogues we will not succeed," Prof De la Rey concluded.

Also present at the ceremony was Prof Tinyiko Maluleka, Advisor to the Vice-Chancellor and Principal. He explained that Future Africa "captures all the ideas that we have about the University's Africa Strategy – ideas of interdisciplinary collaboration, networking, innovation, problem-solving and creating space in which African researchers may address the issues that we are facing as a continent."

Prof Bernard Slippers, Professor in Genetics at UP, has led the Future Africa project since its inception. He affirmed the importance of partnerships, saying, "Partnerships should be strengthened as we align our vision and action for a better Future Africa."

The idea behind the architecture, inspired by social innovation, was to create a working space that is also a social space, as described by EarthWorld's architects who designed the buildings of Future Africa.

Another A-rated Professor for NAS

The Faculty of Natural and Agricultural Sciences (NAS) proudly announces yet another A-rated researcher in our midst. **Prof Pedro Crous** is a professor in the Department of Microbiology and Plant Pathology and involved with the Forestry and Agricultural Biotechnology Institute (FABI) at UP.

Not only can the Faculty boast with seven A-rated researchers, but three of them are also affiliated with FABI. The University currently has a total of 14 A-rated researchers.

Prof Crous is also the Director of the Centraalbureau voor Schimmelcultures (CBS) (Fungal Biodiversity Centre), an Institute of the Royal Dutch Academy of Arts and Sciences, Utrecht, Netherlands, and professor at the Universities of Utrecht and Wageningen in the Netherlands.

Prof Crous received his DSc from UP in 2009.

As a phytomycologist his main interest lies in the evolution and phylogeny of plant pathogenic fungi, especially *Dothideomycetes*, *Diaporthales* and *Hypocreales*. Understanding and defining species means that the importance of sex (recombination) cannot be ignored.

Prof Crous' research has shown that many plant pathogens have both mating type genes, and may be having cryptic sex, which also has serious implications for disease control and rates of evolution. He is interested in intra- and interspecies variation, and how this relates to host specificity and speciation.

Prof Crous actively pursues integrating DNA data with morphology and ecology. In this regard he initiated MycoBank to capture all fungal names, and now links taxa to their DNA data, cultures, specimens and ecology. A main aim of his research group is to determine genetic variation in species and populations, and to develop molecular tools that will enable rapid detection of such pathogens in relation to quarantine and trade. His research group consists of postdoctoral researchers and students in several countries in Europe, Africa, Asia and South America.

Over the past five years he was elected as Corresponding Member of the Royal Academy for Overseas Sciences (2010), received the Founders' Award from the European Mycological Association (2011), received honorary membership of the Mycological Society of America (2012) and became an elected fellow of the Southern African Society for Plant Pathology (2013).

Prof Pedro Crous

Young UP scientist shines with Nobel Laureates

Dr Bianca Verlinden

After a rigorous selection procedure, Dr Bianca Verlinden, a postdoctoral fellow in the Department of Biochemistry, was chosen by the National Research Foundation (NRF) as one of two excellent young researchers to represent South Africa at the 8th HOPE meeting with Nobel Laureates held in Tsukuba, Japan in March.

From the pool of 109 international young scientists present, Dr Verlinden received the prestigious HOPE Award for research excellence. In addition, she also received one of five Best Poster Presenter Awards. Teamwork is a strong focus of the HOPE meeting and the team, of which Dr Verlinden was a member, received the Unique Team Presentation Award for their inspirational efforts.

Since 2008 the Japanese Society for the Promotion of Science (JSPS) has been hosting HOPE meetings in Japan annually. HOPE meetings are designed to foster outstanding scientific talent through an intensive program of research lectures, interdisciplinary discussions and teamwork activities led by Nobel laureates and other distinguished scientists. The participants are granted an opportunity to present their own research results and to form collegial networks.

The generous sponsorship of the NRF and the Department of Science and Technology, in partnership with the JSPS made it possible for Dr Verlinden to attend the HOPE meeting.

Dr Verlinden obtained a BSc (Biotechnology) and a BSc Hons (Biochemistry) degree from the University of Pretoria, both cum laude. In 2011, her MSc degree was upgraded to a PhD degree in Biochemistry. During her PhD studies, Dr Verlinden received five international awards relating to her research and bio-entrepreneurship endeavours. The research for her thesis led to the discovery of a novel antimalarial scaffold, distinct from any existing antimalarial compound. Her research findings were published in the *Journal of Medicinal Chemistry.* It was cited 30 times and also included in the following books: *Advances in protozoa research and treatment* (2012 edition), *Amines- Advances in research and applications* (2013 edition) and was also reviewed in the *Current topics in medicinal chemistry* (2013). These findings were also presented at 11 international conferences, most of them by invitation. Dr Verlinden is an avid communicator and has trained as a public speaker for the past eight years (2009 to the present) at Scientia Toastmasters Club, Pretoria.

International Leadership Award for Prof Mike Wingfield

Prof Mike Wingfield

"Amongst the most productive scientists of his generation, and possibly ever 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.

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. He is also an A1-rated National Research Foundation (NRF) researcher.

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

His work on the topic of tree health has been widely published in more than 600 research papers and five books. As an invited speaker he has made numerous highly acclaimed presentations globally.

Prof Wingfield was elected as a fellow of several scientific societies, including the Royal Society of South Africa, the Academy of Science for South Africa (ASSAf), and 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, and other accolades that he has received include the Johanna Westerdijk Award, awarded 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 the North Carolina State University in 2013.

More details about the reasons why he was selected for the award are provided on the website of the University of Minnesota.

Johan Ferreira named one of SA Top 200 young South Africans

A lecturer in Mathematical Statistics in the day, an oboist at night. These are just two of the facets of the multitalented Johan Ferreira of the Department of Statistics at the University of Pretoria who was named one of the **Mail & Guardian* top 200 young South Africans 2016.

"Mathematics and music are intrinsically linked. Mathematics (and statistics in particular) relies on counting," is Johan's explanation. "The world consists of mathematics. Music is but a part of that! In an orchestra performance or a solo recital, whether you are Beyoncé or Joshua Bell, your performance fundamentally consists of counting.

Johan Ferreira may be merging the worlds of mathematical statistics and wireless communication systems for his PhD, but he is also a lecturer at the University of Pretoria and an occasional rugby player.

"I am involved in a variety of activities that stretches from research, teaching, performing, sports, and community engagement work," says Ferreira, who is also member of the management board of two non-profit organisations in Pretoria and Johannesburg.

During the past four years, Ferreira has won a variety of research prizes from the University of Pretoria, the South African Statistical Association, and the South African Academy of Science and Art.

From 2013 until 2015 he played a pivotal role in raising more than $50 000 for uplifting the discipline of Statistics within the South African scientific fraternity via various initiatives within the Department of Statistics at the University.

In April 2016, Ferreira acted as head of the South African state delegation of the G20 Youth Summit in Germany, where he discussed South African and African challenges in global health, labour market issues, new strategies for the financial sector, and technological challenges with other global young leaders from diverse backgrounds.

That aside, Ferreira considers himself fortunate to be involved in music as the principal oboist of the Gauteng Philharmonic Orchestra in Pretoria. "I also freelance as oboist for the KwaZulu-Natal Philharmonic Orchestra and the Johannesburg Philharmonic Orchestra. Recently I completed my Licentiate of the Royal Schools of Music in oboe performance, and I am part of the woodwind quintet, Airflair in Pretoria, where we maintain a performance schedule," says Ferreira.

"Many people only see statistics as numbers reporting on data. It is so much more: algorithms dictating how the banking system works, logistical planning of government services, underlying models of ways the public communicates – statistics is everywhere."

Ferreira compares being a PhD student to standing in line to buy a train ticket: when you get this ticket, it allows you access to a certain number of trains that can take you somewhere you haven't been before. "Main aim: get this train ticket!" – *Tiana Cline*

*Every year, the *Mail & Guardian* scours the country to find noteworthy and newsworthy young South Africans under 35 to profile in its annual 200 Young South Africans publication.

Credit: *Mail and Guardian*

Johan Ferreira

Prestigious research award for Prof Brenda Wingfield

Prof Brenda Wingfield, one of the University of Pretoria's A-rated scientists was recently awarded the highly prestigious Harry Oppenheimer Memorial Fellowship Award to the value of R1, 5 million, made by the Oppenheimer Memorial Trust (OMT). In receiving this, award she was joined by Prof Xolela Mangcu, political commentator and leading academic at the University of Cape Town.

In announcing the 2016 winners of the award, Mr Nicky Oppenheimer, former Chairman of the De Beers Diamond Company, said that it was unusual, but not unprecedented to make this very prestigious award to not only one, but two leading academics. He said that in years gone by the award no one has received this award. However, this year two candidates had so impressed the Trustees of the OMT that they decided to award both these academics.

The two awards were announced by OMT Trustee, Mr Bobby Godsell, former CEO of the De Beers Diamond Company and they were presented by Mr Nicky Oppenheimer. The awards ceremony, held in the Brenthurst Library of the Brenthurst Estate (home of the Oppenheimer family), was attended by colleagues, family and friends of the awardees. Many distinguished guests, including former South African president Kgalema Motlanthe also attended the ceremony.

The R1, 5 million will be used to pursue the awardees' chosen research goals during the coming year. Prof Wingfield will extend her studies of reproduction in fungi, and specifically will provide her students with an opportunity to participate in an international project on this topic.

Prof Wingfield enjoys significant national and international recognition for her work in Plant Pathology. 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, the African Union Regional Award for Women in Science in 2009 and the National Science and Technology Forum of South Africa's Award for Mentorship and Human Capacity Development in 2014. 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 2015 Prof Wingfield was awarded the SARCHI chair in Fungal Genomics. She is also a programme leader at the Centre for Tree Health Biotechnology (one of South Africa's first seven centres of excellence identified by the Department of Science and Technology and the National Research Foundation). During the first five years of its existence, Prof Wingfield played a leading role in the centre's development.

Mr Bobby Godsell, former CEO of the De Beers Diamond Company, Mr Nicky Oppenheimer, former Chairman of the De Beers Diamond Company and Prof Brenda Wingfield.

Expert on potatoes awarded at National Congress

Prof Martin Steyn, an associate professor in the Department of Plant and Soil Sciences at the University of Pretoria was recently awarded the Board Floating Trophy from the South African Society of Crop Production, for the best oral presentation at the Combined Congress of the Soil, Crop, Horticulture and Weed Science Societies of Southern Africa, that was held in Bloemfontein.

The title of his presentation, which was co-authored by Prof Jacquie van der Waals (UP), Dr Linus Franke (UFS), and Prof Anton Haverkort (Wageningen University, The Netherlands), was 'Resource use efficiencies of potato production in South Africa'.

Prof Steyn's research focus is on the agronomy and water requirements of field crops and medicinal plants, with special emphasis on the potato crop. He collaborates with several research organisations, nationally and internationally, and in the recent past formal links was established with scientists at Wageningen, the Netherlands. His current research focuses on the improvement of effective irrigation water management, potato production in a changing climate and the development of more sustainable crop production practices.

In July 2015 Prof Steyn was invited to act as keynote speaker at the 2015 World Potato Congress in China, where he addressed delegates on the current status and future prospects of potato water productivity.

He was previously employed by the Agricultural Research Council and he has been involved in potato research for the past 28 years. He has a publication record of 41 peer reviewed articles in scientific journals and a further 35 semi-scientific and popular articles. In the past decade he has supervised and co-supervised 40 postgraduate students who have successfully completed their master's and PhD degrees. He is currently the supervisor and co-supervisor of a further 13 master's and PhD students.

Prof Martin Steyn

Presidential Award for Dr Tesfamariam

Dr Eyob H Tesfamariam

Dr Eyob H Tesfamariam, a senior lecturer in the Department of Plant and Soil Sciences at the University of Pretoria was recently awarded the Presidential Award from the Soil Science Society of South Africa, in the category Best oral presentation, at the Combined Congress of the Soil, Crop, Horticulture and Weed Science Societies of Southern Africa, that was held in Bloemfontein.

The Society evaluates all presentations made during the congress for their quality and novelty and the best paper is selected for the Presidential Award. The title of his presentation was 'Municipal sludge as low grade fertilizer for maize production in South Africa: crop yield, nitrogen and phosphorus balances'.

Dr Tesfamariam is an agricultural systems modeller with research focus on water, nitrogen, and carbon cycles in agricultural lands and the impact of climate change on crop and pasture production. His current research emphasises beneficial agricultural use of wastewater sludge and the impact of extreme weather event on maize production in South Africa.

Since 2010 he is involved in multidisciplinary research projects, funded by the European Union FP7 program, Department of Science and Technology, Water Research Commission (WRC), and East Rand Water Care Company (ERWAT). He collaborates with several research organisations nationally and internationally, including the French National Institute of Agricultural Research (INRA), and the Research Council for Agriculture and the Analysis of Agricultural Economies of Italy (CREA), all related to climate change. His research has led to the development of a user friendly decision support tool for sludge application in agricultural lands across South African agro-ecological zones, as well as assessing the impact of extreme weather event under changing climate on maize production in South Africa and potential adaptation and mitigation measures.

Dr Tesfamariam has supervised and co-supervised nine postgraduate students who have successfully completed their master's and PhD degrees. He is currently the supervisor and co-supervisor of 11 master's and PhD students.

UP Biotechnologist one of the Next Einsteins

A Biotechnology PhD candidate at the University of Pretoria (UP), Pelly Malebe was recently selected as the Next Einstein Forum Ambassador for South Africa and represented the Next Einstein Forum and her country at the 2016 global gathering.

The Next Einstein Forum (NEF) is a platform that leverages scientists to solve global challenges by bringing together leading thinkers in science, policy, industry and civil society in Africa. As an initiative of the African Institute for Mathematical Sciences (AIMS) and the Robert Bosch Stiftung, NEF mobilises the brightest minds to look into the most persistent problems through Science, Technology, Engineering and Mathematics (STEM), as well as the social sciences.

Pelly Malebe is a PhD candidate in the Department of Biochemistry, under supervision of Prof Zeno Apostolides. She graduated with a BSc in Human Genetics and an MSc in Biotechnology, both from UP. During her honours and master's studies, she worked as a teaching assistant. She is a member of the Golden Key International Honour Society.

Her current research focuses on identifying and developing molecular markers for drought tolerance and yield in the tea plant. The potential outputs of this research are robust molecular markers that can be used in a selection process in order to improve the yield of tea produced by the global tea industry. Her focus is on increasing the understanding of the genetic basis of drought tolerance in plants, as this knowledge may impact on food and job security through breeding of drought-tolerant crop varieties.

A provisional patent was filed on the results of the research that she conducted during her MSc study. Final filing of this patent with the African Regional Intellectual Property Organisation, as well as in India, Sri Lanka, China and South Africa is underway.

This research is partly funded by UP's Institutional Research Themes in Genomics. Pelly received the National Research Foundation Doctoral Innovation Award, as well as the Southern African Biochemistry and Informatics for Natural Products Network (SABINA) Doctoral Fellowship which is funded by the Carnegie Corporation of New York. In 2008, she received an Award of Merit for outstanding academic achievement from the Department of Biochemistry at the University of Pretoria. She was awarded with the NRF's honours, master's and doctoral Innovation Awards. She also received a SABINA Network PhD Fellowship.

Pelly's interest in science already started at a very young age, because she was a curious child. She later found that the answers to some of her questions could be found in genetics textbooks.

The NEF global gathering took place earlier this year in Dakar, Senegal. NEF compiled a targeted team of 54 young ambassadors, one from each African country, who participated in the NEF Global Gathering 2016, to champion African science, technology, engineering and mathematics globally and they are part of the growing NEF community. The Next Einstein Forum global gathering was attended by world leaders and they joined the movement. Macky Sall (President of Senegal), Paul Kagame (President of Rwanda) and Naledi Pandor (Minister of Science and Technology, South Africa) were among the world leaders that were present at the global gathering and have signed on in support of this movement.

Pelly Malebe

Prof Bernard Slippers awarded with Chancellor's Award for Research

Prof Bernard Slippers

Achiever

Prof Bernard Slippers, a renowned international researcher from the Department of Genetics in the Faculty of Natural and Agricultural Sciences and a research leader in the Tree Protection Co-operative Programme and Centre of Excellence in Tree Health Biotechnology in the Forestry and Agricultural Biotechnology Institute (FABI) was awarded the Chancellor's Award for Research for 2015 at a special gala occasion earlier this year. He also leads the Future Africa project at UP, which is focused on developing excellence in transdisciplinary science leadership in Africa.

The Chancellor's Award for Research is awarded annually to a maximum of two staff members on the professional level, who have performed exceptionally in terms of research output and the international acknowledgement of their research.

His research focuses on the ecology, evolution and management of insects and fungi that affect tree health. He uses genetic, genomic and chemical tools to characterise global patterns of spread of invasive tree pests and pathogens, as well as their population dynamics, communication systems and mating strategies. He has made critical contributions to understanding structure and diversity in plant-associated fungal and insect communities, from population level to species and communities. This work has led to the discovery of numerous new pathogen and pest species, some of which threaten forestry world-wide.

Prof Slippers has contributed to the development of biological control programmes for plantation pests, and also to the establishment of a major Biocontrol Research Centre at the University. Among the awards Prof Slippers has received are the Southern African Association for the Advancement of Science, British Association Medal (Silver) and the JE Vanderplank Award from the Southern African Society for Plant Pathology. He holds a B1 rating from the NRF. He has published more than 180 papers, including in high profile journals such as *Science, Trends in Ecology and Evolution* and *Trends in Plant Science*. He is the editor of a book on *Sirex noctilio*, a global invasive forest pest, and has authored a number of chapters in books. Prof Slippers has supervised a number of postdoctoral researchers, as well as 48 PhD and MSc students. He regularly contributes to national and international congresses as participant, invited speaker and organiser. He reviews papers for key journals in his field. He is an editor for *Plant Pathology* and issue editor for *Studies in Mycology.*

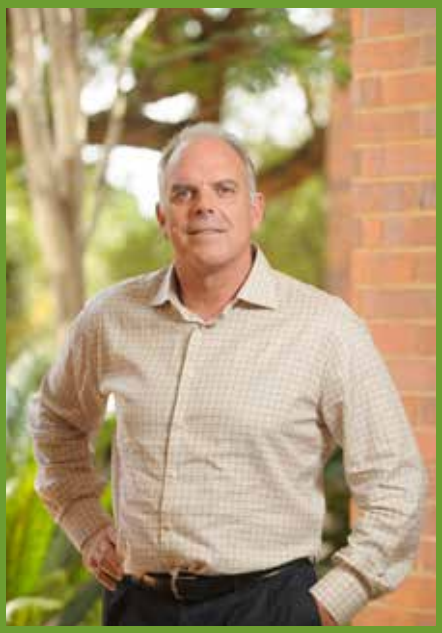
He is a founding member of the Global Young Academy (GYA) and South African Young Academy of Science (SAYAS) and has supported the establishment of young academies in Africa and elsewhere. He has served as co-chair of GYA. Prof Slippers is a Young Affiliate of The World Academy of Science (TWAS), from which he received the AU-TWAS Young Scientist national prize. He currently leads the Future Africa project at UP, which is focused on developing excellence in transdisciplinary science leadership in Africa.

Prof Slippers and his wife Jana are the heads of residence of TuksVillage, where they live with their daughters Yvonne and Mia.

NAS academics shines bright again at Academic Achievers Awards

Excellent Academic Achievers

Prof Teresa Coutinho



Prof Johann Kirsten

Prof Jean Lubuma

The academic staff in the Faculty of Natural and Agricultural Sciences was again the brightest stars at the University's Academic Achievers Awards function this year.

Each year the University of Pretoria (UP) hosts a gala function to pay tribute to academics that have shown exceptional achievement in the preceding year.

The Vice-Chancellor and Principal of UP, Prof Cheryl de la Rey, said that 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 that is committed to excellence in research and teaching and learning. She congratulated all who featured in this year's Academic Achievers publication, saying that they light the way on the institution's path of progress to its vision of becoming a leading research-intensive university in Africa, recognised for developing people, creating knowledge and making a difference both locally and globally.

The Chancellor's Award, which is made in recognition of exceptional achievement in research, aimed at advancing science and the associated promotion of UP's interests, was awarded to Prof Bernard Slippers of the Department of Genetics in the Faculty of Natural and Agricultural Sciences. He is a research leader in the Tree Protection Co-operative Programme and Centre of Excellence in Tree Health Biotechnology in the Forestry and Agricultural Biotechnology Institute (FABI).

Furthermore, this year the Faculty can boast with six of eight of the UP Excellent Academic Achievers, namely Prof Teresa Coutinho, Prof Johann Kirsten, Prof Jean Lubuma, Prof Andrew McKechnie, Prof Louis Nel and Prof John Taylor.

Two academic staff members from the Faculty, Prof Nico de Bruyn and Dr Peter le Roux were also recognised as Exceptional Young Researchers.

The Teaching Excellence and Innovation Laureate Award in the individual category was also awarded to Prof Patricia Forbes from the Department of Chemistry.

Prof Pedro Crous, also from the Faculty was the recipient of this year's only NRF A1 Researcher Award. He is the Director of the Centraalbureau voor Schimmelcultures (CBS) (Fungal Biodiversity Centre), an institute of the Royal Dutch Academy of Arts and Sciences in Utrecht, the Netherlands, and professor at the universities of Pretoria, and Utrecht and Wageningen in the Netherlands. At UP he is a professor in the Department of Microbiology and Plant Pathology in the Forestry and Agricultural Biotechnology Institute (FABI).

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.

Prof Andrew McKechnie

Prof Louis Nel

Prof John Taylor

Exceptional Young Researchers

Prof Nico de Bruyn

Dr Peter le Roux

NSTF awards Prof Dave Berger

Prof Dave Berger from the Department of Plant and Soil Sciences received the Special Award in Crop Science and Food Security at the 2015/2016 National Science and Technology Forum (NSTF) Awards ceremony.

The NSTF Awards are referred to as the 'Science Oscars' of South Africa, as they are the largest, most comprehensive and most sought-after national awards of their kind. The Special Award in Crop Science is sponsored by the Department of Science and Technology and is presented in honour of the 2016 International Year of Pulses, as declared by the United Nations Educational, Scientific, and Cultural Organisation (UNESCO).

Prof Berger is a 'gene detective' whose research is focused on finding which genes protect crop plants against fungal diseases. He is a member of the Department of Plant and Soil Sciences and, leads the research group 'Molecular Plant-Pathogen Interactions' in the Forestry and Agricultural Biotechnology Institute (FABI) at UP. On joining UP in 2000, he set up the ACGT Microarray Facility, which continues to provide a service to local researchers. Microarrays are microscope slides onto which genes are 'printed' by a robot, allowing gene regulation studies of thousands of genes in a single experiment. Prof Berger's research, supported in part by the Genomics Research Institute at UP, has focused on genomics technologies such as microarrays and next generation sequencing to address crop diseases that threaten food security. To date, his work on plant transcriptional responses by using microarrays, has led to development of five bioinformatics software packages, which have been applied for gene discovery.

Prof Berger's current gene research targets grey leaf spot disease, which is a global threat to maize. He also co-ordinates a public-private partnership of local and international research partners on this topic. The consortium has identified maize resistance mechanisms and developed improved maize for both commercial and small-holder farmers. In addition to the maize work, the team is assessing the impact and diversity of the fungal pathogen locally, and the project recently expanded to other countries of sub-Saharan Africa. He also recently led the development of the first tomato diversity array for genetic mapping in wild tomato species as part of a European Union project.

Prof Berger is an NRF Rated researcher (C1 category), and has published more than 50 scientific papers, several patents, book chapters and bioinformatics software packages. He has supervised or co-supervised more than 50 PhD and MSc students. His many accolades over the course of his career include being a 2013 US Department of Agriculture (USDA) Norman E Borlaug International Agricultural Science and Technology Fellow. He was also awarded a 2011 European Union Framework Programme prize in the Capacity Development category, presented by the Department of Science and Technology, and the 2013 he received the Biotech Fundi Award (Capacity Building) from the Gauteng Department of Agricultural and Rural Development.

Prof Dave Berger

Two prestigious prizes for Plant Science student

Ms Rabia Mathakutha, a master's student in the Department of Plant and Soil Sciences recently received two prestigious awards at the Joint Annual Conference of the South African Association of Botany (SAAB) and the Southern African Society for Systematic Biology (SASSB). She won the award for the Best oral presentation by an MSc student, and the Best oral paper by a young scientist.

This Joint Annual Conference was hosted by the University of Free State, Bloemfontein, with the theme *Biodiversity: past, present and future*.

Rabia is a master's student in plant science, conducting research on sub-Antarctic Marion Island, under the supervision of Dr Michelle Greve and Dr Peter le Roux. Her research is focused on understanding what drives the success of invasive plant species on sub-Antarctic islands. The sub-Antarctic islands are isolated areas of cold, wet and windy climatic conditions. Despite these harsh climatic conditions, invasion by alien species occurs.

According to Rabia she uses a trait based approach to address her research questions. This involves comparing the functional traits of native, non-invasive alien species (alien plants with a restricted distribution) and invasive alien species (alien plants that have a widespread distribution), to see if they differ in traits. If differences exist, they can be used to identify which plants are invasive or have a likelihood of becoming invasive in the future, based on what traits they possess. This will have important implications for managing established aliens on the islands and for reducing future invasions. Research is conducted on Marion Island during the April-May period.

From her last field work on the Island and data analysis that followed, Rabia was able to show that indeed invasive alien species differ from native and non-invasive alien species in some key traits. Rabia will be visiting Marion Island again this year to continue her field work by measuring more traits to acquire a better understanding of the underlying mechanisms for the invasion of sub-Antarctic islands by alien plant species.

Rabia Mathakutha

Award for best Soil Science paper to Dr Mbakwe

Dr Ikenna Mbakwe, a postdoctoral fellow in Soil Science, recently received an award from the Soil Science Society of South Africa for the best Soil Science paper on Emerging Agriculture.

The title of his presentation co-authored by Prof Richard Stirzaker and Prof John Annandale is "Improving irrigation water and solute management using simple tools and adaptive learning" In sub-Saharan Africa, crop yields from smallholder irrigation farms have been markedly low, partly due to low skill levels in water and nutrient management. Technologies that guide irrigation management have been poorly adopted, because farmers generally favour experiential knowledge above the use of objective tools, many of which are difficult to understand. The solution to improving soil water management in sub-Saharan Africa as a precursor to increasing agricultural productivity can therefore be found in simple tools that build on farmers' existing knowledge, stimulate local experimentation and creativity, and assist with pattern recognition and intuitive decision-making. The authors presented findings of how the use of simple tools (the FullStop wetting front detector and the Chameleon soil water sensor) in an atmosphere of adaptive learning, has improved irrigation agriculture on smallholder farms in Southern Africa.

Dr Mbakwe is a Nigerian and obtained his MSc Soil Science from the University of Stellenbosch and his PhD in Soil Science from the University of Pretoria. He is currently conducting his postdoctoral research in Soil Science on a project sponsored by the Australian Centre for International Agricultural Research. The title of his research is "Increasing irrigation water productivity in Mozambique, Tanzania and Zimbabwe through on-farm monitoring, adaptive management and agricultural innovation platforms".

Dr Ikenna Mbakwe

The time to be innovative is now!

"Be creative and forge your own future in ways never explored before. Be a leader and create your own new job description like that of the 'Education Evangelist' at Google. The timing for being innovative is perfect – in the past you may have been burnt at the stake for having a non-conventional idea or view, but today people are hungry for novelty – the quest is on for 'disruptive technologies' which change the way in which things are done."

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

Prof Forbes, an associate professor in the Department of Chemistry, was the guest speaker at this prestigious function. She developed an educational spectrophotometer (the SpecUP), which students can assemble from a kit and use to generate analytically useful results. In 2014 she received the Chemical Education Award of the South African Chemical Institute (SACI) for this project, which has been rolled out to numerous institutions throughout Africa. In 2015 the project was also awarded the prestigious international Wharton QS Reimagine Education Award for Presence Learning. In 2016 she was the recipient of the University of Pretoria's Teaching Excellence and Innovation Laureate Award.

Finally, she encouraged the undergraduate students present at the event to explore the numerous exciting opportunities which are available regarding postgraduate studies and to take up the challenge in this regard. "The world is your oyster and the options which your future holds are wide."

Liezl Ferreira continued her excellent achievements from the previous years. This year she was honoured to be the recipient of the Vice-Chancellor's and Principal's Medal for excellent undergraduate academic achievement as the best student in the Faculty, with a weighted average performance of more than 92, 18 % over her three years of study. She also won the Discovery Holdings Prize and the Outsurance Prize. Last year she was the number one student on the Dean's Merit list, with an average of 93% and scooped up most the awards (four) at the event.

Tristan Venter won the most awards this year, which were all sponsored by FNB. The three awards were for the best student in Financial Mathematics, the best second-year student in the BSc (Actuarial Science) degree programme and the best second-year student in Actuarial Mathematics.

The Dean's Merit List for 2015 was announced (the list includes students with an average of more than 75%) and the Top 30 undergraduate students on this list (with an average of 85% or more) were also acknowledged at this event. Duncan Dean was the number one student on this list with an average of 93% and he was also awarded as the best second-year student in Physics.

The Dean especially mentioned all the candidates who received their doctoral degrees during the recent autumn graduation ceremony and announced that they will also be included in the Dean's Merit List.

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

Liezl Ferreira and Mr Piet Maree (Discovery Holdings)

Prof Jean Lubuma (Dean: Faculty of Natural and Agricultural Sciences) and Tristan Venter

UP Laureate Award for Prof Patricia Forbes

An innovative approach to developing a spectrophotometer did not only save students a lot of money, but was also the reason why Prof Patricia Forbes was awarded yet another accolade for her work.

Prof Forbes, an associate professor in Analytical Chemistry is the individual winner of the Teaching Excellence and Innovation Laureate Award this year. The Laureates are awarded to nominated projects that display teaching practices with clear purpose and intent, with strong alignment between the different elements in the broader context, that address identified needs or gaps, with the aim of innovative optimisation of teaching and learning.

She has a passion for teaching the next generation of chemists and believes in encouraging students to develop an understanding of key fundamental concepts via active and inquiry-based learning.

According to Prof Forbes, "modern commercial scientific instrumentation used to analyse samples is built so as to be rugged and to provide reproducible and accurate analytical results. As a consequence, user interaction with the actual instrument components is usually very limited. This has a concomitant disadvantage in the training of students, as opportunities for hands-on learning are very limited and therefore a student's understanding of what goes on in the 'black box' of instruments may be very poor or even incorrect. This is particularly true in respect of spectrophotometry, which utilises light to determine what a sample contains and in which quantities. Spectrophotometry is an important component of many tertiary science courses and is applied in numerous industries, for example to analyse pharmaceuticals and food products."

To address this problem and the demands resulting from increasing student numbers and limited resources, Prof Forbes developed an educational spectrophotometer (called the SpecUP), which students can assemble from a kit and then use to generate analytically useful results. The SpecUP costs around R600, whereas an entry-level commercial instrument costs about R30 000, which means that more SpecUP instruments can be acquired. The SpecUP has a unique, open design with moveable components to enhance hands-on and inquiry-based learning.

The SpecUP has been used in the Analytical Chemistry III module at the University of Pretoria since 2014. The project has attracted funding from the African Laser Centre (which promotes photonics in Africa), the Royal Society of Chemistry, and the Department of Science and Technology. As a result, the SpecUP has been rolled out nationally to numerous institutions, including the universities of the Witwatersrand, and Stellenbosch, Nelson Mandela Metropolitan University, Walter Sisulu University, Rhodes University and Tshwane University of Technology, as well as to Africa (Tunisia, Namibia, Lesotho, Botswana, Kenya, Swaziland, Zimbabwe, Zambia, Ivory Coast, Egypt) and also to Turkey and Italy. To date, the SpecUP has given rise to a journal paper, five SpecUP workshops and five invited conference presentations.

Prof Forbes also received the Chemical Education award of the South African Chemical Institute in 2014 and the prestigious international Wharton QS Reimagine Education Award for Presence Learning in 2015 for the SpecUP project.

Prof Patricia Forbes

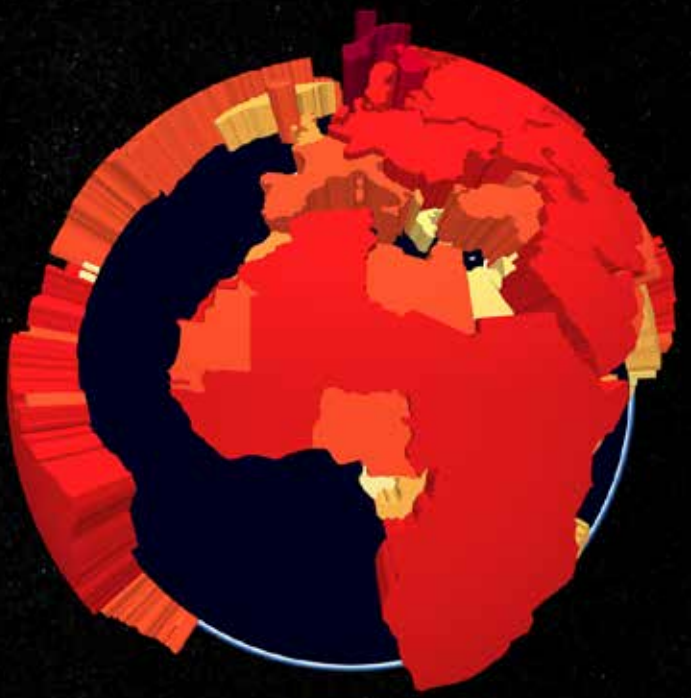
Excellence in teaching acknowledged

At the annual Bosberaad of the Department of Mathematics and Applied Mathematics, Prof Ansie Harding, Chairperson of the Adjudication Panel announced the winners of the prestigious Excellence in Teaching Award as well as the Award for Adding Value to Teaching for 2015.

Ms Rita Möller received the award for Adding Value to Teaching *from Prof Norman Duncan (Vice-Principal: Academic).*

Dr Quay van der Hoff and Prof Norman Duncan (Vice-Principal: Academic)

CGIS wins prize at Durban AgriHack Talent Challenge



A team of postgraduate Geoinformation Science students from the Centre for Geoinformation Science (CGIS) recently won the climate change category at the Durban AgriHack Talent Challenge.

The team comprised of Victoria Rautenbach (UP), Sean Cullen (UP), Nadia Oosthuizen (Natural Resources and the Environment Unit, CSIR) and Danie Jooste (UP) and they developed the Temo le Boso mobile and web application (an overview video).

The platform (website and app) aims to serve as a decision making tool for farmers in selecting which crop type to potentially plant in their area under future climatic conditions. For the prototype, they used open data from many sources, notably data from the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), a partner of the activity. They received their trophy from a board member of the Southern African Confederation of Agricultural Unions (SACAU), another partner of the activity. The price for the category is 4 000 euros and the opportunity to fully develop the application.

The Durban AgriHack Talent Challenge took place in conjunction with the Global Forum for Innovation in Agriculture, African Edition (GFIA Africa) and it started at the end of 2015 in Durban.

A video of the product they developed is available at https://www.youtube.com/watch?v=8eSBK0c0PgI

The article is adapted from http://durban-agrihack.ict4ag.org/index.php/2015/12/03/meet-the-winners-of-the-durban-agrihack-talent-challenge/

A true Bioscience ambassador for UP and Southern Africa

"Science is an invaluable tool ...[to] improve our communities!" This is the firm belief of Thokozani Sikhosana, an MSc Biochemistry student at the University of Pretoria (UP) recently selected as the Southern Africa Network for Biosciences (SANBio) student ambassador for Southern Africa. Her role as student ambassador includes explaining the SANBio mission and promoting Biosciences in Southern Africa.

Thokozani is a true ambassador who not only hails from both the departments of Genetics and Biochemistry in the Faculty of Natural and Agricultural Sciences but who also supports the SANBio vision of a Southern African biosciences network working to improve the livelihoods of all inhabitants. The network would facilitate innovation and support the development of a knowledge-based economy in Southern Africa.

She believes that the many challenges such as malnutrition and the spread of poverty related diseases also provide many opportunities for improvement. "I firmly believe that many African problems can be solved by science – and especially by women in science. Take Prof Evelyn M Witkin who was awarded the National Medal of Science for her work on DNA mutagenetics and DNA repair," she explains."

"I enjoy the thrill of producing experimental results! Being in the laboratory is already fulfilling in itself, even when expected results are elusive. This merely implies that we need to approach the problem from a novel direction. I would advise anyone interested in a scientific career to run with their ideas. Don't hold back and never give up! Your background does not dictate where you are going in life, only your determination. As a passionate young scientist, I feel we must utilise all our resources, learn and develop under the guidance of excellent scientists and contribute to human and animal health," she concludes excitedly.

As an aspiring young scientist Thokozani enrolled in the BSc Honours programme in Biochemistry in 2014 with Prof Christine Maritz-Olivier, who heads the Tick-borne diseases group in the Department of Genetics. In 2015, she enrolled for an MSc in Biochemistry, again with Prof Maritz-Olivier, focusing on antigens as potential anti-tick vaccines for livestock. This field of research spans from antigen production, vaccine formulation to animal vaccination trials.

Thokozani explains, "All the above aim to improve animal health and food security through biotechnology. I have been lucky to produce four antigens, one using a eukaryotic and three in a prokaryotic expression system. One antigen was tested in a small-scale cattle vaccine trial and significantly affected the feeding of female ticks, their egg laying ability and the fecundity of the offspring. A vaccine against ticks, and specifically *Rhipicephalus microplus*, will provide targeted tick control for emerging farmers in areas with acaridan resistance. *Rhipicephalus microplus* transmits lethal bacteria such as *Babesia bovis* (Asiatic redwater), adapts easily to different geographical areas and rapidly spread to acaridan, making it the most economically important tick species."

As Thokozani explains, economic losses due to this tick species impact both small-scale and commercial farmers affecting the job security of 2.2 million workers. In areas already affected by malnutrition, ticks further burden resource-poor communities.

Thokozani Sikhosana

Plant Pathology student won Wirsam Scientific Prize

Willeke de Bruin

Willeke de Bruin, a PhD student in Plant Pathology was recently awarded the Wirsam Scientific Prize for best paper presented by a student author at the Conference of the Microscopy Society of Southern Africa (MSSA) at the St George Hotel. The title of her paper was 'Ultrastructural effects of Nonylphenol on Cos lettuce (*Lactuca sativa* L.)'.

She is supervised by Prof Lise Korsten (Plant Pathology), with Dr Quenton Kritzinger (Plant Science) and Prof Riana Bornman (Faculty of Health Sciences) as her co-supervisors. Willeke's PhD is titled 'Effect of Nonylphenol, an industrial endocrine disruptor chemical, on the germination and development of cos lettuce (*Lactuca sativa*)'.

According to Willeke, Nonylphenol is a breakdown product of Nonylphenol ethoxylate, one of the most extensively used surfactants worldwide. Nonylphenol has frequently been detected in South African irrigation waters, which is said to be of inferior quality, due to inadequate sanitation and waste-removal practices, sewage spills, storm water wash-off and the activities of human settlements. Her research has shown that Nonylphenol has a detrimental effect on the germination and development of lettuce.

Geoinformatics student wins Esri Young Scholar Award

Kathryn Arnold, a BScHons (Geoinformatics) student in the Department of Geography, Geoinformatics and Meteorology won the Esri Young Scholar Award for her third-year project titled, 'A GIS-based response time and risk analysis of municipal firefighting services in the Alaska informal settlement'.

Kathryn Arnold

Winning this award entitled Ms Arnold to attend the Esri User Conference in San Diego in June this year. The conference was attended by 16 000 geographic information system (GIS) users, managers and developers, and featured more than 300 moderated sessions, as well as technical training.

The practical component of Ms Arnold's project was dubbed the Alaska Fire Management Project, and was conducted between July and November 2015. With a focus on shack fires in the informal settlement of Alaska (in Mamelodi East, Pretoria), she used the ArcGIS software and the ArcGIS Web AppBuilder to measure response times and to analyse the risk associated with municipal firefighting services. The final deliverables of the project included a web application, 3D models and hard-copy maps that visualised areas at high risk for fires in the Alaska informal settlement.

Prof Rashid Hassan appointed as member of UN Committee for Development Policy

Prof Rashid Hassan, Director of the Centre for Environmental Economics and Policy in Africa (CEEPA) in the Faculty of Natural and Agricultural Sciences was appointed as a member of the United Nations (UN) Committee for Development Policy (CDP).

In accordance with the Council's resolutions, the Secretary General nominates 24 experts, in their personal capacity, as members of the Committee for three-year terms. In making the nominations for the Committee, the Secretary General takes into account the need to have a diversity of development experience, including ecologists, economists, and social scientists, as well as geographical balance, gender balance, and a balance between continuity and change in the membership of the Committee.

Prof Hassan has been the Director of the Centre for Environmental Economics and Policy in Africa (CEEPA) in the Faculty of Natural and Agricultural Sciences from 1997. He is a Senior Fellow of the University of Bonn Centre for Development Research (ZEF), from 2012to 2016) and has served as a member of many national and international advisory boards and committees, including the Science Advisory Council (SAC) of the Stockholm Environment Institute (2014), the Board of the International Society for Ecological Economics, the Consortium of International Agricultural Research Centres (CGIAR), Science Council – Independent Science and Partnership Council (ISPC), the CGIAR Climate Change Challenge Program (CCCP), the Academic Advisory Panel for The World Development Report on Climate Change, the Stockholm Resilience Centre Board, the Global Environment Facility (GEF) Science and Technical Advisory Panel-STAP IV, the Science Panel of the Millennium Ecosystem Assessment and the Human Sciences Research Council (HSRC) of South Africa.

Prof Hassan has been a member of the Academy of Sciences of South Africa since 2005, an Elected Fellow of the Academy of Sciences for the Developing World-TWAS, and a Senior Fellow of the Africa Association of Agricultural Economists (AAAE). He serves on the editorial boards of many international journals and was the founding chief editor of the *African Journal of Agricultural and Resource Economics* (2006-2010). Prof Hassan is the author of more than 160 peer reviewed publications, including 12 books. He was awarded the University of Pretoria Chancellor's Medal (Research) in 2011 and in 2015.

Prof Rashid Hassan

Horticulture student scooped up awards

Mathew Banda, an MSc student in Horticulture in the Department of Plant and Soil Sciences recently received two prizes from the South African Society for Horticultural Sciences. He was co-recipient of these two prizes with a student from Stellenbosch.

The first prize was awarded to the best oral presentation by a master's student in Horticulture and the second prize is a travel grant worth R10 000 for the best overall student presentation in Horticulture at the Joint Congress of the Weed, Crop, Soil and Horticultural Societies. The travel grant is towards payment to attend any International Horticultural congress. Mathew's presentation at the conference was titled 'Validating sap flux density measurement methods in *Citrus sinensis*", co-authored by Mr Teunis Vahrmeijer and Dr Nicolette Taylor.

Mathew's research focus is on citrus water use. The increase in citrus production in South Africa over the years resulted in much pressure on water resources. The increase in demand of irrigation water has prompted research to determine the specific water needs of citrus, which enable famers to accurately schedule irrigation as per daily plant water use. This results in saving water and alleviating problems of nutrient leaching which results in eutrophication, making citrus production sustainable.

Mathew Banda

Consumer Science confirms its competitive advantage

At the recent 12th International Conference of the SA Association of Family Ecology and Consumer Sciences, the Department of Consumer Science won all the best publication awards for its research results published in the associated journal for the previous three years.

Particularly noteworthy is that these accolades confirm the excellent reputation of the Department's colleagues who have won this prestigious award since publication in Volume 36. Awards are only presented at bi-annual conferences. Although the content of this accredited journal is not restricted to local research, it provides an excellent platform in which to publish research results that is particularly relevant in a South African context.

The publications were:

- **Sonnenberg, NC & Erasmus, AC.** 2013. The development of a theoretical model to investigate factors associated with environmentally significant choice behaviour in the South African major household appliance market: an integrative conceptual approach. *Journal of Family Ecology and Consumer Sciences*, 41:71-84. ISSN 0378-5254. http://www.ajol.info/index.php/jfecs/article

The article was an output of the PhD thesis of Dr Sonnenberg under supervision of Prof Erasmus.

- **Van der Spuy, EH, De Klerk, HM, Vogel, DM** & Wenhold, FAM. 2014. The meaning of food for obese men. *Journal of Family Ecology and Consumer Sciences*, 42:59-69. ISSN 0378-5254. http://www.ajol.info/index.php/jfecs/article/view/110245/99986

The article was based on the PhD thesis of Dr Van der Spuy, under the supervision of the co-authors.

- **Muthambi, A, De Klerk, HM & Mastamet-Mason, A**. 2015. Sizing for ethnicity in multi-cultural societies: development of size specifications for young South African women of African descent. *Journal of Family Ecology and Consumer Sciences*, 43:62-72. ISSN 0378-5254. http://www.ajol.info/index.php/jfecs/article/view/126227/115751

The article is based on research done for Mr Muthambi's masters' degree under the supervision of the co-authors.

Mr Amu Muthambi and Prof E Boshoff (Editor of the JFECS)

Geology student awarded with Corstorphine Medal

Sameera Mohamed, a PhD student at the University of Pretoria (UP) was recently honoured by the Geological Society of South Africa (GSSA) with the Corstorphine Medal. This medal is annually awarded for an MSc dissertation of outstanding merit, which also complies with the standards of international best practice.

Sameera graduated with an honours degree in Geology from UP in 2013 and then embarked on an MSc in Geology, which was awarded cum laude earlier this year.

She is currently registered for a PhD degree in the Department of Chemistry. Her research focuses on the development of cost-effective surface-engineered nano adsorbents for environmental technological applications, using Platinum Group Metal (PGM) mine tailings. The research project is jointly funded by the National Research Foundation (NRF) and the Council for Geoscience (CGS), under the Professional Development Programme.

Sameera held a two-year position as a Mining Qualifications Authority (MQA) intern in the Industrial Mineralogy Section at the CGS. The research interests of the group evolved around developing industrial chemical processes for the valorisation of industrial mineral wastes (e.g. mine tailings and coal fly ash). She obtained the dux award during her matric year and became a member of the Golden Key International Honour Society in 2011. She was the recipient of the second prize for her oral presentation at the 20th South African Coal Science and Technology Conference in 2015. In 2016, she received a Merit Certificate for Academics on behalf of the Student Community of the University of Pretoria.

The rationale of her MSc was based on mineral beneficiation of Platinum-Group Elements' (PGE) tailings which has become a key focus area in South Africa, to ensure sustainable growth of the economy beyond mining. This initiative could potentially be expanded to include associated mineral waste products which could create a suitable platform to minimise the volume of tailings stored in a tailings storage facility and reduce associated environmental impact.

The thesis was supervised by Prof Wlady Altermann (Department of Geology) and co-supervised by Dr Frederic Doucet (CGS) and Dr Liezel van der Merwe (Department of Chemistry) and is titled "Extraction of major elements from PGE tailings in view of nanoparticle synthesis for environmental technological applications." The MSc research project was financially supported by the NRF, CGS, GSSA and the University of Pretoria.

Sameera Mohamed

Sameera Mohamed with her parents

International Award for red meat research

The 11th International Food Data Conference on the generation of compositional data of animal products in South Africa was recently held in Hyderabad, India. During this event Prof Hettie Schönfeldt and postgraduate students from the University of Pretoria (UP) received the 2015 International Network of Food Data Systems (INFOODS) Success Story award, to honour their exceptional achievement and progress in the field of food composition.

Food composition data forms the basis of almost everything related to nutrition. Data on the nutrient content of foods is used to study how the food we eat affects our health, growth and development. Such data is also needed to devise special diets, or to guide industries, policies and programmes to render our food supply more nutritious.

South Africa, a country with many areas of poverty and food insecurity in-between developed communities, has a unique population nutritional profile. Overweight and obesity is on the increase amidst persistent undernutrition and nutritional deficiencies. A wide variety of cultures, each having their own unique food preferences and consumption patterns, increases the complexity of our food environment.

This diversity highlights the importance of own food composition data to inform our food system towards supplying and promoting a more nutritious food offerings. Red meat is a favourite South African food. Although red meat can play a positive role in improving undernutrition through the provision of essential nutrients such as protein, iron and B-vitamins, animal source foods are also scrutinised as contributing to diseases associated with over-nutrition, such as cardiovascular diseases, high blood pressure and even some types of cancers. Animal production systems in South Africa are also unique, resulting in products that are nutritionally different to that found in other countries. For example, food composition data shows that South African lamb and mutton contain less total fat than their American counterparts.

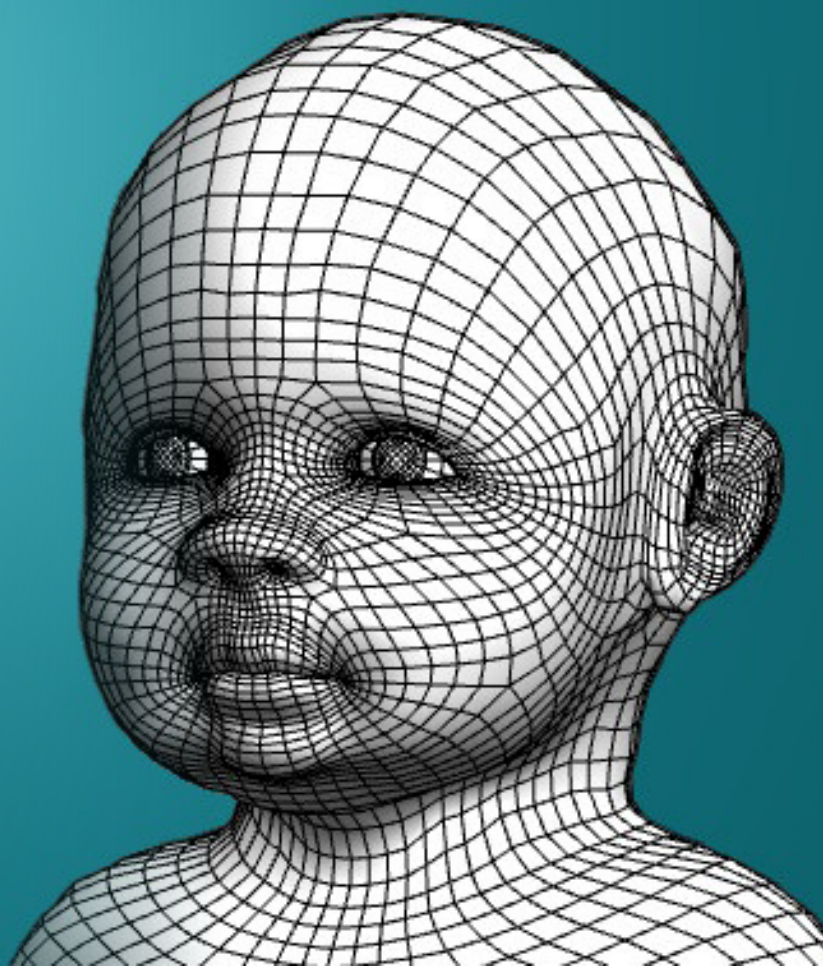
To build a case for the role of red meat within the diets of South Africans, young researchers (Dr Nicolette Hall, Dr Ina van Heerden, Ms Marina Bester and Ms Jeanine Sainsbury), completed their postgraduate degrees at UP under the leadership of Prof Schönfeldt. Through their academic endeavours they compiled an extensive amount of food composition data on a variety of local red meat products, including lamb, mutton, grain- and grass-fed beef, as well as offal. From the data generated, more than 10 scientific articles have been published in a variety of national and international peer-reviewed journals, followed by adoption in popular media. The data was also published as part of four theses, nine pamphlets and 13 booklets.

With limited or no national incentive to support food composition data generation, industry funding was leveraged to support these four large research projects. These include support from the Red Meat Research and Development Trust of South Africa, the Red Meat Producers Organisation, the Agricultural Research Council Animal Nutrition and Animal Product Institute, the CSIR and the SABS.

INFOODS, established in 1984, functions as a global network of food composition experts, aiming to improve the quality, availability, reliability and use of food composition data. INFOODS is organised into several regional data centres, with the Food and Agriculture Organisation of the United Nations (FAO) functioning as the global coordinator.

Price awarded by Dr Paul Finglas (left) on behalf of IUNS (International Union of Nutritional Sciences) – INFOODS Task Force and Dr Paul Hulshof (right) as co-ordinator of the International Postgraduate Courses on the Production and Use of Food Composition Data in Nutrition. Prof Hettie Schönfeldt (centre).

Facial screening project to assist with early diagnosis of Down syndrome in African children



3D image (Photo: Dr Vinet Coetzee)

Around 700 conditions have characteristic facial features associated with them. As a matter of fact, a baby's facial features can often provide the first clues that they were born with a condition. Think for example of the flat nasal bridge and slanted eyes associated with Down syndrome, or the characteristic thin upper lip of a baby with foetal alcohol syndrome. These facial features can play an important role in the initial diagnosis of certain conditions, but they tend to vary by population group. Although much research has been conducted on the subject in Europe and America to date, very little is actually known about the specific facial features associated with these conditions in African populations.

In terms of Down syndrome specifically, most Western infants with the condition are diagnosed before or shortly after birth, while their African counterparts are often only diagnosed at around seven months or later. This is largely due doctors often struggling to identify the link between the child's facial features and a specific condition, owing to differences in how it presents in the facial features of different population groups. This presents a problem, as it is vitally important that these children are diagnosed as early as possible. Early detection not only makes it easier to successfully manage most conditions, but also helps doctors to know which other associated conditions to look for and which developmental interventions to recommend to the child's parents or caretakers. Children who are diagnosed late often miss out on crucial interventions and screenings that could have made an immense difference to their own, and their families', quality of life.

Realising that this problem had to be addressed, a team of researchers from the University of Pretoria (UP), headed by Dr Vinet Coetzee from the Facial Morphology Research Group in the Department of Genetics, embarked on a project to identify the specific facial features associated with conditions in African infants and children.

As a starting point, the team needed accurate facial photographs of children with and without a condition. Dr Coetzee explains that 3D images are ideal for this purpose as they contain information in a range of different dimensions, which enables researchers to identify key facial features more accurately.

To this end, the team initially built their own 3D camera that successfully produced 3D images, but they soon realised that it was not accurate enough for their purposes. As commercial 3D cameras that work well on infants – who rarely sit still when you ask them to – are really expensive and there were apparently no commercial 3D facial imaging systems available in South Africa, or for that matter, in Africa at that stage, the team started a crowd funding campaign to raise funds towards custom building a more accurate 3D camera that would meet their needs. The campaign, which ran on Walacea from 13 January to 1 March this year, was immensely successful and the team was able to raise all the funds they needed for the project to go ahead. In addition to the good response from the public and the scientific community in terms of funding, Canon also donated ten EOS 1200D cameras to be used as part of the project.

'When we heard about this tremendous, forward-thinking project we were excited to be involved in bringing it to fruition. We are pleased to be in a position to sponsor the necessary equipment to facilitate the building of a 3D camera for the facial morphology research project. This initiative has great potential to facilitate early diagnosis of syndromes in African children, allowing for timely treatment to be effected and to improve prognoses,' says Michelle Janse van Vuuren, Marketing Director at Canon South Africa.

The ten cameras will be used to construct a 3D camera. The setup will allow for the ten cameras to be triggered simultaneously and the resultant images will be used to build 3D models of the children's

faces. These 3D models will, in turn, be used to identify specific facial features associated with syndromes such as Down, Prader-Willi, Fragile X and Marfan in African infants.

During the first stage of the project, the team will only focus on identifying the facial features associated with Down syndrome in African children and infants. Once the groundwork has been laid, the team will include more researchers and more conditions in order to reach their ultimate goal of developing a facial screening tool to aid in the diagnosis of a variety of conditions in African infants and children.

Dr Emad Ghabrial from UP's Department of Orthodontics, who is one of the core members of the team, will also be using the camera to more accurately identify (and track) nasal asymmetries in children with cleft upper lip and palate, in order to improve correction methods for these conditions.

'This 3D camera can open so many doors for facial dysmorphology research in Africa. My hope is that our work will help to diagnose children that would otherwise have escaped our attention,' concludes Dr Coetzee.

Dr Vinet Coetzee

The fruit industry's big problem

The med-fly, Ceratitis capitata. (Photo: Andre Coetzer)

South Africa is home to a number of species of fruit fly, three of which are of economic significance, owing to their ability to disrupt fruit production and cause export restrictions. The three species regarded as being disruptive to fruit production are the Mediterranean fruit fly, or the med-fly (*Ceratitis capitata*), the morula fruit fly (*Ceratitis cosyra*), and the Natal fruit fly (*Ceratitis rosa*). It is estimated that crop losses and pest control costs resulting from fruit flies amount to more than R20 million per year in the Western Cape alone.[1]

As a result of the fruit trade, the med-fly has the widest distribution of any fruit fly in the world. This species has successfully established itself in various climate types, as well as areas like the Western Cape, which has a typically Mediterranean climate, tropical regions in Eastern Africa, across sub-Saharan Africa and beyond to the northern deserts. Med-flies are proving to be desiccation tolerant, meaning that they are able to endure extremely dry weather conditions. It seems that, as long as there is some source of water, the med-fly can survive.

Research indicates that climate change is affecting these pests' distribution – and not in a favourable way. Dr Chris Weldon, from the Department of Zoology and Entomology, is researching the prevalence of fruit flies and how certain species are able to tolerate certain weather conditions better than others, particularly hot, dry temperatures resulting from climate change. Aiming to better understand how these flies are able to withstand such conditions, Dr Weldon's research investigates how med-flies have adapted, doing a comparative study of the three indigenous South African flies.

Fruit flies lay their eggs in specific types of fruit. The commercially grown fruits that are most affected by these flies include citrus and deciduous fruit. The med-fly has a much wider host range than the other two South African fruit flies, which has contributed to its vast distribution range. It is said that its host range spans more than 300 different fruit types. Interestingly, Dr Weldon found the morula fly to be just as desiccation-tolerant as the med-fly. However, it is much more particular in its host fruit, laying its eggs mostly in the morula fruit and mangoes. The morula fly's distribution is therefore limited by its host range, rather than its ability to withstand dry conditions. The Natal fruit fly has the most restricted distribution range, preferring wetter conditions and having very limited tolerance to dry conditions.

Dr Weldon's research found an interesting reason for the med-fly's ability to tolerate dry conditions: it is able to break down its stored body fat and to metabolise it, thus releasing water. Dr Weldon

suspects that the flies use the water released in this way to help it cope with dry conditions and to survive for longer periods without access to other sources of water. To date, he has not been able to observe this phenomenon in the other two species.

Dr Weldon also found that the med-fly is able to withstand more water loss relative to its body size, compared to other species. He hopes to extend this research to investigate the ways in which insects lose water and how South African fruit flies differ in this regard.

The kind of research that Dr Weldon does is hugely important as fruit flies can cause major financial losses. Fruit flies are a major threat to fruit production because infested fruit cannot be sold. Production costs increase because management techniques are costly, resulting in increased fruit prices. Countries where fruit flies do not occur are less likely to import fruit from countries where fruit flies are present for fear of importing fruit flies along with the fruit. Preventing fruit from being infested so that it can be exported remains an important challenge to fruit farmers.

There are several ways of controlling fruit flies, but in South Africa the main methods used are bait spraying, the male annihilation technique and the sterile insect technique. Dr Weldon noted that South Africa's control strategies are working well, which makes South Africa's fruit production quite efficient. However, in view of the insects' remarkable ability to adapt to changes in the environment, it is important to constantly improve the control systems.

A new fruit fly species was recently discovered in South Africa, namely the Oriental fruit fly (*Bactrocera dorsalis*). This fly, which was first detected in Kenya, has spread through most of sub-Saharan Africa and is now also found in the northern parts of South Africa. Its presence is particularly alarming because it targets fruit as well as vegetables. Dr Weldon's research group, FliES (Flies of Economic Significance Research Group), started researching *Bactrocera dorsalis* to arrive at a better understanding of its dispersal and the susceptibility of local commercially produced fruits. Of major concern to him is the fact that, as the effects of climate change become more pronounced more flies may spread to new areas of fruit production.

[1] http://www.fruitfly.co.za/faq/

Traditional knowledge to enhance modern medicine

Prof Namrita Lall from the Department of Plant and Soil Science in the Faculty of Natural and Agricultural Sciences is bringing science and traditional knowledge together and making it accessible to the modern market by tapping into South Africa's diverse pool of plant life and making it available for medicinal and cosmeceutical use. Prof Lall is one of only a few UP researchers to have a product available on the commercial market.

An estimated 20 000 plant species are used medicinally today and a number of the ingredients used in modern medicine to treat serious diseases originate from plant-based traditional medicine. Despite the fact that it constitutes only 2% of the world's land surface, South Africa is one of only 17 countries worldwide that is considered to be mega-diverse in terms of its plant life, with more than 25 000 different indigenous plant species, or about 10% of all the known plant species on Earth. South Africa is therefore a prime location for Prof Lall's work.

Prof Lall has been studying medicinal plants for more than 20 years, using science to prove their efficacy, and has thereby validated traditional knowledge. Plant-based medicine is in huge demand in Europe, which has encouraged Prof Lall to use her knowledge and research findings to satisfy the demand. The process of testing plants for beneficial properties is often delayed by a lack of resources and time. Despite these factors, Prof Lall has successfully completed the process for a number of plants that are now ready for commercialisation.

The medicinal plant *Ceratonia siliqua*, commonly known as the carob tree or St John's bread, is now being used by Carina Franck in one of South Africa's top organic skin-care ranges, *Kalahari*. Prof Lall has discovered a number of other plants that can be used for the effective treatment of skin conditions, ranging from pigmentation abnormalities and wrinkles to acne. She is waiting for the plants' permits to be finalised before they, too, can be commercialised. Other products developed by Prof Lall include an effective mouthwash for periodontal diseases, as well as chemo-preventative skincare, hepato-protective and immune-modulatory products.

Prof Lall explains that plants are selected in two ways, namely through ethno-botanical selection or through phytochemistry. The ethno-botanical approach refers to plants used by indigenous communities for traditional purposes – for instance, for food and medicine – are tested to ascertain whether or not they have medicinal value. 'The phytochemistry approach refers to the use of existing knowledge about the chemical substances found in specific plants. If we know that a plant is rich in a specific chemical compound that could be of medicinal or cosmeceutical use, we isolate that compound and run trials to determine its usability,' she explains.

Through her work, the Department of Science and Technology (DST) has identified a flagship project, focussed on applying traditional knowledge of plants for pharmaceutical and cosmetic uses. Prof Lall says this is one of the most exciting parts of her work. Not only are students obtaining degrees, but the research results also benefits humankind. 'I am very interested in community work. For instance,


Prof Namrita Lall

my postgraduate students and I are involved in a project in Mamelodi where we are helping farmers to cultivate plants that can be used for medicinal purposes. In fact, the communities where we work are always involved and will, no doubt, benefit from the results, once some of these projects become economically viable,' she explains.

Working so intimately with traditional knowledge does require delicacy and patience. The process of securing intellectual property rights and other legalities are the main factors that delay commercialisation of a product and getting it onto the market. Prof Lall has already patented a number of plants, but sourcing the community from which the knowledge originated in order for them to benefit, can be challenging. After 11 years of trying to get products onto the market, however, Prof Lall is optimistic that now that the process is in place, progress will be faster. She has already received the permits for plants that were selected from UP's own gardens. The resulting products can be used to treat skin pigmentation abnormalities and for chemo-preventative skin-care. Encouragingly, Prof Lall is the first researcher at UP to receive a bioprospecting permit for two types of plants.

It is very exciting to think about the potential of Prof Lall's work. Her outstanding research findings will be beneficial on a number of levels, from the growing link between academia and industry, to enriching the lives of rural communities and improving the well-being of the people who use these products.

In April 2016, the University celebrated Prof Lall's achievements by holding an exhibition to showcase some of the products she helped to develop.

Prof Lall's accolades include the following:

- She is ranked in the top 1% of the global Essential Science Indicators list of influential academics who write about pharmacology and toxicology.
- In 2014, she received the Order of Mapungubwe – South Africa's highest honour – from President Jacob Zuma, in recognition of her research.
- She was a finalist in the 2014 National Science and Technology Forum Award in the category that recognises outstanding contributions made by researchers over the past 10 years.
- She was a winner of the 2002 UNESCO-L'Oreal Award for Women in Science.

Uniting researchers and journalists to bring about positive change

A common challenge for researchers nowadays is getting their research beyond the confines of academia and having it applied in practical contexts and situations. The University of Pretoria's Institute for Food, Nutrition and Well-being (IFNuW) is involved in an international programme working towards bridging this gap by bringing researchers and the media together to drive policy change in food security.

This initiative by the IFNuW, the International Food Policy Research Institute (IFPRI) and the Michigan State University, in partnership with Malawi's Ministry of Agriculture, is funded by the United States Agency for International Development (USAID).

In April a week-long training programme was presented in Blantyre, Malawi. The purpose of the programme was to convey technical and policy information to journalists and editors about policy change in food security. The aim of the programme was to build the capacity of journalists and editors in driving and supporting policy change. Participants represented a range of media types, including radio, print and television. 'We have the potential to change our society into a food-secure nation. We are policy drivers!' stated one journalist during a training session.

The IFNuW's Director, Prof Sheryl Hendriks, served as co-facilitator with Dr Suresh Babu, Head of Capacity Strengthening at IFPRI. Elizabeth Mkandawire, a PhD candidate under Prof Hendriks' supervision, was a researcher on the team and presented two sessions. 'It seldom happens that academics experience the immediate internalisation and application of their training as reflected through the stories presented by these 27 enthusiastic journalists during the final session,' reported Prof Hendriks.

During this week, the research team was able to apply a recently developed tool for policy analysis, the Kaleidoscope Model for Policy Change. While training journalists on the foundations of food security theory, researchers applied this model to nutrition policy in Malawi. The sessions were facilitated by experienced and internationally recognised experts in food security, policy and communications from the partner institutions. 'Unless the journalists understand the broad policy process in a country and the specific policy context, the reporting of the issues, problems, and solutions cannot be made more decision-friendly,' said Dr Babu.

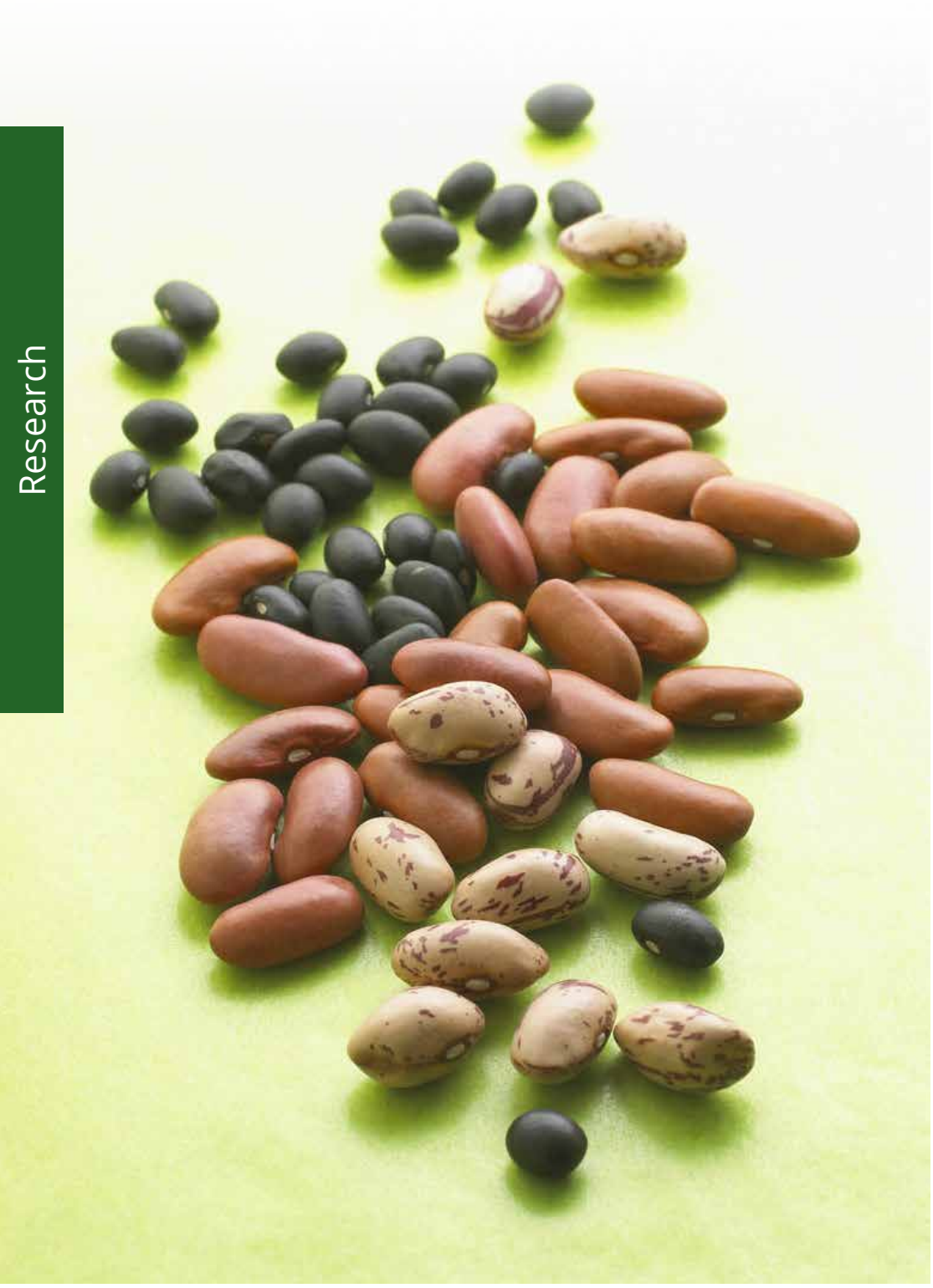
The media pieces prepared by journalists who attended this programme demonstrated a far deeper understanding of food security, nutrition and how to report accurate, well-researched and balanced media reports. Their pieces conveyed critical information and the journalists are now better equipped to influence policy change by changing the knowledge and attitudes of the target audience. This is sure to lead to changes in practice.

The media documents compiled by journalists attending the programme reflects a deeper understanding of food, food security and how to compile accurate, thoroughly researched and blanked media reports. Their documents conveyed critical information and the journalists are now better equipped to influence policy change by influencing the knowledge and attitudes of their target audience. This will definitely lead to changes in practice.

The researchers, officials and journalists all concurred that more sessions of this nature are needed to share knowledge, build a deeper understanding of policy issues and to make research available in the public domain. What better partners than journalists to move science into action as a driver of policy change?

Reflecting on the trip, Mkandawire says: 'It was encouraging to see how the training empowered journalists to realise the level of influence that they have and the various ways in which they can influence policy change. It was an inspiring group to work with, because they identified with the issues that were raised. Their ability to apply the lessons to their assignments showed that they were really engaged.'

Why the African food basket should be full of beans and other pulses



On 20 December 2013, the 68th session of the United Nations General Assembly passed an adopted resolution declaring 2016 the International Year of the Pulse. Pulses – which include dried beans, chickpeas and lentils – is a good source of protein and amino acids and is a critical part of the food basket. It is important for food security, health and nutrition.

The resolution was adopted to reap the benefits that pulses have towards the environment, because it increases soil fertility. Nutritionally, it also assists in maintaining a healthy weight and prevents and manages chronic diseases.

Due to the increasing concerns for the environment, food security, health and nutrition, pulses is one of the best food types to feed the millions of people suffering from chronic hunger, micro-nutrient deficiencies and chronic diseases. A majority of the people suffering lives in Africa.

These concerns are set against a background of a continent that has the ability to produce its own rich diversity of nutritious plant foods and crops, like pulses, that could play a far more significant role in solving malnutrition in Africa. For example, indigenous cereals and pulses such as sorghum and cowpea, which grow well where other crops fail, such as in the arid and semi-arid areas can be used.

Dr Nokuthula Vilakati

What are pulses?

Dry beans, dry broad beans, dry peas, chickpeas, dry cow peas, pigeon peas, lentils, bambara beans, vetches and lupins are all plant foods which belong to the family of legumes. The term legume is used to refer to foods enclosed in a pod and pulses is only a subgroup of the legume family which is used in its dried seed form.

Besides being a good source of protein, pulses is a good source of fibre, calcium, iron and vitamins B, E and K. Depending on their genetic makeup, pulses can grow in extreme climatic conditions where other foods are difficult to be found. Pulses make up most of the average diet in developing countries due to its low cost.

Even though the production and consumption of pulses has declined, it forms almost 4% of the major crops grown in the world. In Africa, the term indigenous food crops does not only refer to food crops from the continent, it also includes crops that have been introduced and are recognised as naturalised or traditional crops.

An example of this is the pulses originally from Asia, now considered to be indigenous to Africa. The most commonly consumed pulses in South Africa are cowpeas and mung bean, produced in the Limpopo, Gauteng, Mpumalanga, North West and KwaZulu-Natal provinces.

South Africa's problem

In South Africa, sorghum and cowpea have good potential. They produce higher yields than less resistant crops like maize and wheat. But they are produced in smaller quantities by subsistence farmers for home consumption. The decrease in the use of indigenous foods is mainly a result of dietary changes due to nutrition transition.

One in four children in South Africa has also been found to be too short for their age – their growth is stunted. One in three people in the country, is also faced with hunger due to food insecurity.

All these signs of growth faltering begin in early childhood. More so, a considerably larger proportion of South Africa's population has been said to experience what is termed, hidden hunger. This kind of hunger is characterised by growing numbers of people suffering from overweight, obesity and micro-nutrient malnutrition, which can easily be solved by providing a cheaper, yet good source of nutrition from plant foods like pulses.

The desire for convenience, driven by urbanisation and nutrition transition has increased the consumption of highly processed, less nutritious foods. The intensive processing and refining of foods unfortunately come at a higher cost to consumers.

The availability of convenient westernised type of diets has led to the neglect of locally available healthier and less expensive food options. These Western diets offer high levels of energy and low micro-nutrient content, leading to overweight, obesity and micro-nutrient malnutrition.

Food types indigenous to Africa, however, have the ability to provide adequate nutrition. Currently, indigenous foods use is slowly diminishing. Indigenous foods are mainly used by small holder farmers for their own consumption, hence they are produced in smaller quantities.

Sorghum and cowpea – lost food resources

There is need for greater creativity in identifying ways to assist government interventions for the malnutrition problem. Pulses like cowpea can be used as a cheaper source for nutrition. South Africa's government is currently using some interventions like supplementation of vitamins, the enrichment of flour and bread and child support grants to deal with the issue of malnutrition.

In a recent study we found that 40% of children between the ages of two and five could get their required protein intake in a ready-made meal which includes sorghum and cowpea. Proper marketing and re-introducing indigenous foods in the diet can help to increase the use of such foods. The same mix could also provide essential amino acids like lysine that is typically missing in maize. Lysine is an essential amino acid because it cannot be synthesised by the body, but can only be obtained through the diet. It can also provide children aged two to five with the recommended iron and zinc.

Africa needs to make use of indigenous foods. Being the International Year of the Pulse, 2016 is the year in which indigenous foods can be used in in more creative ways. One of the reasons for this is that, indigenous foods are climate resilient and have a low carbon footprint because it can be produced locally with minimal inputs. This article was originally published on The Conversation. Read the original article, click on this link.

Author: Dr Nokuthula Vilakati, postdoctoral fellow at the Institute of Food, Nutrition and Well-being at UP

Beans and pulses

The science behind your favourite alcoholic beverage

Alcoholic beverages such as your favourite wine must go through a lot of scientific tests before the point is reached where it can be enjoyed. Before alcohol is sold, it must be rigorously tested to ensure that what is inside the bottle is indeed the same as what is indicated on the label.

One of the tests that are used is to look at the carbon isotopic composition of the product. Different types of alcoholic beverages, such as wine, whisky and cider, have very specific carbon isotope ranges which are tested to ensure that the product does not contain added ingredients. The adding of ingredients such as cane spirits to wine is known as adulteration. The University of Pretoria's Stable Isotope Laboratory is the only one in the country that performs regular testing of alcohol products to ensure that it complies with the regulations for the production of alcoholic beverages. The laboratory works very closely with the Department of Agriculture, Forestry and Fisheries' (DAFF) Directorate: Food Safety & Quality Assurance to ensure that South Africa's alcoholic products meet the strict international standards and regulations for these products.

The head of the laboratory, Dr Grant Hall does all the laboratory tests himself, using a stable light isotope-ratio mass spectrometer to measure the relative isotope or isotopes in a given sample. In the case of alcohol, carbon isotopes are measured and depending on the range the sample falls into, determines the plant origin of the sample. Isotopes (such as carbon or nitrogen) are forms of the same element that differ in atomic mass. All alcohol types, whether ciders, spirits or wines, have a particular carbon isotopic range.

Products, such as wine, made mostly from grapes, have a range of carbon isotope ratios that fall in the C3 plant category. Grapevines follow a particular photosynthetic pathway absorbing carbon from the atmosphere and processing it in the plant to form tissues such as fruit. Spirits, such as cane spirits, are derived from sugar cane (a grass species) which is a C4 plant. C3 and C4 plants respectively follow a slightly different metabolic process, producing different carbon isotope ratios. For example, wines will therefore have a different carbon isotopic range to ciders or spirits.

Dr Hall receives samples of a range of products from DAFF, as well as from various manufacturers. He tests the product's carbon isotope range to determine whether the product has been adulterated. Sometimes, additional products, such as cane spirits or cane sugar are added to wine to raise the alcoholic percentage or to increase the volume of the drink. There are regulations regarding the amounts of additional products that may be added. If these regulations are not followed, it would be illegal to name the product a wine.

With the increasing popularity of cider drinks, there is an increase of local producers of ciders, as well as drinks being imported from Europe. Stringent local and international regulations specify that the drink has to comprise a minimum of 80% of apple or pear to qualify as a cider.

Dr Grant Hall

Alcohol samples ready to be analysed

Typically, Dr Hall will run each sample through the mass spectrometer three times to determine the product's carbon isotope range. If a product does not fall into the range in which it is marketed, Dr Hall will send an explanatory report to the Department or manufacturer. If it falls outside the range, the product would need to amend its recipe.

Dr Hall remains completely impartial in his work. All samples receive a laboratory number rather than being identified by its product name. This ensures that there is no bias in his findings and because products are only handled by him, there is no tampering with products. This is particularly important, should any products ever be taken to court.

Food forensics is a thriving industry overseas and laboratories in the USA and Europe have made some major advances in the field. The testing of food items, such as meat, cheese, honey and alcoholic beverages, has become a regular occurrence due to the large amount of money involved in these markets. Through the analysis of samples, these isotope laboratories are even able to determine the geographic location the sample originated from – a process known as source tracing. Using isotopic analysis, other forensic isotope laboratories have even extended their analysis to things like drugs and explosives and are able to trace where these items originated from.

Whilst the UP Stable Isotope Laboratory is currently the only one that performs these alcohol tests, there is great potential for growth in the field. Dr Hall says it would be ideal if more laboratories in South Africa that were commercially available and accredited, in order to expand the market. Other isotope research colleagues are developing isoscapes which are isotopic maps of areas. These isoscapes will include the creation of a database of oxygen and hydrogen isotope ratios from both ground and rain water from across South Africa. Conducting further tests on samples and using the water isotope database, scientists like Dr Hall can extract water from, for instance a sample of wine, and from the isotopic ratios of the extracted water information and so determine the geographic location where the wine was produced.

The University's Stable Isotope Laboratory is also used by postgraduate students conducting a range of other research in a variety of disciplines. The laboratory provides work space and training for students, to allow them to prepare their samples for isotope analysis. Currently, some of the other studies being conducted in the laboratory include fertiliser tests for plant crops, dietary choices of otters, and a range of research work from the Mammal Research Institute's team, based on Marion Island, as well as on-going baobab research which covers Southern Africa.

Photos by Dr Stephan Woodborne

Bee nutrition and human food security

It is ironic that whilst we expand agriculture in our efforts to increase food production, we jeopardise some of nature's most important pollinators. Honeybees are the world's most important pollinators of food crops. It is estimated that one third of the food we consume each day relies on pollination – mainly by bees.[1]

Managed honeybee colonies are on the decline. Research has revealed that disease and the use of pesticides are among the reasons for their declining numbers. Currently researchers in the Faculty of Natural and Agricultural Sciences are investigating another factor that may affect the survival of these valuable pollinating insects, namely nutrition.

As is the case with human beings, a healthy diet is able to boost the immune systems of bees. Poor nutrition is proving to be one of the reasons why honeybee numbers are declining. With the loss of their natural habitat and the increase in monoculture crops, bees are no longer able to obtain the necessary variety in their diets and have consequently become more susceptible to the effects of pesticides and diseases.

Prof Sue Nicolson from the Department of Zoology and Entomology, her colleague Prof Christian Pirk and the Honeybee Research Group are investigating how bees respond to varying diets. Using hives maintained at the University of Pretoria's Experimental Farm, the researchers focus on how bees respond to the quantity and quality of macronutrients (carbohydrates, proteins and fats), and especially to variations in the ratio of carbohydrates to proteins. Bees from different colonies are kept in small cages, placed in a dark incubator to mimic an actual hive, and are fed various diets. Their food consumption, survival and other parameters are then measured.

Due to the abundance of mass-flowering crops or monocultures, which are characteristic of agriculture today, the research group investigates how bees respond to unbalanced diets. In the case of sunflower crops, the pollen is low in protein. As United Kingdom researchers have explained, bees feeding on monoculture crops can be compared to humans eating only sardines, chocolate or parsnips for a month! [2] Apart from the fact that such crops cannot provide the required nutritional variety, mass-flowering crops also expose bees to pesticides.

While it is true that adult bees do not need much protein in their diets, Prof Nicolson stresses the importance of protein and its functional role within a honeybee colony. Bee larvae, also known as the brood, are dependent on protein to grow. Larvae rely on the adult worker-bees to consume pollen from varied plant sources and convert it to the jelly on which the larvae feed. Honeybees thrive on carbohydrate-rich nectar and their immune systems are strengthened by a diet that mainly comprises sucrose. with a small amount of protein. Bee nutrition is proving to be an important component in their ability to fight disease-causing pests and parasites.

Prof Nicolson stresses the importance of ensuring that South Africa's honeybee populations, both wild and managed, have enough dietary diversity. Her research affirms that a mixed-pollen diet is much better than a single-pollen source and will strengthen their immunity.

Regardless of whether these little yellow and black insects interest you or not, it is important to take note of the fact that bees play a vital role in the agriculture industry and that without them, human food security will be in serious jeopardy.

1. 'Why bees are important'

2. 'Poor nutrition may be another reason for the declining honeybee population.

Prof Christian Pirk

Prof Sue Nicolson

Livestock protein supplement of the future

Fly maggots can be used to reduce organic waste products that are a source of pollution and costly to manage, while simultaneously producing a cheap and sustainable source of protein.

Ms Nina Parry, a master's degree student in the Department of Zoology and Entomology, is investigating the use of fly maggots to reduce organic waste and to process these maggots into a protein that can be fed to livestock and farmed fish. This innovative idea will reduce reliance on expensive and unsustainable protein products such as soybean meal and fish meal, while simultaneously reducing problematic organic waste products.

Fly maggots have been found to successfully convert and reduce waste products, such as manure, sewage, abattoir waste and kitchen or restaurant waste, into a usable source of protein. When the maggots stop feeding, they can be collected, sterilised and dried out to produce a type of protein feed that is suitable for pigs, chickens, crustaceans and carnivorous farmed fish. The leftover waste is less pungent, produces fewer CO_2 and methane emissions (owing to a reduction in the presence and activity of bacteria) and can be turned into a rich form of fertiliser.

This type of nutrient recycling can be performed in industrial-size bioconversion plants, but as more information about bioconversion is made available, even smallholder farmers can produce a source of protein for their animals from waste that is naturally produced on their farms. This can alleviate the costs associated with buying protein feed and managing waste. The benefit of having an industrial-size bioconversion plant is that the waste produced in an area can be sustainably managed and a cheap and locally produced source of protein can be made available to nearby farmers.

Ms Parry is currently running experiments with several fly species that occur naturally in Gauteng to determine how well they reduce swine manure, abattoir waste and kitchen waste. Thereafter, the maggots will be processed to determine their nutritional value for use as animal feed.

According to Ms Parry, the purpose of her research is to find local fly species that are best suited to reducing different types of waste with maximum efficiency, as currently only one or two species are used to reduce all types of waste.

Ms Parry is supervised by Dr Chris Weldon, who hopes that the results of this research will provide a strong foundation for a fledgling industry that will reduce waste and provide a sustainable source of income for developing communities.

Nina Parry

Insects as an alternative food source

According to the World Bank, land, biodiversity, oceans, forests and many other forms of natural capital are being depleted at an unprecedented rate and, unless we change the way we grow our food and manage our natural capital, food security will be at risk, especially for the poorest people of the world. Current data suggests that the world needs to produce at least 50% more food to feed an estimated nine million people by 2050. This dire situation is compounded by the fact that the effects of climate change could diminish crop yields by more than 25%. It is therefore vital that we start thinking about alternative sources of nutrition for the world's ever-growing population.

According to Dr Yusuf Abdullah, a postdoctoral researcher from the Department of Zoology and Entomology at the University of Pretoria (UP), a large variety of insects are relatively easy to breed and are highly nutritious as well. As a matter of fact, in many societies across the world, people traditionally eat a wide variety of insects on a regular basis, both cooked and raw. It is actually only in Western countries that people tend to steer clear of eating insects. Dr Abdullah says that introducing insects into our diet however, could provide a solution to a multitude of problems, including the shortage of viable agricultural land that is required for traditional agriculture, such as raising livestock and planting crops.

The TV programme *Living Land*, a popular production by SABC Education that deals with agriculture in South Africa, recently featured Dr Abdullah, as well as other scientists from the University of Pretoria, in an episode on alternative sources of nutrition.

Science Communication in the spotlight at UP

At the University of Pretoria (UP) we firmly believe that the solutions to change the world can be found in the research we do today, and that the sharing of scientific knowledge and effective science communication are critical steps towards the achievement of this goal. To this end the University has launched an exciting new website titled Research Matters, to showcase and highlight some of its research and innovation output and to emphasise the impact of this work in South Africa, Africa and globally.

Research Matters contains case studies on interesting research projects by University staff, infographics and videos that will provide an overview of high impact projects at a glance, as well as information about various institutes, centres and units.

Click here to visit Research Matters and find out how researchers at UP are making today matter.

Prof Brenda Wingfield steps down as Deputy Dean

Prof Brenda Wingfield.

After seven years of dedication to her portfolio as Deputy Dean: Research and Postgraduate Studies in the Faculty of Natural and Agricultural Sciences, Prof Brenda Wingfield stepped down. She was recently awarded the SARChI Chair in Fungal Genomics in the Department of Genetics. She leaves the Dean's office to take up this research chair.

From 15 August 2014 until 15 March 2015 Prof Wingfield also served the Faculty as Acting Dean.

Prof Wingfield enjoys significant national and international recognition for her work in 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, the African Union Regional Award for Women in Science in 2009 and the National Science and Technology Forum of South Africa's Award for Mentorship and Human Capacity Development in 2014. In 2015 she was the first female researcher to receive the Christiaan Hendrik Persoon Medal from the Southern African Society for Plant Pathology (SASPP). She is also a programme leader at the Centre for Tree Health Biotechnology (one of South Africa's first seven centres of excellence, identified by the Department of Science and Technology and the National Research Foundation). During the first five years of its existence, Prof Wingfield played a leading role in the centre's development.

She was also recently awarded the highly prestigious Harry Oppenheimer Memorial Fellowship Award to the value of R1, 5 million, presented by the Oppenheimer Memorial Trust (OMT). The R1, 5 million will be used to pursue the awardees' chosen research goals during the coming year. Prof Wingfield will extend her studies of reproduction in fungi, and specifically will provide her students with an opportunity to participate in an international project on this topic.

Animal Scientist appointed as Acting Deputy Dean in NAS

Prof Eddie Webb has been appointed as Acting Deputy Dean: Research and Postgraduate Studies in the Faculty of Natural and Agricultural Sciences (NAS) from 1 July to 31 December 2016.

He takes over the reins from Prof Brenda Wingfield who was the Deputy Dean since 2009. Prof Wingfield will take up a SARCHI Chair in Fungal Genomics.

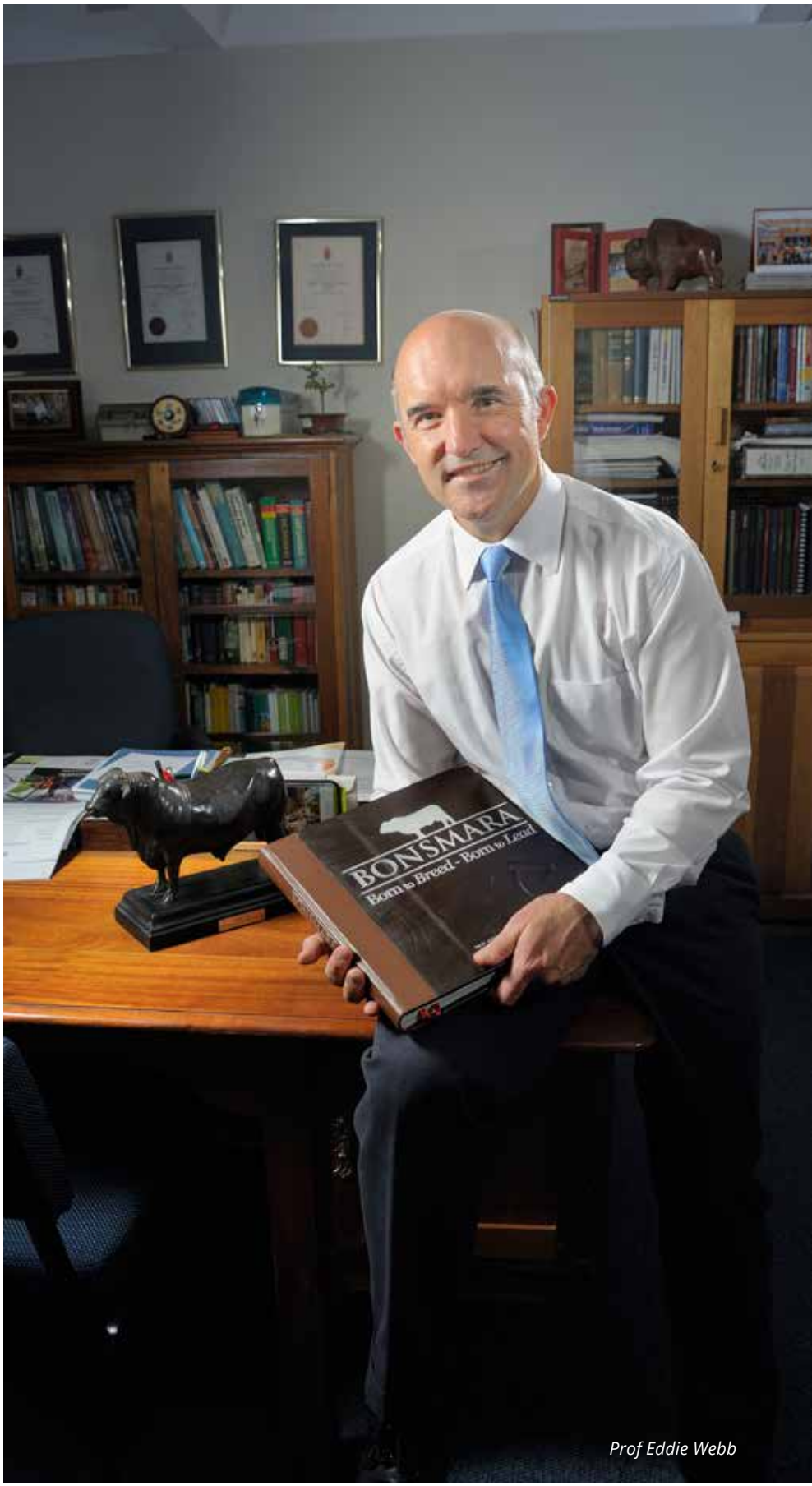
Prof Webb obtained the degrees BScAgric (1988), BScAgric (Hons) cum laude (1989), MScAgric cum laude (1992) and PhD (1994) from the University of Pretoria.

Outstanding academic achievements include the Standard Bank of South Africa merit award, UP postgraduate and merit bursaries, NRF merit awards, the AM Bosman Gold Medal, the South African Society for Animal Science merit award and the South African Society of Animal Science Bronze Medal for his PhD thesis.

In 1997 he was awarded a Research Fellowship from the Flemish Ministry and completed a postdoctoral study at the University of Ghent in Belgium and Nutreco in the Netherlands on aspects of growth modelling and the effects of nutrition on fatty acid synthesis in livestock. Prof Webb continued his research on meat science and animal production physiology at the University of Pretoria in 1999.

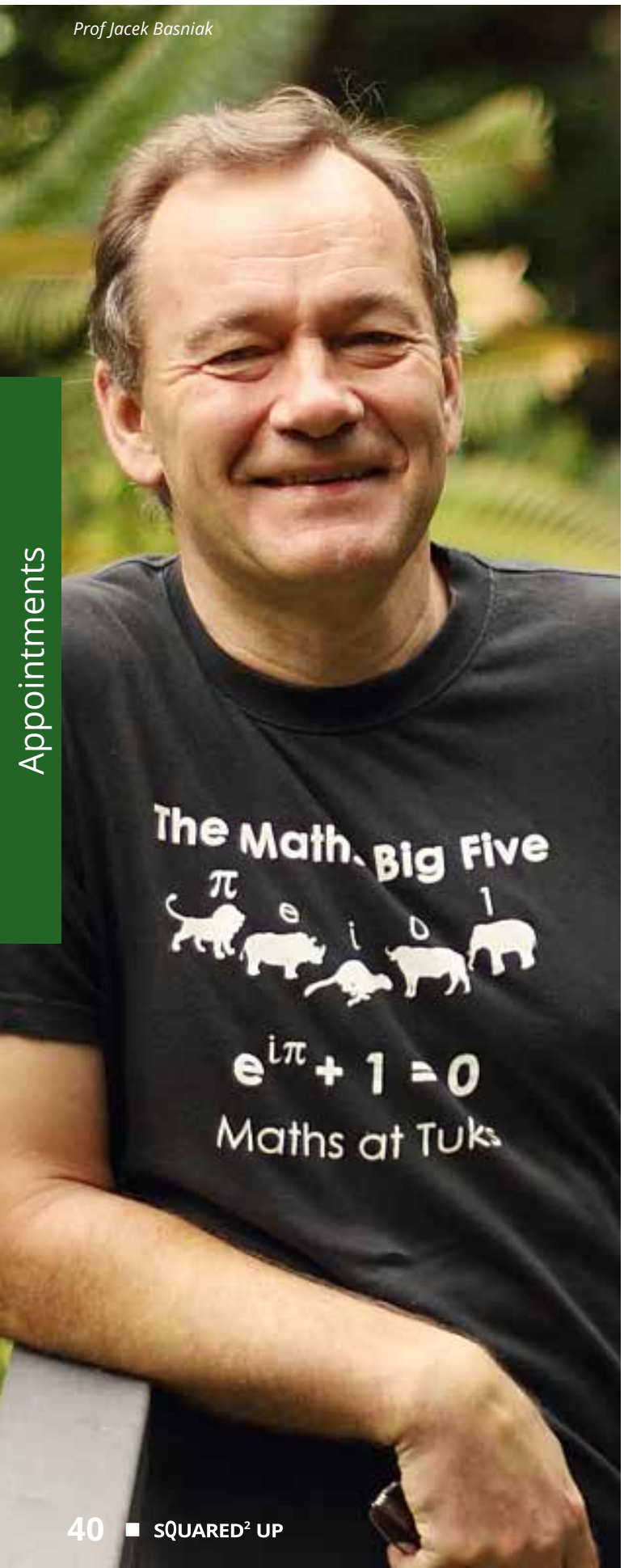
Prof Webb's teaching and research focus on the effects of dietary factors, growth and growth modifiers on meat quality and animal reproduction. He has published and presented more than 70 peer-reviewed scientific papers, presented 85 papers at conferences or symposia, published 25 technical reports, co-edited two books, seven chapters in books, and 23 popular scientific papers. He is president of the South African Society for Animal Science and is a registered professional Animal Scientist. Prof Webb has a C1-rating from the NRF.

The Faculty will benefit from Prof Webb's expertise in striving to be a leading research-intensive university in the fields of natural and agricultural sciences.



Prof Eddie Webb

Prof Banasiak leads Mathematical Models and Methods in Bioengineering and Biosciences Chair



Prof Jacek Basniak

Appointments

Prof Jacek Banasiak is the new incumbent of the DST/NRF SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences (M^3B^2). He follows in the footsteps of Prof Jean Lubuma, currently the Dean of the Faculty of Natural and Agricultural Sciences, since January 2016.

Prior to his appointment at the University of Pretoria (UP), Prof Banasiak was an Academic Leader: Research, at the University of Natal (UN). During his tenure at the UN 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

Prof Banasiak graduated with a PhD from the Strathclyde University in Glasgow in 1989, with the topic elliptic and parabolic problems in irregular domains. Furthermore a Habilitation (DSc) was conferred on him by the University of Warsaw in 1999 and the State title of Professor was conferred on him by the President of the Republic of Poland in 2007.

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

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. In 2014 he was awarded the first prize in the competition for the best paper in applied mathematics organised by Centre for Applications of Mathematics (Gdańsk). He has been a B1-rated scientist since 2008.

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*, member of Editorial Board of *Evolution Equations and Control Theory* and of the AIMS Library Series of the Cambridge University Press.

Prof Banasiak says: "I have entered into a well-developed and maintained environment, created by my predecessors, Prof Jean Lubuma and Dr Michael Chapwanya (acting) and to a large extent I see myself as a custodian of their achievements. Research-wise, I am interested in a qualitative and an analytical approach to models developed in Biosciences but, together with the principal investigators, we shall not neglect the quantitative and computational aspects that are of more interest to practitioners. Besides epidemiology, I also plan to work in population dynamics and ecological networks.

"From an organisational viewpoint, I plan to extend the local and international network of researchers working on quantitative models in life sciences, including, in particular, in close collaboration with malaria research units at the University of Pretoria and with the DST/NRF Centre of Excellence for Epidemiological Modelling and Analysis in Stellenbosch, as well as with international experts and public health organisations."

Prof Altermann leads Department of Geology

Prof Wlady Altermann was appointed as the new Head of the Department of Geology in the Faculty of Natural and Agricultural Sciences from 1 June 2016.

He has been the incumbent of the Kumba-Exxaro Chair in Geodynamics in the Department of Geology since July, 2009. He has taught in many countries, including Germany, China, France, India, the USA and Australia.

At UP, he has facilitated courses in the field of geology, economic geology and the geodynamics of mineral deposits. He has gathered around him the largest Carbon Storage Working Group in South Africa, also co-operating closely with the South African Centre for Carbon Capture and Storage (SACCS), the Council for Geoscience (CGS), the DST/NRF Centre of Excellence for Integrated Minerals and Energy Resources Analysis (CIMERA), the Karoo Research Initiative (KARIN) and with international institutions.

Prof Altermann is an internationally acknowledged Precambrian sedimentologist and bio-geologist. He is interested in and drives the following research projects: Precambrian geology, biogeology, the evolution of life, as well as sedimentary ore and coal deposits. He has drafted a new vision for the Department of Geology, which aims to develop a new research focus on geological carbon storage and the geology of conventional and unconventional energy resources. A co-operation agreement on this research, signed with the University of Oslo (UiO), Norway, in 2015 will enable UP students and lecturers to take part in an academic exchange programme. The first courses by a UiO professor at UP will start in 2016.

Prof Altermann has served on several international science evaluation panels and editorial boards of international journals and as treasurer and council member of the Geological Society of Africa. He is the current Vice-President of this society and the Chairman of the South African Committee for Stratigraphy (SACS). He received a B2 rating from the NRF.

Prof Wlady Altermann

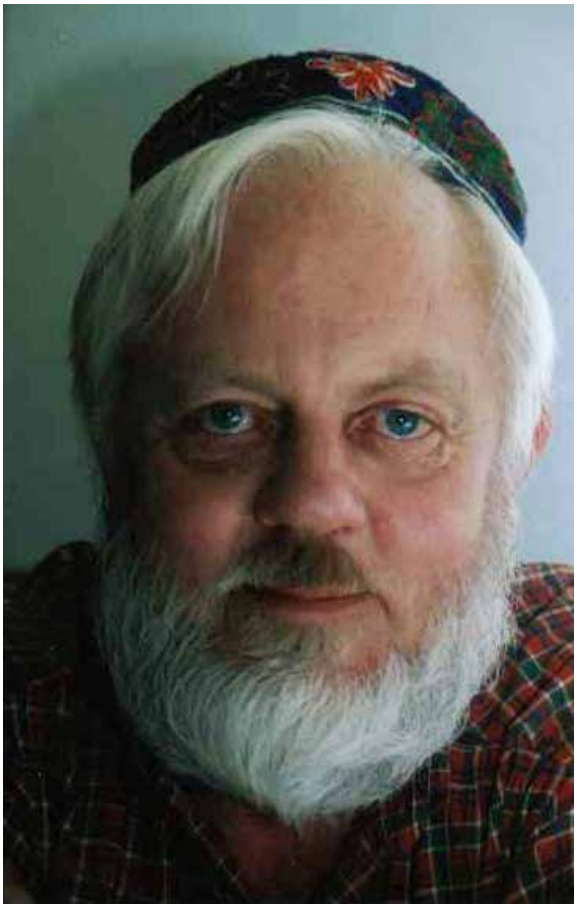
Final farewell to Prof Fritz Wehner

It was with great sadness that we became aware of the passing away of Prof Fritz Wehner, former mycologist in the Department of Microbiology and Plant Pathology. Prof Wehner was born on 12 March 1943 and passed away on the 21 June 2016.

Prof Wehner was employed at the University of Pretoria as a senior lecturer and later as a full professor until his retirement at the age of 65. He remained editor of the journal *African Plant Protection* for a period after his retirement. Prof Wehner was best known for his brilliant mycological knowledge and was in many ways a true old-school mycologist and plant pathologist. He was also an excellent carpenter and crafted many special gifts for his colleagues and postgraduate students. Many of us will remember his dog: the only picture in his office.

He had a very dry sense of humour and his ability to edit a paper or thesis was unique. Reading through the small print and many sarcastic comments later contributed to his students being more durable and resilient.

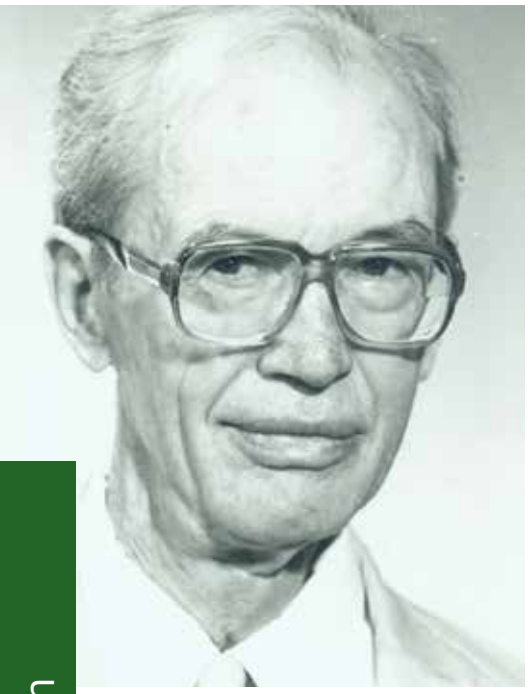
Furthermore, Prof Wehner was adamant that he would not succumb to the global technology frenzy of smarter computers and he point-blank refused to upgrade his desk-top PC. While we were already the "stiffy" generation, he kept his typewriter as long as he could and then refused to upgrade further than a floppy drive. Eventually, his computer was the only one in the Faculty that still had a "floppy" drive. Needless to say, getting any material edited by Prof Wehner was a mammoth task of conversions between "floppy" drives and "stiffy" drives. His sense of humour never failed him under these tricky situations. One final story that should be told about Prof Wehner is the orderly-disorder of his office. Piles and piles of books and files were stacked on his table. Notwithstanding, nobody underestimated his ability to pull out the right file, with "military precision", in a split-second, if requested.



Prof Fritz Wehner

Many plant pathologists will recall numerous special stories about Prof Wehner and undoubtedly remember him as a very special, but eccentric and brilliant mycologist. He made a significant impact in the lives of many undergraduate students, was a trusted friend for many postgraduate students and a true supporter of his fellow research collaborators. He will be remembered as a traditional mycologist, a true plant pathologist and a good friend.

Prof Jan H van der Merwe, a renowned physicist passed away



Jan H van der Merwe

It is with great sadness that we were informed that one of the most famous South African physicists, Prof Jan H van der Merwe (affectionately known as Prof Jan) passed away on Sunday 28 February 2016, on his 94th birthday.

In 1941 Prof Van der Merwe obtained a bursary to study Engineering at the University of Stellenbosch. After obtaining his BSc degree, he was persuaded by the Head of Applied Mathematics to change to an MSc in Applied Mathematics, which he obtained with distinction in 1945. In 1946 he was appointed as a junior lecturer in the Department of Applied Mathematics at the University of Stellenbosch. In 1947 he obtained a position at the CSIR (Council for Scientific and Industrial Research) in Pretoria under the supervision of Dr Meiring Naudé. The CSIR also awarded him a bursary to obtain a PhD in Britain.

Dr Naudé arranged that he could pursue his PhD in Theoretical Solid State Physics under the leadership of Sir Neville Mott (a Nobel Laureate) at the University of Bristol. During this period Prof Jan befriended a number of very well-known physicists, such as another Nobel Laureate, Prof CF Powell, Professors Tyndall, Burton, Cabrera and Heinz and Doris Wilsdorf.

Late 1949, Prof Jan returned to the CSIR, South Africa. From 1953 to 1964 he served as a senior lecturer and thereafter Associate Professor in the Physics Department, University of Pretoria. He realised that he needed a better understanding of Mathematics. In 1956 he obtained an MSc in Mathematics at the University of Pretoria. During the period at the University of Pretoria, lectured MSc students of whom many well-known scientists (physicists and chemists) in South Africa. Many of them later attested to the enormous influence Prof Jan had on them. During this period he re-established friendship with another Bristol colleague, Prof Frank Nabarro, Head of Physics at the University of the Witwatersrand in Johannesburg. A sabbatical leave in 1961 at the University of Virginia with the Wilsdorfs enormously benefited his scientific outputs with many new seminal ideas, including enhancing his initial model to thickening two-dimensional interfaces in 1963.

In 1972, Prof Jan accepted the position of Head of Department and Professor in Physics at the Department of Physics, University of Pretoria. With the establishment of the Foundation for Research Development (FRD) he was one of the first group of scientists to be rated, and received the highest rating possible (an A rating), which meant extra research funding attached to the prestige of the award. This enabled him to invite visiting scientists for an extended period, and Gary Shiflet of the University of Virginia became a friend and collaborator from that time onward. After his mandatory retirement at 65 years of age (the University of Pretoria was too late with a counter offer), Prof Jan took a Professor Extraordinarius position at the Physics Department, Unisa, from 1990 to 2003. From 2004 he was appointed as an Honorary Professor in the Department of Physics at the University of Pretoria.

Prof Jan also spent extended periods as Visiting Professor at the Technical University of Claustal-Zellerfeld, Germany (1981 and 1989), University of Virginia, USA (1981) and Visiting Researcher to Kodak Research Labs, Richmond, USA.

Naturally for such a great scientist, he served on numerous important councils and committees, nationally and internationally. He received a large number of awards in recognition of his achievements, including the Havenga Prize for Physics (1967) from the *Suid-Afrikaanse Akademie vir Wetenskap en Kuns* (South African Academy for Science and Art), EW Muller Award (University of Wisconsin, Milwaukee, USA), FRD A rating first awarded in 1984 and re-awarded until the end of his working career, De Beers Gold Medal in Physics (1984), DSc (*honoris causa*) University of South Africa (1984), SAMES award for the best publication in the *South African Journal of Physics* (1987), the South Africa Order for Excellent Service, Class 1: Gold (1989), DSc (*honoris causa*) University of Pretoria (1990), DSc (*honoris causa*) University of Port Elizabeth (1994) and a Gold Medal of the South African Association for the Advancement of Science (1998). In 2000 a Symposium in honour of Prof JH van der Merwe on the 50th anniversary of his discovery of *Interfacial Dislocations* was arranged by the American Society for Metals, Materials and Minerals (2000). He achieved the Tuks Alumni Laureatus Award for Eminent Scientific Achievements (2000) and in 2008 he was awarded the Centenary Award, *Leading Minds* 1908 to 2008 by the University of Pretoria for his research.

His list of postgraduate student reads like the Who's Who in Physics in South Africa, with his biggest legacy being the profound influence the manner of thinking and problem solving skills of his students. His students, colleagues, friends, family and Physics will remember him fondly, but will surely miss him – a great son of South Africa.

We express our deepest condolences to his family, numerous colleagues all over the world and his friends. In particular, we would like to extend our warmest sympathy to his son Willem and daughter-in-law, Marisa, his daughter Anna, his grandchildren and his great grandchildren.

Credit: Contributions by Professors Johan Malherbe and Max Braun

UP participates in Summer School on Geomatics in Germany

UP participants at the Summer School in Karlsruhe

A summer school where smartphone apps are developed to facilitate increased citizen participation in nature conservation was recently hosted in Germany. The first 'Geomatics and Participation' Summer School with students and lecturers from the University of Pretoria (UP) and the Karlsruhe University of Applied Sciences (HsKA) took place in Karslruhe.

Since September 2015, the Baden-Württemberg Stiftung has supported the 'Geomatics and Participation Summer School – a study of and research in the tension field between a European technology region and an African emerging country.' The project between UP and HsKA falls under the Baden-Württemberg-STIPENDIUM für Studierende – BWS plus programme. The project runs for three years and project funding amounts to 125 000 €. The purpose of the project is to initiate long-term collaboration between the German and South African universities. Amongst others, a Summer School will be held at each university during which students of both universities collaborate on a project.

Prof Dr Gertrud Schaab and Mr Christian Stern from the Faculty of Information Management and Media at HsKA prepared a versatile programme for the 18 participants, of which six were Geomatics master's degree students from Karlsruhe, eight Geoinformatics students from UP and their lecturers, Prof Serena Coetzee and Ms Victoria Rautenbach.

On the first afternoon, lectures were presented on 'Why nature conservation?' and on the representation of the landscape development in the Upper Rhine River Valley on historical maps. On the second day, participants visited the study area, the 'Rastatter Rheinaue' nature conservation area. First, they had a guided tour with representatives of the Umweltstiftung Rastatt and the Stadt Rastatt, later they went on a canoeing tour. This provided participants with the opportunity to develop ideas for mobile mapping apps that could lead to increased citizen participation and active learning about nature conservation. "It remains to be seen how much progress we will be able to make with the app development during the two weeks," Prof Dr Schaab said, "but we also hope to demonstrate differences in relevance and acceptance of citizen participation between Africa and Europe. At the same time, participants should get the opportunity to learn and experiment with new technologies and developments in geomatics."

Another Summer School will be hosted in a year's time in Pretoria. In both summer schools, the participants will collaborate on a project related to 'Participatory Sensing'. Due to the widespread use of smartphones with a variety of embedded sensors, citizens increasingly participate in data collection and sharing. Therefore, participants of the Summer School in Karlsruhe will explore these new possibilities through the development of mobile mapping apps to increase citizen participation in nature conservation.

Apart from the acquisition of professional competencies, inter-cultural exchange plays an important role. For this, an appropriate socialising programme is required. The South African students got to know Baden-Württemberg, specifically Karlsruhe, and will take home the impression of a study or research visit to this part of Germany.

Read more about the Baden-Württemberg Stiftung and Baden-Württemberg Stipendium at https://www.hs-karlsruhe.de/en/the-university/about-hska/press-releases/geomatics-participation-summer-school.html

Development of social learning spaces at UP

Developments that are being planned for transforming student spaces on campus were discussed at the SCITAL Forum in May this year.

The SCITAL Forum is currently exploring the theme of *Learning Spaces* and during this session academics were informed about so-called Social Learning Spaces. As Prof Marietjie Potgieter explained, "a Social Learning Space is a trendy European concept and refers to spaces on campus where students, together or alone, informally spend academic time. UP is rapidly identifying and developing such spaces. Prof Susan Adendorff (Director of Facilities Management), Mr Nicolaas Bester (Deputy Director: Facilities Management) and Ms Ané Genis (Campus Architect) shared their expert opinions on this issue.

The event concluded with a visit to the Makerspace, a particular Social Learning Space that is already operational. Makerspace is a place where students can bring their creative ideas to life. It is situated in the library and offers a space where students together learn and produce, equipped with rapid processing technologies like 3D printers.

From left: Prof Ansie Harding (SCITAL), Ms Ané Genis (Campus Architect), Prof Susan Adendorff (Facilities Management), Mr Nicolaas Bester (Facilities Management) and Prof Marietjie Potgieter (SCITAL).

ACGT builds national Bioinformatics capacity

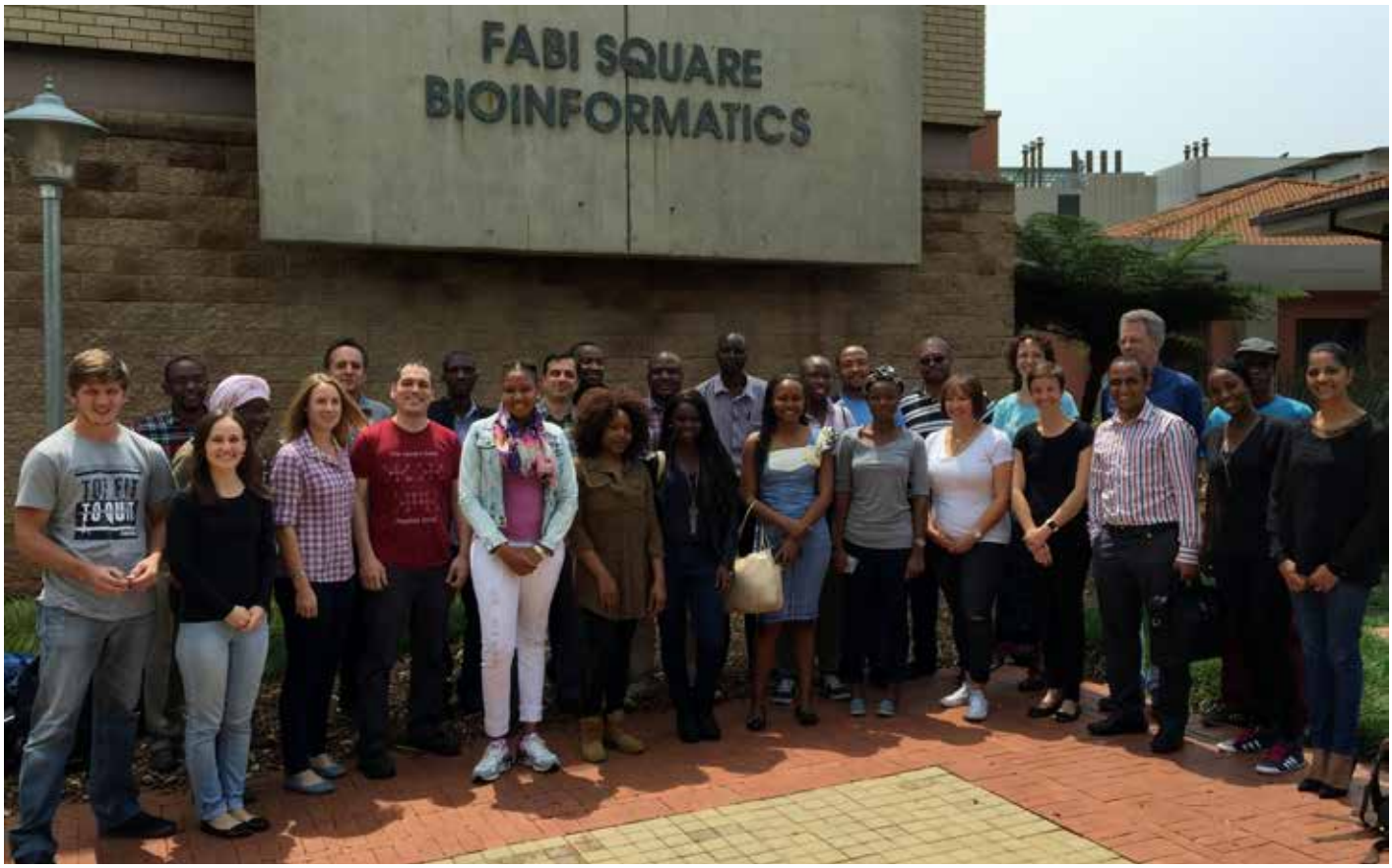
Two exciting workshops were held at the University of Pretoria (UP)'s Centre for Bioinformatics and Computational Biology (CBCB) earlier this year.

The Proteomics and the Metabolomics workshops were respectively hosted in February and March. Proteomics and Metabolomics are 'Omic' technologies that are primarily aimed at the universal detection of proteins and metabolites in a specific biological sample. These approaches make use of analytical techniques, such as Mass Spectrometry (MS) and Nuclear Magnetic Resonance (NMR). The experimental design, execution of experiments and data and statistical analysis are complex in nature and therefore workshops like these are essential and facilitate a deeper understanding of new and cutting-edge technologies.

The workshops aimed to provide a platform for discussion of the key questions and challenges in these two fields, from study design to protein and metabolite identification. The workshop programmes were designed to include lectures, computer-based tutorial sessions, participant presentations and interactive group discussions. Both workshops were nationally advertised and attracted participants from a number of different institutions, including UP, UJ, WITS, Unisa, UCT, UWC, SU, TUT and VUT.

The African Centre for Gene Technologies (ACGT) was extremely privileged regarding the facilitation of these workshops, as they managed to secure several international and local expers, all of whom possess a wealth of expertise and knowledge in different aspects of Proteomics and Metabolomics. International experts included Prof Lennart Martens (Ghent University), Prof Kathryn Lilley and Dr Reza Salek (both from the University of Cambridge), Dr Karl Burgess (University of Glasgow) and Prof Ron Wehrens (Wageningen University). South African experts included Prof Ian Dubery, Dr Edwin Madala and Mr Fidele Tugizimana (all from the University of Johannesburg), Prof Alvaro Viljoen (Tshwane University of Technology) and Ms Tracey Hurrell (University of Pretoria).

Opening and speaking at both workshops, Dr John Becker of the ACGT praised the efforts of the Bioinformatics Service Platform (BSP) for financial support of these types of training and capacity building programmes. Both workshops were extremely well received and attendees are keen to initiate and establish Proteomic and Metabolomic societies and to move them forward. For further information on the ACGT activities in either of these fields undertaken by the ACGT, Dr Farhahna Allie's or Mr Thabo Khoza's details are available at: http://www.acgt.co.za/contact-us. The ACGT would like to acknowledge the continued assistance of its partners in the capacity building programmes, especially the CBCB.



Participants attending the Proteomics and Metabolomics workshops.

SCITAL explores different learning spaces

"Due to the disruptive events earlier this year, it was of the utmost importance that we need to look at learning spaces other than the lecture halls. These events made us realise the importance of Wi-Fi accessibility and we have investigated this aspect." These were the words of Prof Marietjie Potgieter, Deputy Dean: Teaching and Learning in the Faculty of Natural and Agricultural Sciences, at the first SCITAL meeting of this year.

Therefore it was no surprise that the topic of this meeting was Learning Spaces, with Mr André Kleynhans from UP's IT Division, Mr James Devine from Project Isizwe (the service providers for Tshwane's Wi-Fi) and Mr Dolf Jordaan from Education Innovation, as expert speakers on the matter.

Mr Kleynhans alluded to the Unit for Academic Information Technology and the important role it plays as an interface between ITS and academics. He explained that "the Wi-Fi roll-out on campus will be done in phases. In phase 1 all communal areas received Wi-Fi via 1 000 access points on and around campus. This phase was completed in 2014. The second phase looks at Wi-Fi in lecture halls and a steering committee prioritised the venues." He shared the guiding principles with the audience and it can be viewed in the PowerPoint presentation on the clickUP site for SCITAL. He explained the difference between high density and Wi-Fi presence in a venue and also supplied a breakdown of the venues in terms of their sizes and priority allocated. Mr Kleynhans concluded his presentation with the challenges phased by the project team, for example the fact that venues are constantly in use, and a proposed time line.

Mr James Devine shared his passion for access to technology for all learners and students and explained why he established a NGO to assist big entities like the City of Tshwane to empower their people with the use Wi-Fi. He explained that the hotspots are not everywhere yet, because the project is not finished. He also alluded to the fact that the closer to the hotspot you are, the better your reception would be. The hotspots are not actually designed to serve people in their homes. A map with the hotspots is available and it can be accessed at: http://projectisizwe.org/coverage/

Mr Dolf Jordaan elaborated on the impact of Wi-Fi and mobile applications to teaching and learning. He shared some statistics and projections about student device ownership. They collected data from 1 500 students and there were five things that students requested about the content on clickUP (our learning management system): Lecturers should: be aware of mobile compatibility; make more use of the basic features of clickUP; be active in the discussions on clickUP; allow access to other resources; and centralise (not decentralise) the content. He also shared some clickUP traffic patterns with the audience, especially its mobile access. He elaborated on the types of access (tools, content or assessment). The audience was amazed at how much analytics could be obtained from clickUP.

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

Acknowledgement: Dr Ina Louw (Department of Education Innovation)

From left: Dr Ina Louw (SCITAL), Mr James Devine (Project Isizwe), Dr Lizelle Fletcher (SCITAL), Mr André Kleynhans (IT), Prof Marietjie Potgieter (SCITAL) and Mr Dolf Jordaan (Education Innovation).

FMG showcases research at Science Forum

The Forest Molecular Genetics (FMG) Research Programme was recently invited by the Department of Science and Technology to showcase their research at the first Science Forum of South Africa, held at the CSIR International Convention Centre, Pretoria.

Members of government, including the Minister of Science and Technology, industry representatives, students (even a 9-year-old scholar) and people with a general interest in science and technology were part of a diverse crowd of attendees. Students representing FMG at the exhibit were interviewed on live national television (SABC 2) and Power FM and portrayed, with enthusiasm, the dedication to excellence in science that FMG promotes from day to day.

More recently, during April, FMG was also invited to exhibit its diverse research during the annual Sappi Executive Review at the Sappi Technology Centre. The aim of the meeting was to highlight research achievements for the past twelve months, as well as to present the plans and thoughts for the future to executives, including the Sappi Ltd CEO, Mr Steve Binnie, and the Sappi Southern Africa CEO, Mr Alex Thiel. In his invited presentation, FMG's Prof Zander Myburg reflected on the benefits of 13 years' worth of co-operative research between Sappi and FMG and presented the vision of opportunities for the future. This message was reinforced with a benchtop demonstration of DNA fingerprinting technology, the genetic modification of plants, and opportunities for improving the wood properties of trees.

FMG hopes to use the positive experienced gained from these two events to continue showcasing the relevance of its research to industry, business and the general public.

One of the FMG students, Mrs Lorraine Mhoswa being prepared for a live television interview on SABC 2 at the South African Science Forum.

A healthy dose of Mathematics in the fight against infectious diseases

The third Joint Workshop on Theoretical and Mathematical Epidemiology, hosted by the University of South Africa (Unisa) and the University of Pretoria (UP) was held earlier this year at Pure Joy Lodge and Conference Centre in Pretoria.

The workshop consisted of a pre-workshop, which was held on Saturday and Sunday, followed by the main part that ran from Monday to Saturday. The pre-workshop was devoted to a couple of refresher mini-courses in Theoretical and Mathematical Epidemiology. The main part of the workshop combined a series of specialised lectures, presented by local and international experts in Epidemiology, with intensive work on a series of relevant projects carried out by the participants, mainly postgraduate students, under the supervision of these experts. The main emphasis of the projects was to gain in-depth qualitative and quantitative understanding of epidemiological models affecting South Africa and other African countries. These include mainly malaria and other vector borne diseases, HIV/AIDS and tuberculosis, as well as developing methods for the control of these diseases. In particular, the workshop involved case studies to highlight the impact of the control measures of infectious diseases and the design of health policies. Thanks to this, it is expected that the workshop will significantly contribute to the emergence of a critical mass of experts in Mathematical Epidemiology, both locally and across the continent.

A highlight of the workshop was the opening address by the Director-General of the National Department of Health, Ms Malebona Matsoso. Ms Matsoso said that South Africa's already overburdened health system is coming under even bigger strain as the country's demographics change, the diseases evolve and the antibiotics and other drugs prove increasingly ineffective. However, she added that there is hope for an effective response – and the right medicine could well include a healthy dose of Mathematics. She said the Department of Health was already using Mathematical Modelling to develop interventions for different healthcare challenges.

The workshop was interdisciplinary in nature. Hosted by the SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences (M^3B^2), the workshop attracted 54 participants from eight countries (Botswana, Canada, France, Nigeria, South Africa, USA, Zambia and Zimbabwe). Most of them were postgraduate students, from a wide range of disciplines, including Mathematics and Applied Mathematics, Biology, Zoology and Entomology, Veterinary Science and Health Science.

The workshop owes its success to the presence of seven high profile researchers, considered to be among the best international experts in Mathematical Epidemiology, who delivered lectures of a high quality and worked long hours supervising the devoted participants working on research projects.

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

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

Front: Prof Abba Gumel, Arizona State University, US, Prof Jacek Banasiak, University of Pretoria, (SARChI Chair M3B2) and Prof Yves Dumont, CIRAD, France. Back: Dr Justin Munganga, Unisa, Dr Rachid Ouifki, SACEMA, Prof Roumen Anguelov, University of Pretoria (Head, Department of Mathematics and Applied Mathematics) and Dr Michael Chapwanya, University of Pretoria

More on Sensory Science

Prof Riëtte de Kock from the Department of Food Science was the keynote speaker at the 2nd Food Structure and Functionality Forum Symposium, with the theme *From Molecules to Functionality* (www.foodstructuresymposium.com), held early in March 2016 in Singapore.

During her speech, titled *Sensory Science: What is hot and what is not?* she reviewed classic approaches and new developments in the application of Sensory Science to understand end-user functionality. The Food Structure and Functionality Forum primarily focuses on the structuring of food tailored towards end-user functionality (e.g. improved texture, taste perception, health, shelf stability). Sensory science focuses on methods used to study product attributes and the users of products.

Prof De Kock also visited and held discussions with the research team of Prof Ciaran Forde, a Principal Investigator: Sensory Nutritional Science at the Clinical Nutrition Research Centre, Yong Loo Lin School of Medicine, National University of Singapore. https://www.a-star.edu.sg/sics/About-Us/Our-Investigators/Ciaran-Forde.aspx

The group focuses on research to understand the sensory and cognitive influences on energy intake and the subsequent dietary patterns that inform health. They aim to get insight in the factors that influence food choice, eating behaviour and sensory factors that influence energy intake within and across meals. They study the development of food preferences and dietary behaviour in children, adults and elderly.

From left: Dr Anna Fogel, Dr Keri McCrickerd, Prof Riëtte de Kock, Dr Agnes Tey, Edwin Chia-Ming, Claudia Leong and Prof Ciaran Forde

First statistics lecture presented at UP 90 years ago

The Department of Statistics at UP, the oldest statistics department in South Africa also celebrated its 76th birthday and the fact that the first statistics lecture was presented at the University of Pretoria 90 years ago. Prof Dawie Stoker (Head of the Department from 1963 to 1980) blew out the candles of the cake and Prof Nico Crowther (Head of the Department from 1991 to 2012) also joined in on this celebration.

Dr Andriëtte Bekker and Prof Nico Crowther

Dr Dawie Stoker and Dr Liebie Louw

UP celebrates hybrid model of teaching and learning with a unique fair

The first-ever hybrid fair was recently hosted at the University of Pretoria (UP) to celebrate the hybrid model of teaching and learning.

In his opening address at the fair, Prof Norman Duncan, the UP Deputy Vice-Chancellor: Academic said: "Today we celebrate diverse teaching styles and approaches that are or can be used to enhance the student learning experience and student success. This fair allowed the role-players in the field of teaching innovation to engage and network with each other and to showcase the University's commitment to harnessing a range of technology-mediated teaching methods in the service of student success."

The Science Teaching and Learning Forum (SCITAL Forum) of the Faculty of Natural and Agricultural Sciences at UP took the lead by organising this fair.

The University adopted the hybrid teaching and learning model which is an optimal blend of face-to-face and virtual (or online) learning opportunities for students, which provides the best of both worlds – face-to-face teaching where it is most suitable, but enriched by the wide range of virtual learning tools and products that are becoming available.

According to Prof Marietjie Potgieter, Deputy Dean: Teaching and Learning in the Faculty of Natural and Agricultural Sciences, "there are many delivery modes in a hybrid model, starting with the well-known lecture (face-to-face), the self-study by students and then importantly, the online component to support student learning. Hybrid means engaging students in online-activities. The different types of activities are numerous, which was showcased at the fair. UP is one of the leading universities in terms of Blackboard use (that is the learning management system that hosts clickUP). clickUP is the virtual space where students get everything from timetables, announcements, notes, right through to their marks."

Some of the hybrid activities that were showcased at the fair were Turnitin, the plagiarism detecting package, TurningPoint Technologies with their clickers (audience response devices), Blackboard with all its functionalities, mobile apps, YouTube videos, narrative PowerPoints and many more. From the electronic textbook side we had Cengage, Pearson, Wiley and McGraw Hill and we engaged them in a panel discussion to share what is up-coming. From UP's own stable, we showcased our Creative Studios and the support they supply to lecturers, a demonstration of how to use QR codes, cahoot, as well as the library Makerspace (3D printer).

Dr Ina Louw, Educational Consultant at the University and a member of SCITAL, emphasised "that the current situation in our schools necessitates that universities support learners more than ever before and the online space is ideal for that. We scaffold their learning by presenting them with quizzes (where they can have multiple attempts and get shown where they go wrong) and regular online tests to allow them to measure their own progress. We do not plan to get rid of our excellent lecturers, we just strengthen their hands with technology."

From left: SCITAL Forum Management Committee: Prof Ansie Harding, Dr Lizelle Fletcher, Prof Marietjie Potgieter and Dr Ina Louw.

UP and Sappi partner to sponsor Synthetic Biology undergraduate team

2016 Pretoria_UP team discusses synthetic biology, physics and engineering. From left: Nomakula Zim, Maryn Van der Laarse, Brad Querl, Simon Bezuidenhout, Vaughn Barendsen, Thabang Msimango, Ricu Claassens, Modjadji Makwela, Palesa Mohale, Bernard Smit and Pieter Bredenkamp.

Seven biologists, one mechanical engineer, an industrial engineer, an electrical engineer and an information science and multimedia student – that is the curious mix of expertise comprising the multidisciplinary synthetic biology team that will represent UP at the International Genetically Engineered Machines (iGEM) competition in 2016. This is a prestigious tournament, drawing hundreds of international university and high school teams to Boston each October. The Pretoria_UP team will tackle the task of improving photo-bioelectrochemical cells for sustainable and green electricity generation from photosynthetic systems as their 2016 iGEM project.

In January this year, the team approached Sappi Ltd for funding and presented their project, facilitated by Dr Charlie Clarke (Manager: Sappi Technology Centre) at the Sappi Braamfontein headquarters. Sappi generously sponsored the team with R250 000 towards their 2016 project, as well as their travel costs, and UP offered an additional R100 000 towards the team expenses in participating in the competition. This complements the base funding provided by the team's hosting laboratory, the Forest Molecular Genetics (FMG) Programme (Director: Prof Zander Myburg) in the Department of Genetics, as part of their annual community project.

The 2016 team is supervised by a number of academics, including Prof Zander Myburg, Dr Eshchar Mizrachi (FMG) and Dr Tjaart Kruger (Biophysics Research Group, Department of Physics). Dr Steven Hussey (FMG) is instructing the team and Prof Ncholu Manyala (Carbon-based Nanomaterials Research Group) is facilitating the development of graphene-based materials by the team, as part of their photo-bioelectrochemical cell design.

Pretoria_UP team members presented their project proposal at Sappi

57th South African Statistical Association Conference hosted at UP

The 57th annual South African Statistical Association (SASA) Conference was recently co-hosted by the Department of Statistics, University of Pretoria (UP) and StatsSA. The presence of Minister Jeff Radebe (in the Presidency, for Planning, Monitoring and Evaluation) and Pali Lehohla (Statistician General, StatsSA) ensured a very high profile for this year's SASA conference, especially with the opening address of Minister Radebe. The conference addressed a wide range of important issues relating to the South African statistical community.

International contingent

An impressive line-up of national and international speakers was present. A number of 30 international delegates participated in the plenary and parallel special sessions. Plenary speakers included Prof Din Chen (Biostatistician, Rochester University) who discussed statistical meta-analysis and its efficiency. He provided an overview of meta-analysis with summary statistics on both fixed-effects and random effects models which incorporate within or between them, study variation. Walter Radermacher (Director General of Eurostat and Chief Statistician of the European Union) discussed official statistics and the challenges that statisticians face, since society is evolving rapidly and becoming more and more data and technologically driven. Dr Robert N. Rodriguez (Senior Director of Research and Development at the SAS Institute and 2012 President of the American Statistical Association) questioned whether the statistics profession is prepared for the world of big data, since the demand for statistical skills has never been greater in areas of business, government and research. By receiving these international speakers, South Africa will stay on top of the game of international academic trends in the field of statistics.

Data Science summit

In the Data Science workshop the latest trends in the field were discussed, including developments in business analytics, data driven solutions, big data and automated data sources, high performance computing and modelling unstructured data. Key industry partners, as well as academia debated the role of data science in industry and academia.

From left: Pali Lehohla (Statistician General, StatsSA), Charl Jansen van Rensberg (SASA paper competition prize winner), Minister Jeff Radebe (The Presidency, For Planning, Monitoring and Evaluation) and Prof Delia North (Chair of the SASA Education Committee)

Statistics students excel in national postgraduate competition

The 57th annual South African Statistical Association (SASA) conference ended with a prize awarding ceremony for a national doctoral, master's and honours presentation competition. Five of the six prizes were awarded to postgraduate students from UP, namely Janet van Niekerk (1st prize doctoral presentation), Johan Ferreira (2nd prize doctoral presentation), Albert Mijburgh (2nd prize master's presentation), Prenil Sewmohan (1st prize honours poster) and Ané Neethling (2nd prize honours poster).

Front: Albert Mijburgh, Ané Neethling and Prenil Sewmohan. Back: Dr Schalk Human, Janet van Niekerk, Prof Andriëtte Bekker, Johan Ferreira, Dr Paul van Staden and Dr Inger Fabris-Rotelli.

Food Science students celebrate their cultural diversity

Team Nigeria with their traditional dishes prepared for the Taste of Africa lunch

Food Science ladies displaying their national costumes

The Department of Food Science has many postgraduate students from all over Africa, with a wide and rich cultural heritage. For the fifth year in a row, the Department has celebrated and shared this rich heritage in the form of the "Taste of Africa" lunch.

In what became an exciting and much anticipated event, students and staff joined together in groups to produce traditional dishes from their countries of origin or in some cases, their adopted countries. This year we shared dishes from eleven different countries, with contributions by more than 70 staff and student 'chefs'.

With Food Science undergraduates who also joined the celebration, the number of people attending the lunch was close to 150, certainly the single largest Food Science gathering yet. The dishes ranged from finger millet pap and beef trotters from Zimbabwe to a whole feast of dishes from Ethiopia, beer and pretzels from Germany and lots of delicious South African deserts. The competition was fierce for the prizes for the best traditional costumes. Each year the recipes are collected and an illustrated recipe book is compiled and shared on the Departments Facebook page. If you are interested in trying out some of the recipes yourself, visit tuksfostrecipes@groups.facebook.com or just search on our website for Tuksfost Recipes.

Geography student part of international climate change resolution

Courtney Gehle, a third-year BSc Geography student in the Department of Geography, Geoinformatics and Meteorology with a special interest in Climate Change and Environmental Sustainability recently had the opportunity to be part of the United Stated (US) Leadership Programme and visit Paris and the US.

During Courtney's visit to Paris at the end of 2015, she was selected as one of eight people to coordinate the drafting of a youth resolution on climate change at the 11th annual Conference of the Youth (COY11), an official conference of the United Nations Framework Convention on Climate Change (UNFCCC). COY11 brought 2 000 people aged between 18 and 30 years together over three days last year to critically discuss issues relating to climate change and subsequently to draft a youth resolution on climate change. The delegates divided into eight working groups corresponding to different topics and Courtney was selected to coordinate the Youth Inclusion in Climate Legislation Working Group. This Youth Resolution was used by Francois Hollande, French president, Laurent Fabius, French Minister of Foreign Affairs and President of the COP21, as well as Ahmad Alhendawi, United Nations Secretary-General's Envoy on Youth in the negotiations at COP21.

"The Faculty of Natural and Agricultural Sciences and the Department of Geography, Geoinformatics and Meteorology sponsored my trip and without their support I would never have had that absolutely incredible experience," said a grateful Courtney.

She was also fortunate enough to be selected as one of four South African and one out of twenty Southern African leaders to be selected by the US State Department for a fully sponsored cultural and educational leadership exchange programme in January 2016. The programme is called Study of the U.S Institutes for Student Leaders on Civic Engagement. During the programme they spent a month at the University of Nebraska – Lincoln for the educational, leadership and community service aspects of their trip. "The highlight of my time in Lincoln was having the opportunity to experience Barack Obama giving a live speech! We then had a weeklong study tour to Alabama and Washington DC. In Alabama we followed the footsteps of Dr Martin Luther King Jr on the civil rights trail. In Washington we met with representatives from the State Department as well as U.S Congressman Jeff Fortenberry," an elated Courtney concluded.

Courtney Gehle

Sharing the latest buzz about bees with learners

As part of an outreach programme to create awareness about the plight of the bee, the Social Insect Research Group (SIRG) from the Department of Zoology and Entomology aka 'The Bee Group' visited the Grade 7 learners of Cornwall Hill College during their Natural Science lessons earlier this year.

The aim of the visit was to educate the learners about pollination services, bee keeping and bee conservation in the light of the worrying declines in bee population across the globe recently. Bees and other pollinators and the invaluable pollinating services they provide, help to produce approximately one out of every three bites of food we eat. Most crops that are grown for their fruits (including vegetables), nuts, seeds, fibre (such as cotton) and hay require pollination by insects. Pollinating insects also play a critical role in maintaining natural plant communities and ensuring production of seeds in most flowering plants. By far, the main insect pollinators, are bees, and while honey bees are the best known and widely managed pollinators, there are also hundreds of other species of bees that contribute, to some extent, to pollination services for crops and are very important in natural ecosystems.

The lessons were both informative and interactive. Not only did the learners have the opportunity to view bee larvae and pupae through the microscope, but the display also included worker bees carrying pollen in their pollen baskets on their hind legs and a rear glimpse of the queen bee. The learners were also treated to a taste of freshly harvested comb honey from the University's apiary, which was the first time many of the learners tasted honey in the wax comb. The main attractions, however, were most definitely the observation hive – a small sealed hive consisting of two brood frames and 200 to 300 young bees cleaning and tending the brood. The box has glass panels through which the activities inside the hive can be viewed. Afterwards, the teacher quizzed the learners a bit on the subject of bees and pollination. These clever youngsters seemed to know the correct answers to all the questions. This demonstrates that these future leaders are keen on bee keeping!

Dressed in their protective bee suits as part of the demonstration, the bee keepers are explaining to the Grade 7's that smoking the bees before opening the hive calms the bees.

Members of the 'Bee group' showing the Grade 7's what the inside of a hive looks like.

Students care about their environment

A student society that takes action on and creates awareness about environmental issues affecting our campus and surrounding community – that is The Greenline Society.

Three passionate students, Jasmine Jacob, Brian Nkala and Courtney Gehle, all from the Faculty of Natural and Agricultural Sciences, established the Society in 2015. They built a solid base and hit the ground running for 2016.

“We have some really exciting projects planned for 2016 and we have tried to be as inclusive of all disciplines as possible”, said current Chairperson, Courtney Gehle. “We look forward to seeing all that we can achieve and to partner with other organisations on campus to work towards a common goal”

Brian Nkala, SRC member for Facilities, Safety and Security hopes that through this The Greenline, the University will decrease its carbon footprint and students will be more aware of the impact they have on the carbon footprint. Through his portfolio he hopes to move the University towards a sustainable future.

The Greenline works closely with the Department of Facilities Management and due to that, partnership with the University’s recycling programme started. “Currently, anything that you throw away on any of the UP campuses is recycled,” Brian stated.

Other projects of The Greenline included organising the University of Pretoria’s Green week, organising tree plantings and engaging with TuksRes. Last year TuksRes sent two Greenline members to Cape Town, where they represented UP at the Annual Green Campus Conference. Courtney Gehle was also invited to speak at the City of Tshwane Youth and the Green Economy Seminar last year.

The Greenline has set a goal to plant 3 650 trees in 2016, and have other events such as clean ups, seminars, an Earth Day event, a Woman’s Day event, a Green Business Workshop, projects at Primary schools and a recycling week planned.

If you are interested in being involved with The Greenline you can contact the society on the greenline.up@gmail.com or ‘like’ it on Facebook at The Greenline UP.

From left: Brian Nkala, Courtney Gehle, Jasmin Jacob and Mzuvumile Mzuzu

Celebrating Green week