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Newsletter of the Faculty of Natural and Agricultural Sciences

May 2025

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Make today matter

DISCOVERING HOW CURIOSITY MEETS INNOVATION

– UP's first Science and Engineering Open Day

The faculties of Engineering, Built Environment and Information Technology (EBIT), and Natural and Agricultural Sciences (NAS) at the University of Pretoria (UP) hosted the first-ever Science and Engineering Open Day on Saturday, 8 March 2025, with a very apt theme, *Where curiosity meets innovation*.

From exploring cutting-edge laboratories to engaging with expert lecturers, the day was filled with opportunities for prospective students, parents, and guardians to learn more about the sciences and engineering fields.

Barbara Moagi, a UP alumna and radio personality, was the MC for the day and added even more flair and inspiration.

Welcoming everyone in the Amphitheatre at the start of the event, Prof Barend Erasmus, Dean of NAS, said, "Studying in NAS and EBIT allows you to have that sneak preview of what's on the horizon, and what new career opportunities there might be. An education in NAS and EBIT allows you to be better prepared than anyone else to take advantage of those new career opportunities."

"There's a very good reason why we have this joint Open Day: the really exciting challenges, projects, and training happen at the intersection of traditional disciplines."

The "Circle of Life" exhibition on the lawn was a highlight where exhibitors demonstrated how scientists, IT specialists, built environment specialists and engineers work together to be the planet's superheroes. The whale research exhibit, a smart farm, a 3D-printed train and virtual reality (VR) experiences all formed part of the "Circle of Life" area.

The importance of pure maths and physical science was practically exhibited so that learners could realise why a critical mind is vital in an ever-changing world.

Prof Barend Erasmus, Ms Barbara Moagi and Prof Wynand Steyn.

Prof Wynand Steyn, Dean of EBIT, emphasised the importance of fundamentals in all degree programmes. "If you understand the fundamentals, you become an agile person the day you start to work. That prepares you for whatever surprises will pop up in your work environment".

There was also an educators' session at the Javett Art Centre where teachers were more informed about studying at UP, with information sessions hosted by the deputy deans of the two faculties and the Department of Enrolment and Student Administration.

Grade 8-9 learners were not forgotten, with a tailormade session on subject choices and talks by current students from JuniorTukkie, EBITHouse and NATHouse. Sci-Enza, UP's Science Centre, also opened its doors to the learners to show them what fun science can be.

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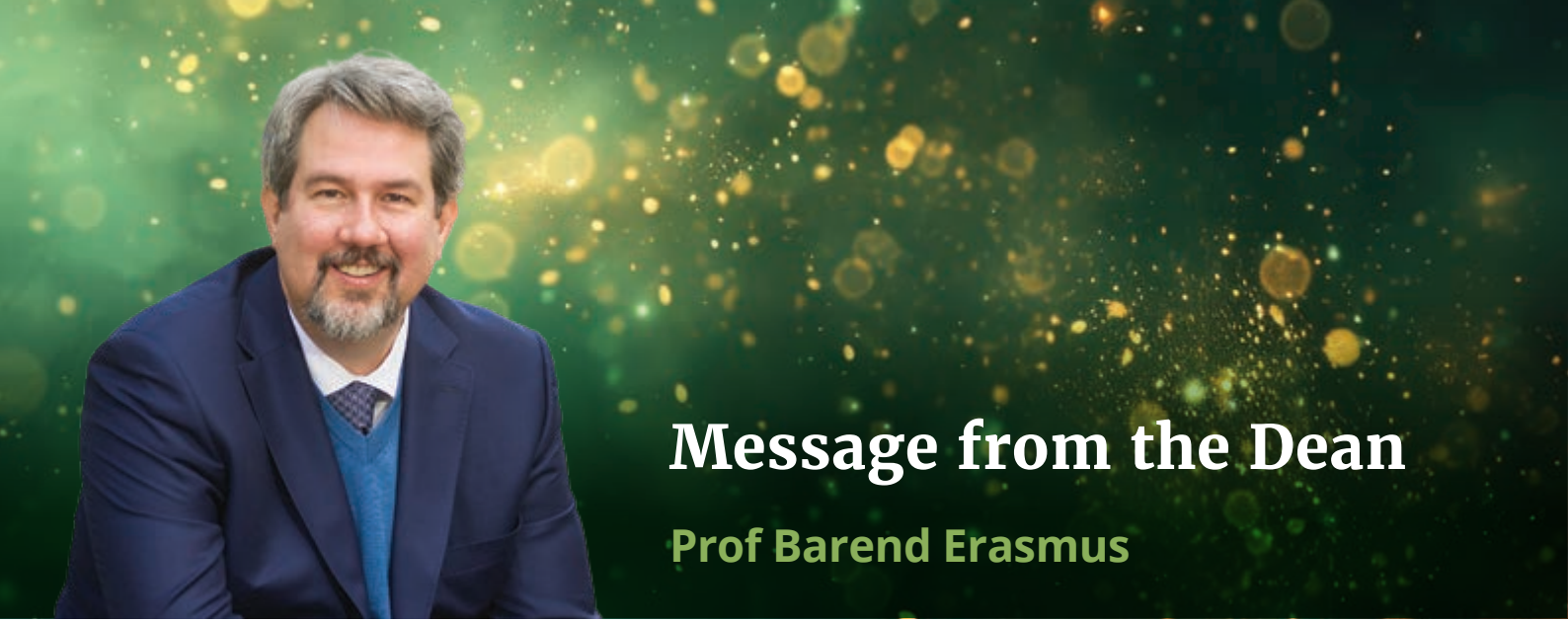

Message from the Dean

Prof Barend Erasmus

As always, the Faculty of Natural and Agricultural Sciences is a beehive of activities.

We just completed five sessions of Autumn graduations, conferring two honorary degrees and more than 1 200 undergraduate and postgraduate degrees. Graduations are always a highlight on the academic calendar – not only due to the gravitas of the event that recognises the effort and commitment to graduate, but also the collective joy of achieving this milestone (More graduation news in the next edition of the Faculty newsletter).

Another reminder that the semester is ending is that the mid-year exams have kicked off. I wish our students all the best for the exams, and I am sure all the hard work is paying off. When things feel overwhelming, remember that you are not alone, and reach out to friends, academic success coaches, lecturers or anyone else in our large student support ecosystem. Exams also challenge academic staff to mark and grade papers accurately, fairly and on time. I want to acknowledge their hard work and express gratitude for their commitment to quality.

The competition for future students among science and engineering faculties at the top universities is increasing, and this means we have to think of new ways to show the career opportunities at UP. This led to the first-ever Science and Engineering Open Day hosted by NAS and the Faculty of Engineering, Built Environment and Information Technology (EBIT) on 8 March this year. More than 11 000 people were on campus and the two faculties had the opportunity to demonstrate how scientists and engineers work together to be the planet's superheroes. It featured initiatives such as whale research, chemical, water and environmental engineering projects, virtual reality in mining, metallurgy and geology, 3D-printed wind turbines, a smart farm, railway and much more (page 1).

The University of Pretoria has come to the end of a 15-year planning cycle. Under the leadership of the VC, an extended consultation process is underway to engage with some of the early reports drawn up by five task teams. I lead one of these task teams – on UP's enrolment, shape and size – and I am pretty excited about the insights from the combined (and considerable!) brain trust that worked on the first draft documents. Keep an eye out for opportunities to contribute!

Cutting-edge research is synonymous with the Faculty, and in this edition, we share how a UP-led astronomy research team explores the formation of giant radio galaxies (page 7). Furthermore, another research endeavour on the nutrient composition of different types of blue food (seafood) is currently underway (page 17), and a new dung beetle species has recently been discovered (page 9).

Another proud moment for the Faculty is Prof Andrew McKechnie, Professor in the Department of Zoology and Entomology and the holder of the South African Research Chair in Conservation Physiology, who recently received a prestigious A2-rating by the National Research Foundation, becoming the eighth A-rated researcher currently in the Faculty (page 32).

Our female researchers also keep on making inroads internationally. Prof Lise Korsten has been conferred a distinguished honorary doctorate by Belgium's Ghent University in recognition of her transformative contributions to resilience in food security and safety (page 19). Prof Patricia Forbes has been appointed Editor-in-Chief of the internationally renowned research journal ACS Earth and Space Chemistry (page 20). At the same time, Prof Hettie Schönfeldt is the new Hub Chair for the United Nations Academic Impact Sustainable Development Goal 3 (UNAI SDG 3) – Good Health and Well-Being (page 21).

Teaching and learning remain a high priority. A new chapter for the BSc Extended Curriculum Programmes (ECPs) started in 2025, welcoming the latest cohort of BSc four-year and BScAgric five-year programmes to the Hatfield Campus (page 38). Furthermore, our final-year students from the Department of Consumer and Food Sciences showcased their ability to transform rescued food ingredients into high-quality retail and restaurant products during the second UP-Cycled Food Experience. This event served as both a practical exam and an exhibition, highlighting the potential of academic research and innovation to create valuable food products from rescued foods, thus benefiting communities (page 62).

Centenaries do not pass unnoticed. This year, we celebrate the joint Centenary of the Manie van der Schijff Botanical Gardens and the H.G.W.J. Schweickerdt Herbarium, kicking the celebrations off with a symposium in the Plant Sciences Complex in March (page 53).

Other exciting news is that the renovation of the Faculty's Student Administration offices in the Agriculture and Sciences Building has been completed and officially opened in March (page 55). The UP Stable Isotope Laboratory is also back in action after being revamped (page 55). I want to acknowledge the efforts of the team at Facilities to design innovative workspaces with limited budgets. There are several ongoing and a few new building projects in the pipeline, and I look forward to reporting on those, too, when they are done.

Social responsiveness and a transformed and inclusive community are close to our hearts. We round off this bumper edition with a reflection of the activities of RETHINK@NAS, the Faculty's Transformation Initiative (page 47). Our unique science centre, Sci-Enza, launched its first-ever ticketed public shows, marking a significant step forward in our ongoing commitment to making science accessible and engaging for everyone (page 61).

I encourage you all to take a well-deserved break during the winter holidays and come back refreshed, ready for the challenges of the second semester.

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Prof Erasmus added that a degree from UP is not just about the degree – it's also about making an impact. "So whether your goal is to continue your studies in graduate school after your first degree, whether you want to join the workforce or embark on your entrepreneurial venture, the skills you develop here will prepare you for success."

Prof Steyn concluded with some wise words: "As you ask questions, as you walk around, as you prepare for whatever you are going to do after you finish school, determine how to make today matter, because each day matters, and how you can innovate tomorrow to make a difference in communities – that's your job for the future!"

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RESEARCH

UP-led astronomy research team explores formation of giant radio galaxies

Enabled by supercomputing, University of Pretoria (UP) researchers have led an international team of astronomers that has provided more profound insight into the entire life cycle (birth, growth and death) of giant radio galaxies, which resemble "cosmic fountains" – jets of superheated gas that are ejected into near-empty space from their spinning supermassive black holes.

The findings of this breakthrough study were published in the journal *Astronomy & Astrophysics*, and it challenges known theoretical models by explaining how extragalactic cosmic fountains grow to cover such colossal distances, raising new questions about the mechanisms behind these vast cosmic structures.

The research team – which was led by astrophysicist Dr Gourab Giri, who holds a postdoctoral fellowship from the South African Radio Astronomy Observatory at UP – consisted of Associate Professor Kshitij Thorat and Extraordinary Professor Roger Deane of UP's Faculty of Natural and Agricultural Sciences; Prof Joydeep Bagchi of Christ University in India; Prof DJ Sailkia of the Inter-University Centre for Astronomy and Astrophysics, also in India; and Dr Jacinta Delhaize of the University of Cape Town (UCT).

This study tackles a key question in modern astrophysics: how these structures, which are larger than galaxies and are made up of black hole jets, interact over cosmological timescales with their very thin, gaseous surroundings.

"We mimicked the flow of the jets of the fountains in the universe to observe how they propagate themselves over hundreds of millions of years – a process that is, of course, impossible to track directly in the real cosmos," Dr Giri explains. "These sophisticated simulations enable a clearer understanding of the likely life cycle of radio galaxies by revealing the differences between their smaller, early stages and giant, mature stages. Understanding the evolution of radio galaxies is vital for deepening our knowledge of the formation and development of the universe."

"While such studies are computationally expensive," Prof Thorat adds, "the team embarked on this adventure informed by the exciting, cutting-edge observations carried out by new-generation radio telescopes, such as the South African MeerKAT telescope, which has been instrumental in providing us with the details of the structure of these cosmic fountains."

Dr Giri says that astronomers study galaxies for more than just the stars they can see. "We also look at many, often interrelated, phenomena. One of the most amazing things to see is when a supermassive black hole at the centre of a galaxy, which is relatively tiny in size compared to the galaxies they grow in, 'wakes up' and starts eating up lots of nearby gas and dust. This isn't a calm, slow or passive process. As the black hole pulls in material, the material gets superheated and is ejected from the galaxy at near-light speeds, creating powerful jets that look like cosmic fountains. These fountains emit radio signals as the accelerated high-speed plasma matter generates radio waves. These signals are detected by powerful radio telescopes, built through the collaborative efforts of multiple countries working together."

With the recent advent of powerful and sensitive radio telescopes – such

Dr Gourab Giri

Prof Kshitij Thorat

Prof Roger Deane

as MeerKAT in South Africa, the Low Frequency Array (LOFAR) in Europe and the Giant Metrewave Radio Telescope (GMRT) in India – astronomers are now detecting these fountains even in their faintest stages, Dr Giri adds.

"These advanced telescopes can capture the weakest signals from dying or fading parts of the jet, leading to new discoveries of more such extended sources previously undetectable."

The study also implies that these giant jets may be more common than previously thought.

Since discovering these high-speed fountains in the 1970s, astronomers have been curious about how far the ejected matter travels before eventually fading out. The answer was astounding as they began to discover that cosmic jets travel vast distances – some reaching nearly 16 million light-years (nearly six times the distance between the Milky Way and Andromeda).

"I took on the challenge of developing theoretical models for these sources, rigorously testing the models with the advanced capabilities of modern supercomputers," Dr Giri says. "This computer-driven study aimed to simulate the behaviour of giant cosmic jets within a mock universe, constructed according to known physical laws governing the cosmos. Our primary focus was to answer two questions: Is the enormous size of these jets due to their exceptionally high speeds; or is it because they travel through regions of space that are nearly empty of surrounding matter, offering minimal resistance to the jets' free propagation?"

The UP-led study presents evidence that a combination of these considerations is a key aspect in the formation of these giant jets.

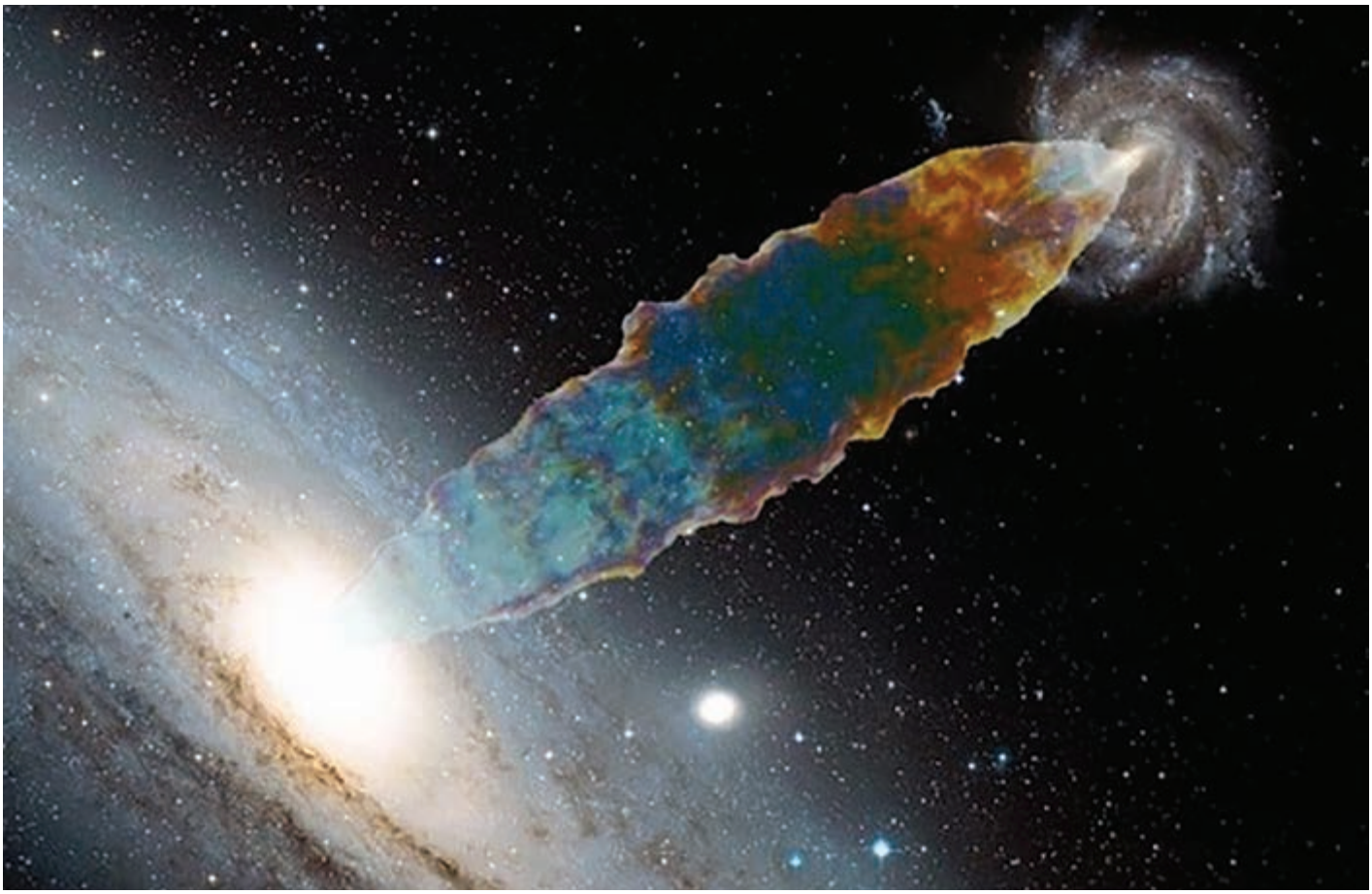
With the help of the supercomputing power of the Inter-University Institute for Data Astronomy (a collaborative network consisting of UP, UCT and the University of Western Cape), the international research team was able to analyse the vast quantities of simulated data, effectively spanning millions of years.

"These computer-based models, which simulate jet evolution in a mock universe, do more than explain the origin of most giant radio galaxies," Dr Giri says. "They're also powerful enough to address puzzling exceptions that have confused astronomers in this field. For example, they help explain how some cosmic fountains bend sharply, forming the shape of an X in radio waves instead of following a straight path, and clarify the conditions under which giant fountains can still grow in dense cosmic environments." These findings can be tested further by radio astronomers using advanced telescopes.

"Studies like this lead the way in formulating our understanding of these wonderful objects from a theoretical perspective," Prof Thorat adds. "This provides a complementary picture to deep-sky observations by telescopes like MeerKAT and the upcoming SKA, making simulations a key tool along with artificial intelligence techniques and high-performance computing to maximise the discovery space and optimise the scientific understanding of these and other 'exotic' objects."

Prof Sunil Maharaj, Vice-Principal for Research, Innovation and Postgraduate Education at UP, noted that the University is proud of the rapid growth of its radio astronomy research group.

"This was enabled by strategic investment in the Inter-University Institute for Data Astronomy and key personnel focused on science with world-leading African telescopes," he says. "It's just one example of UP's leadership role in harnessing cutting-edge technology that increases Africa's contributions to pushing scientific frontiers while developing the next generation of researchers on the continent. Our research today opens up new worlds and possibilities for the future."



An artistic representation of what a giant cosmic jet the size of the distance between the Milky Way and Andromeda could look like (image for illustrative purposes only).

New dung beetle species discovered while fetching kids from school

Over the past two decades, field trips in search of dung beetles have taken University of Pretoria (UP) doctoral student Christian Deschodt across Southern Africa. But a well-trodden walk to fetch his kids from school, a mere 1,5 km from his home near Hartbeespoort, saw him stumble upon an entirely new species.

This was just one of two new species recently described by Deschodt, who has been involved in discovering and describing more than 50 new dung beetle species.

News about the species, named *Hathoronthophagus spinosa*, spotted on his stroll was announced in *Zootaxa*, a scientific journal that specialises in updates about the discovery of new species. Deschodt, together with his PhD supervisor, Professor Catherine Sole of UP's Department of Zoology and Entomology, also placed the species in a new genus, *Hathoronthophagus*.

"We live near Hartbeespoort Dam on a small piece of land, some 30km from UP's Hatfield Campus," Deschodt says. "After a morning of research work, I stretch my legs by walking to fetch my two children from primary school."

He never imagined walking along that particular gravel farm road would allow him to combine work with his parental duties. In January 2023, Deschodt set off to fetch his children. It had rained the previous day. About 500 metres into the walk, he spotted a tiny chocolate brown dung beetle less than 5mm in size amid a hoard of common pugnacious ants. No dung was to be seen, as would be expected when dung beetles are around.

Careful not to squash it, he carried the specimen to the school and back home where, after a quick look at it under the microscope, he realised it was the female of a species that he'd never seen before. He named it after 'Hathor', an ancient Egyptian deity associated with joy, love, women, fertility and maternal care.

"She was often portrayed as a woman wearing a headdress of cow horns," Deschodt explains, "which reminded me of the longish horns of *Hathoronthophagus spinosa*."

Deschodt has since had no luck in tracking down more specimens, despite having put out lures baited with cattle dung and extensively examining ant nests around Hartbeespoort. He believes this particular species of dung beetle may live in ant nests, and may be providing a mutually beneficial service to its fellow insects. Incidentally, other dung beetles that have antennas with eight segments, like *Hathoronthophagus spinosa*, have such a relationship with ants. More work will have to be done to confirm this hypothesis.

"I hope that news about this find will at least prompt other experts working in Southern Africa to explore the relatively unknown relationship between ants and dung beetles more intensively," he says.

There are about 500 species of dung beetle in South Africa, and more than 700 in

Prof Catherine Sole

Mr Christian Deschodt

all Southern African countries, including South Africa, Botswana, Namibia, southern Mozambique and Zimbabwe. According to Deschodt, this diversity is partly due to South Africa's hugely varied geography and range of vegetation types, from fynbos to succulents, thickets and savannas.

He says many species of dung beetles are specific about the type of dung they use. For instance, some are only found using elephant or rhinoceros dung. For his PhD, Deschodt is working on a flightless genus found in the arid parts of Namibia and western South Africa that only keeps to rock hyrax ('dassie') dung pellets.

It is also a fallacy that dung beetles only feed on faeces, despite what their common name might infer. Some species have been seen scavenging on dead frogs and chicken livers, or feeding on different types of mushrooms.

Meet the dung beetle named 'Pragtig'

In his latest paper, which also appeared in *Zootaxa*, Deschodt described yet another new species. *Onthophagus pragtig* most likely only feeds on the innards of dead millipedes. It is one of 20 species that is part of a small group of dung beetles in the genus *Onthophagus*. All other species in this group are known to prefer feeding on the soft internal organs (or viscera) of dead millipedes.

"These beetles are small and about the width of a millipede in cross-section," Deschodt explains. "One after the other, they enter a millipede's carcass via any breach in the body they can find. I've seen some sitting tightly packed together in a carcass, almost like a string of dark pearls. They scrape soft edible tissue off, then form these into small balls to feed on later."

"*Onthophagus pragtig* will form a ball with the viscera of a dead millipede and bury it directly under the millipede carcass. For dung beetles, forming a ball to provision their offspring from something other than dung is already unique, but forming it from the innards of a millipede is quite extraordinary. It is known that millipedes have hydrogen cyanide, hydrochloric acid, hydroquinones, benzoquinones, alkaloids, and phenols inside of them", he says.

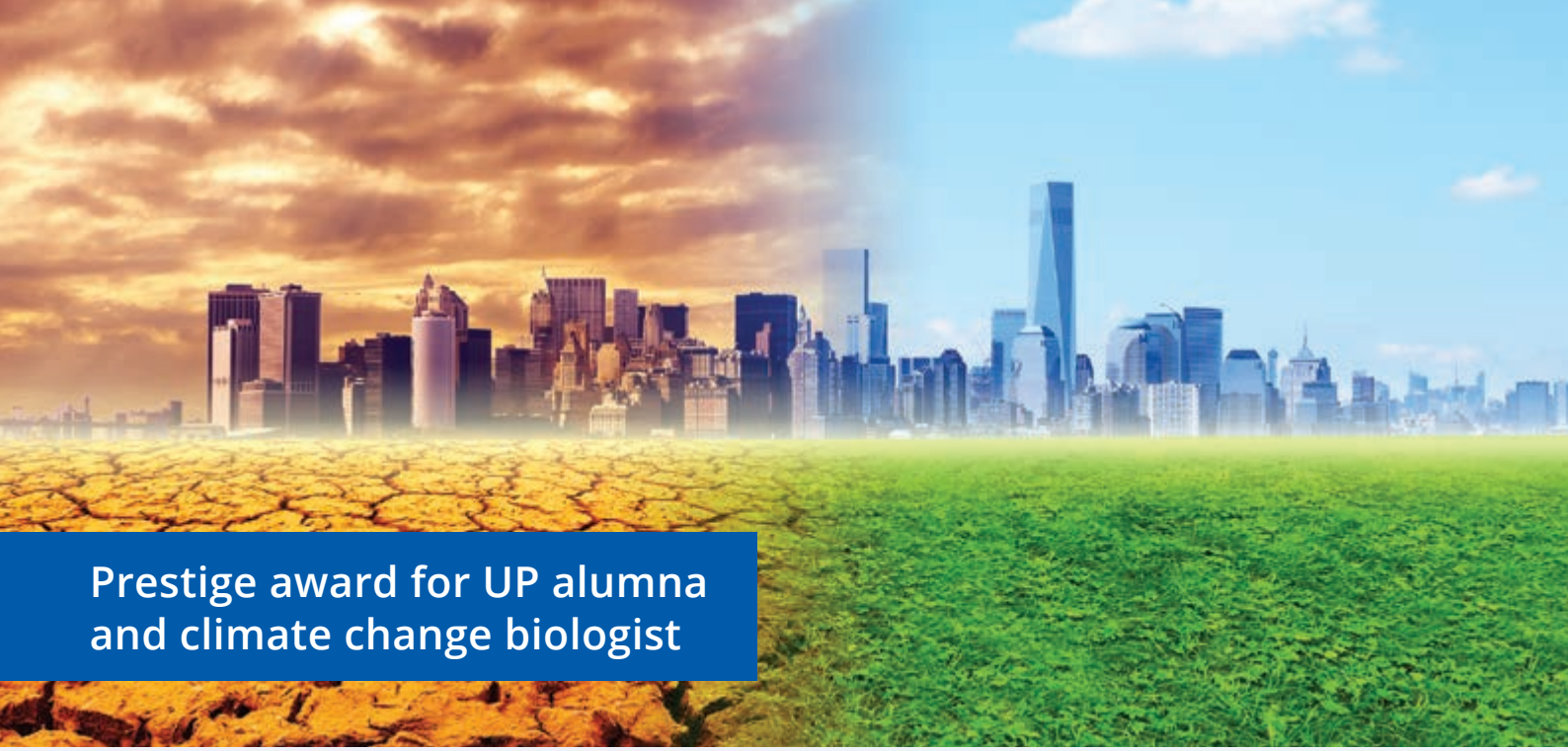
Most species range in colour, from black, brown and orange to shiny coppery shades. Some can be metallic blue, green and red, while only a few have coloured spots or markings. Deschodt says the coppery red metallic sheen of Onthophagus pragtig makes it particularly beautiful and almost jewel-like.

"The epithet 'pragtig' is Afrikaans for 'splendid'," he explains. "It links this species with some other very closely related species within the same group, namely *Onthophagus splendidus* and *Onthophagus splendidoides*. All of them seem to prefer sandy soils."

Examples of *Onthophagus pragtig* have been collected in Limpopo and the Northern Cape, and were described from specimens that are part of collections held at UP and the Ditsong Museum of Natural History in Pretoria. The first known specimens of *Onthophagus pragtig* were collected by Deschodt's mentor, Professor Clarke Scholtz, who, before his retirement, was associated with UP's Department of Zoology and Entomology for many years. In the early 2000s, Deschodt was part of Prof Scholtz's research team investigating livestock dips' impact on dung beetle diversity in South Africa.

"It's difficult to study species like *Onthophagus pragtig* that do not have a specific relationship to dung", Deschodt says, "as they are not readily attracted to faeces bait as 'typical' dung beetles are". He hopes the description of this beautiful new species will encourage other scarab experts in Africa to explore carrion and millipede carcasses that may have been trampled on.

Click on the infographic to learn more about the importance of dung beetles or click on the gallery to view pictures of both species.



Prestige award for UP alumna and climate change biologist

Dr Shannon Conradie

Nearly 1 million species face extinction. The award to Dr Shannon Conradie by the Jennifer Ward Oppenheimer (JWO) Research Grant boosts interventions.

Dr Conradie, a UP alumna and a former PhD student of Prof Andrew McKechnie from the Department of Zoology and Entomology is currently a lecturer in the School of Animal, Plant and Environmental Sciences at the University of Witwatersrand, and has been named the 2024 recipient of this prestigious research grant valued at $150 000 (approximately R2.6 million).

Prof McKechnie also holds the South African Research Chair in Conservation Physiology (co-hosted by the South African National Biodiversity Institute and UP). As a thermal physiologist by training, he co-leads the Hot Birds Research Project (HBRP). This research programme seeks to understand and predict climate change's impacts on birds in southern Africa and globally.

Dr Conradie's research uses scenario modelling to understand and predict changes in desert birds' behaviour as they respond to global temperature change.

This quest for understanding is urgent. By the end of this century, the maximum air temperatures in some desert zones will increase by up to 5°C, pushing way beyond the upper limits of tolerance of desert birds.

Reacting to this new opportunity, Dr Conradie says: "Receiving the prestigious JWO Grant will empower me to keep building on the skills I have in biophysical ecology, and develop further expertise in remote sensing and thermal drone technology."

"But more than that, I hope this research will help further our collective work to understand how climate change will likely impact biodiversity. This work can highlight vulnerable species and habitats, allowing us to precisely implement conservation measures. And crucially, it can also highlight systems that are doing well and inform best practices – and with nearly 1 million species currently facing extinction globally, the need for research-driven interventions has never been higher. It is an honour that the Oppenheimer family have seen the value of this research and will be supporting its continuation."

Bird experiences

In an interview with the JWO, Dr Conradie explained some of the recent events that show biodiversity is under threat, especially birdlife.

"We're seeing knock-on effects of birds stopping breeding because it's too hot and their body condition is compromised. We've seen in southern yellow-billed hornbills, for example, when average summer temperatures are above 35°C, there's about a 50% drop off in breeding success, because of these heat-related trade-offs that they have to make."

In a heat wave, birds plummet from the skies, chicks jump out of nests in desperation, and the shock stunts biodiversity. A mass mortality of this nature occurred at the Pongolo Nature Reserve in KwaZulu-Natal in November 2020, when temperatures hit 45°C, killing 110 birds and fruit bats in a very small area searched by rangers. Although the only one recorded in South Africa, such events have been more extensively chronicled in Australia. Read the full interview.

About the JWO Research Grant

The Jennifer Ward Oppenheimer Research Grant is managed by Oppenheimer Generations Research and Conservation and Oppenheimer Generations Philanthropies and was established six years ago to help early-career scientists develop scientific solutions to African problems.

This year saw 697 proposal submissions from across 36 African countries. The grant is intended to encourage African-led research in the environmental and allied sciences, with an eye on tackling critical real-world problems.

Credit: University of the Witwatersrand

Science benefits from long-term partnership between CERU and IFAW

The Conservation Ecology Research Unit (CERU) in the Department of Zoology and Entomology and the International Fund for Animal Welfare (IFAW) have had a partnership that started over two decades ago.

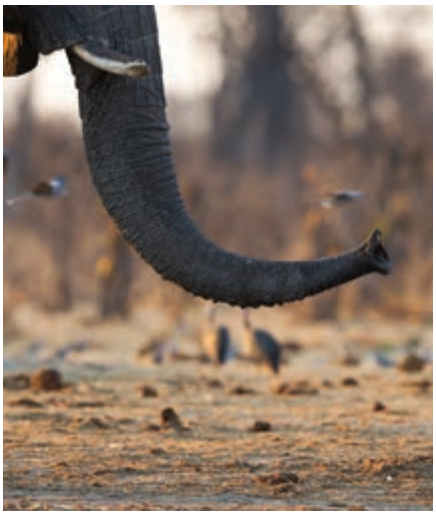
This relationship was started by the late Prof Rudi van Aarde (the then Director of CERU) and Jason Bell (currently the Executive Vice President at IFAW) to find sustainable solutions for managing elephant populations.

Dr Robert Guldemond, Research Manager at CERU, explained, "From the outset, it was clear that providing space for elephants to thrive, be healthy, and have stable populations required large swaths of protected and connected land. This is an ambitious undertaking, especially today. So, the question begs – how do we buffer ourselves against these global instabilities that threaten people's and animals' wellbeing, and ultimately, biodiversity conservation?"

One approach relies on the lessons learned in the historical development of the CERU-IFAW partnership. It also benefited greatly from collaborating with Prof Stuart Pimm (the Doris Duke Professor of Conservation at Duke University, US) and now the Senior Science Advisor for CERU's Elephant Conservation programme. Another way is establishing a network of people and institutions with mutual and overlapping research interests. Over the past 18 months, CERU established several research consortia with early– and mid-career scholars at the UP, other South African universities and institutions, and across Europe, the UK, and the US. CERU is doing the same by collaborating with NGOs, government conservation agencies, and people with academic interests who are working in African savannas.

Dr Guldemond added, "IFAW similarly, formulated partnerships with strategic stakeholders in 12 key conservation landscapes across southern and eastern Africa as part of their Room to Roam programme. IFAW benefits directly from CERU's involvement in these landscapes, in that CERU provides the science behind Room to Roam. Likewise, we benefit from the research opportunities provided by IFAW. Everyone working with IFAW across the sub-Saharan African savanna benefits from the independent science that CERU and partners offer."

He concluded, "We, in turn, are provided with the financial and logistical support to do so. This long-term partnership between IFAW and CERU culminated in the late Prof Van Aarde producing *Let Elephants Roam*, a coffee-book-style book published posthumously, celebrating his passion for science, elephant conservation and management, and photography."



Endless possibilities for biodiversity research in Waterberg

Who would have thought that the curiosity sparked during a family holiday at a game reserve would lead to endless research possibilities in the Waterberg?

In 2021, Prof Nigel Barker from the Department of Plant and Soil Sciences received almost R4.5m from the Foundational Biodiversity Information Programme (FPIB) for three years of biodiversity research across multiple institutions and disciplines. FPIB is a mechanism to ringfence National Research Foundation (NRF) funds for biodiversity research.

Prof Barker, Principal Investigator (PI) of this research project, explained that the aim was to document South Africa's biodiversity and focused on the Waterberg Mountain Complex (WMC), providing specimen records, genetic information, databases, etc.

Ms Marilize Greyling, founder of the Waterberg Research Support Centre (WRSC), was instrumental in the research since its inception and emphasised that the FPIB Waterberg Biodiversity Project (WBP) is the first structured baseline biodiversity project conducted in the Waterberg. "It yielded excellent results with a couple of new species and range expansions identified – and we have just started scratching the surface."

Prof Barker added, "This project required lots of sample and specimen collecting. These specimens had to be put into recognised collections – museums and herbaria. Naturally, staff at the University of Pretoria (UP) were the core of many of the disciplines. Other institutions included Bayworld (herpetology), SAIAB (aquatic biodiversity), Ditsong Museum (arachnids and mammals), WITS (aquatic biodiversity), UKZN (invertebrates), University of Limpopo (plants), SANBI (plants), University of Mpumalanga (mammals), Rhodes University (aquatic biodiversity). Major groups of organisms focused on include arthropods, including dung beetles, spiders, solifuges and scorpions (Ditsong Museum). Mammals were surveyed using camera traps and ultrasonic sound recorders for bats. Other major groups were snakes and frogs, fish and aquatic invertebrates, plants and even a component of soil microfauna and microbial diversity."

Prof Catherine Sole from the Department of Zoology and Entomology has been documenting the insect diversity, especially dung beetles, which are key ecosystem elements. She and her students have sorted a total of 56 000 specimens that had been caught in pitfall traps across six localities in the Waterberg. This resulted in identifying 137 beetle species across 10 tribes and 38 genera. She estimates that approximately 42 undescribed species have been collected. Dr Werner Strumpher from Ditsong Museum was part of this team and was involved in the dung beetle survey and subsequent identifications.

Funding for 'DNA barcoding' was also included, as the use of DNA sequence data to identify new species and confirm existing species identifications is a major tool of modern-day biodiversity surveys Initially this had to wait until sufficient samples have been accumulated, but is currently being done on dung beetles, bats and some birds.

UP's Department of Zoology and Entomology researchers and students have also been very involved in the FPIB Waterberg Biodiversity Project. According to Prof Mark Keith from the Mammal Research Institute in the Department of Zoology and Entomology, "This project provided valuable fine-scale data, which formed part of many MSc and honours students' research. This research emphasises the value of fine-scale and systematic field work to provide up-to-date information on species presence data. It also demonstrates the importance of work supported by the FBIP to provide updated and verified species lists for the Waterberg, contributing to distribution records and 'museum' collections while offering landowners valuable, property-specific mammal data. These findings underscore the importance of integrating digital repositories with field-based studies to effectively inform management and conservation initiatives."

Prof Mark Robertson (Department of Zoology and Entomology) and Prof Kate Parr (extraordinary professor) shared that research on savanna ecosystem function is being undertaken on Kaingo Game Reserve, near Vaalwater in the Waterberg. The research project aims to understand the primary pathways through which vegetation is consumed and how this affects ecosystem nutrient cycling. Prof Robertson explained, "Animals affect the cycling of nutrients, but their role in this process is poorly understood. This project involves a large-scale manipulative experiment to investigate the roles of large mammal herbivores and decomposers (termites) in the savanna ecosystem function through their impact on nutrient cycling. This involves measuring vegetation's primary productivity and chemical composition, where the impact of large mammal herbivores, termites, and a combination of both have been experimentally manipulated. The project also involves collaborators from Oxford University and the University of Witwatersrand."

Prof Barker emphasised that "The Waterberg is not a haven for a great number of endemic species (species found there and nowhere else), but it is a region where topographic diversity, vegetation diversity and thus overall biodiversity is packed into a rather small area to combine into a unique ecosystem, and, while the Biosphere reserve protects some of the region, it needs expansion, especially in light of the threats of expanded mining and other industrial activities such as power stations that surround the mountainous regions of the Waterberg itself. In addition, the region has been declared a Strategic Water Source Area due to water provisioning to the Mokolo dam, which ensures water security in Lephalale. This further enhances the strategic economic importance of the Waterberg rivers and catchments."

"Other research organisations and overseas universities (e.g. Trinity College Dublin, Ireland, which University of Winchester, UK, and the University of Georgia, USA) also have a research in the area, and the momentum of a general Waterberg research ethos grew rapidly, leading to the first Waterberg Research Convention (WRC) recently," explained Prof Barker. This convention was organised by the Waterberg Research Support Centre and took place in January 2025. It provided a space where researchers presented findings on their work, and a lot of networking was also undertaken. Several team members of the FBIP presented their work, alongside many others involved in aspects of Waterberg conservation. Several postgraduate students involved in the WBP also presented their work as talks or posters.

What next? The initial FBIP funding has almost run out, but this project is morphing into several other smaller projects that will continue to be run by the FBIP WBP team members. Prof Barker has been awarded a further three years of NRF funding to investigate the impact and challenges of managing the encroachment of an indigenous species known locally as 'bankrotbos (*bankrupt bush*) – a shrubby daisy that invades areas to the point where no commercial or economic activities can be carried out. As it is indigenous, this species is not on the radar of alien invasion researchers. This plant's impact on biodiversity and ecosystem services is not well known, and management, control and eradication measures have been only partially effective to date.

Dr Gimo Daniel setting pitfall trap

Ms Greyling added, "There is a real need and value to make the WBP a long-term project. "The WRSC, together with key institutions and organisations, aim to develop a Waterberg Research hub, including an accessible research and biodiversity database, laboratory, accommodation and access to research properties – a one-stop shop for research in the area.

Prof Barend Erasmus, Dean of the Faculty of Natural and Agricultural Sciences, attended the Waterberg Research Convention to better understand the opportunity for research collaborations. "The Waterberg is such a unique piece of our natural heritage, but it is faced by a wide range of challenges. At UP, we know the value of place-based research where multiple disciplines and stakeholders work together to solve complex problems. I can see a great opportunity to expand our footprint in the Waterberg and work with landowners and stakeholders to ensure that the Waterberg legacy lives on. We are already in conversation with specific landowners to formalise our collaboration, and I look forward to making further announcements very soon," Prof Erasmus concluded.

Students surveying Wetland vegetation in the Waterberg

UP study finds tea to be as antioxidant-rich as fruit and vegetables

University of Pretoria (UP) researchers have found that the antioxidant content of certain types of tea can be likened to that found in recommended portions of fruit and vegetables.

For the study, which was published in Toxicology, Professor Zeno Apostolides of UP's Department of Biochemistry, Genetics and Microbiology in the Faculty of Natural and Agricultural Sciences measured the amount of antioxidants in fruit, vegetables and tea against the amount found in a standard 200mg vitamin C tablet.

The result: an equivalent amount – and a compelling reason to incorporate tea into your diet.

"This does not mean you can ditch your healthy eating habits," Prof Apostolides cautions. "While tea made from the Camellia sinensis plant has considerable health benefits, tea should not be used as a substitute for fruit and vegetables under any circumstances, and should simply be used to supplement your diet."

Prof Apostolides' research was conducted on 15 types of non-herbal tea and 10 types of herbal tea found in supermarkets, as well as a variety of fruit and vegetables. The findings showed that just half a cup of black tea, oolong tea or green tea contained the same amount of antioxidants with radical scavenging capabilities (RSC) as that of a 200mg vitamin C tablet. RSC refers to a substance's ability to neutralise harmful free radicals – unstable molecules that can cause cell damage. Antioxidants are compounds that counteract free radicals, preventing and slowing down the cell damage and cell death caused by them.

Furthermore, one cup of black, oolong or green tea contains the same amount of RSC as four servings of fruit or 12 servings of vegetables. Different foods contain different types of antioxidants, and a variety of antioxidants is needed to combat the negative effects of free radicals.

"Free radicals are highly reactive, unstable molecules that are produced as a by-product of the body's natural metabolism processes," Prof Apostolides explains. "They only live for a fraction of a second, but during their short lifespan, they can damage the DNA inside your body's cells."

The damage that they cause can increase the risk of developing cancer and heart disease, among other health conditions. Free radicals are produced after the body has been exposed to harmful compounds in the environment, such as tobacco smoke, toxic chemicals or air pollution, or prolonged exposure to sun and ultraviolet light. A nutrient-poor diet can also produce free radicals.

"Free radicals can be either harmful or helpful, but a build-up of harmful free radicals (known as oxidative stress) can cause significant damage to the body's cells," Prof Apostolides says.

Prof Zeno Apostolides

Oxidative stress causes damage to cell membranes, proteins, lipids and DNA. This damage negatively affects how the body's cells work and how they replicate. A negative effect on cell replication can cause mutations in DNA, thereby increasing the risk of developing cancer.

"The results of the study also showed that tea made from the Camellia sinensis plant contained a significantly larger amount of RSC than the amount found in herbal teas," Prof Apostolides says. "Rooibos tea, however, is still a close second, with one and a half cups containing as much RSC as that of a standard vitamin C tablet."

FOOD FOR THOUGHT: Could protein determine our socio-economic future?

Our bodies need protein. But because protein-rich foods are expensive, millions of people do not have access to sufficient protein. Without it, people face health problems such as the loss of muscle mass, the inability to concentrate and, in severe cases, diseases such as kwashiorkor and marasmus.

Researchers at the Department of Animal Science and the School of Health Systems and Public Health at the University of Pretoria (UP) have made a crucial discovery regarding the methods used to measure the protein content of foods. They have confirmed that current methods often produce inaccurate results, and that more accurate results could do much to prevent malnutrition, along with encouraging the cultivation of alternative sources of plant-sourced protein.

According to the World Health Organisation, the recommended amount of protein for adults is about 0.83g per kilogram of body weight per day. A man weighing 90kg would need around 75g of protein daily.

"To determine whether a person is getting enough protein, we need to know how much protein is present in the foods they routinely consume," Dr Beulah Pretorius says. "Traditionally, scientists have used a method called the 'proximate system' to measure protein content. By using specific nitrogen-to-protein conversion factors – also called the Jones conversion method – protein content is calculated based on the amount of nitrogen in foodstuffs. This method assumes that most of the nitrogen in food comes from amino acids (the building blocks of protein) and that a significant portion of those amino acids are part of the protein."

The commonly used conversion factor is 6.25, which again assumes all proteins contain about 16% nitrogen. This research has now shown that this method can over- or underestimate the true protein content present in foodstuffs.

"This is why scientists prefer to report protein in food composition tables, and to indicate 'true protein' on product labels as the sum of individual amino acid residues," Dr Pretorius says. "The chemical analysis to determine the amino acid content is, however, complicated and costly, and therefore not a feasible methodology to use in developing countries."

But what if we could update and improve the conversion factors that are being used? An exploratory study collected data on the amino acid content in foods from animal sources. The crude protein was calculated using the samples' nitrogen value (as determined by the Kjeldahl method for dairy samples and the Dumas method for meat samples). These were then multiplied by the respective Jones conversion factors of 6.25 for meat samples and 6.38 for dairy samples. True protein was calculated as the sum of amino acid residues (the molecular weight of each amino acid, minus the molecular weight of water).

"The findings were concerning," Professor Hettie Schönfeldt says. "For all animal products, the protein content was over-reported. It became evident that the 'assumed' nitrogen content of protein is not 16% but varies significantly depending on the source of protein. By accurately determining protein content, we could not only counter malnutrition but also encourage the cultivation of a diverse range of plant species, including often-overlooked valuable sources of protein. A greater variety of crops would also result in much-desired biodiversity in regions."

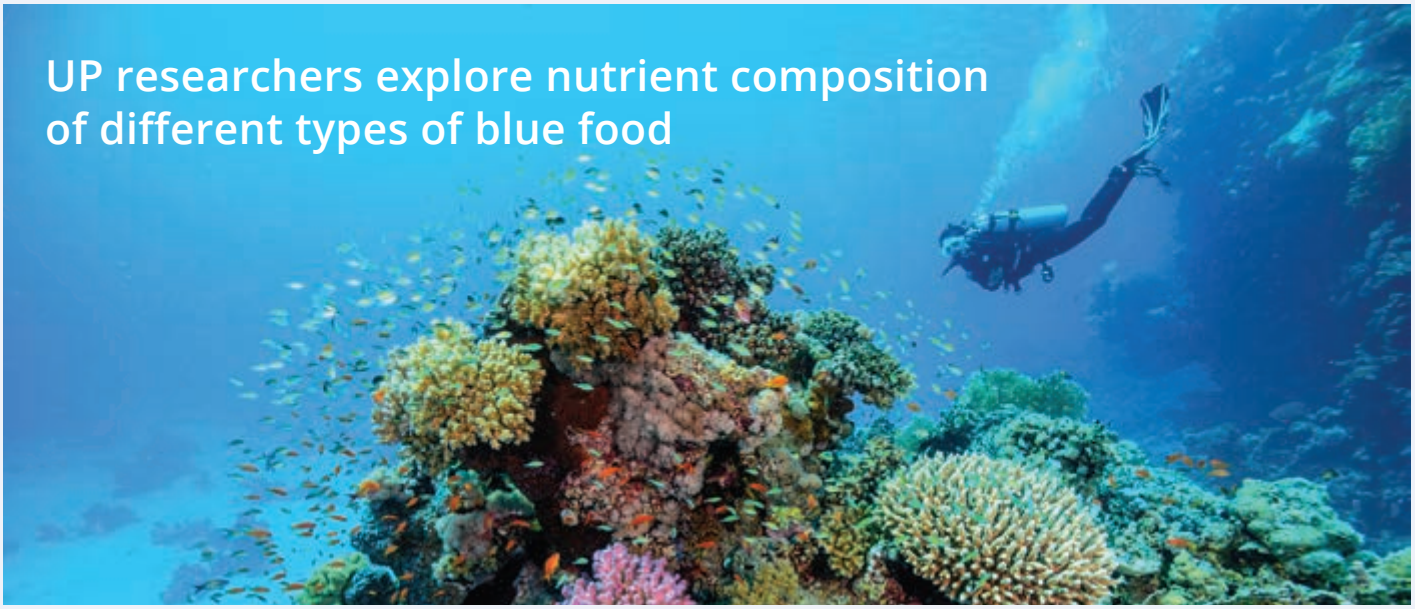
"These changes will affect virtually all sectors in the food chain: agriculture, manufacturing, food preservation, labelling and regulatory compliance, to name a few," Dr Pretorius adds. "However, the greatest challenge would probably be to gain acceptance of new food options from the general population. Humans are, by nature, resistant to change. It would therefore require intensive, persuasive education to alter dietary preferences."

Prof Hettie Schönfeldt

Dr Beulah Pretorius

Given humankind's attachment to habits, the sooner we start changing ingrained preconceptions, the sooner more people will have the chance to see their children thrive.

UP researchers explore nutrient composition of different types of blue food



Blue food is any form of sea life regarded as food by humans and is divided into different classes, i.e., marine finfish, shellfish, marine mammals, echinoderms, marine plants, and algae.

According to Prof Hettie Schönfeldt and Dr Beulah Pretorius, researchers in the Faculty of Natural and Agricultural Sciences (NAS), "Blue food or seafood is an excellent source of high-quality, easily digestible protein rich in essential amino acids, crucial for bodily functions and overall health. It provides beneficial fats, particularly omega-3 polyunsaturated fatty acids (PUFAs), which support cardiovascular health, cognitive function, and protection against chronic diseases."

She added, "Seafood also supplies essential minerals such as iron, calcium, magnesium, zinc, selenium, and iodine, each contributing to critical physiological roles like immune support, bone health, and thyroid function. Furthermore, seafood is a notable source of fat-soluble vitamins (A and D) and water-soluble B vitamins (niacin and B12). Despite these benefits, seafood can also accumulate harmful contaminants, such as mercury, lead, and industrial chemicals, through environmental pollution, which poses potential health risks." However, food composition data on South African blue food is lacking.

Dr Pretorius explains that country-specific food composition data for blue food is essential for accurately evaluating nutrient intake and guiding public health nutrition strategies. This information reflects differences in fish species, fishing methods, and local preparation techniques, all of which can greatly influence the nutritional value of seafood. Without such data, it is not feasible to translate foods consumed into assessments of nutrient intake and public health nutrition interventions.

Aquatic food systems (marine and inland) have enormous growth potential towards a more sustainable and equitable food system, particularly in developing countries and, most importantly, in Africa.

Prof Schönfeldt concluded, "We are currently engaging with five divisions within the National Department of Forestry, Fisheries, and the Environment to explore opportunities for future research collaboration. Building upon current expertise within the University of Pretoria, we will co-create research initiatives that will include new innovative areas of research, to address complex challenges in this space."

Five divisions within the National Department of Forestry, Fisheries, and the Environment

Marine plants and algae
- Seaweeds
- Algae

Echinoderms
- Starfish
- Sea urchins
- Sea cucumbers

Marine mammals
- Cetacea – Dolphins, Whales
- Sirenia – Dugong
- Carnivora – Carnivores

Marine finfish
- Diadromous fish – Trout and Salmon
- Pelagic fish – Mackerel
- Other finfish – Cod

Shellfish
- Mollusks – Squid, Octopus and Mussel
- Crustaceans – Shrimp, Crab and Lobster

GLOBAL ENGAGEMENT

Prof Lise Korsten receives Honorary Doctorate from Ghent University

Prof Lise Korsten (centre) and her promotors, Prof Marijke D'Haese (left) and Prof Mieke Uyttendaele (right)

Photo – www.mircophoto.com/ Ghent University.

Professor Lise Korsten, an eminent scholar in Plant Pathology at the University of Pretoria (UP) and CoDirector of the Department of Science, Technology and Innovation (DSTI), National Research Foundation (NRF), Centre of Excellence (CoE) in Food Security, has been conferred a distinguished honorary doctorate by Belgium's Ghent University on 21 March 2025, in recognition of her transformative contributions to resilience in food security and safety. As the first female President of the African Academy of Sciences (AAS), she continues to drive equitable scientific excellence across the continent.

From humble beginnings, Prof Korsten's passion for science was ignited by her stepfather, Prof Jan Kotze, a plant pathologist who inspired her focus on agriculture and plant health. She earned her BSc and BSc Hons degrees at Stellenbosch University, where her interest in agriculture took root, but her MSc and PhD at the University of Pretoria shaped her ground-breaking career. This honorary doctorate from a globally esteemed institution underscores her lifelong dedication to advancing scientific frontiers for societal good. "Receiving this recognition from a world-leading university is a humbling testament to a lifetime dedicated to advancing scientific frontiers for societal benefit," she said. "It galvanises my resolve to foster equitable, resilient food systems that empower communities and drive global sustainability, particularly in Africa."

Her PhD research at UP resulted in a world-first biological control product for avocado, which she patented and commercialised. This achievement established her as a leader in plant pathology. It led to her role as a founding member and pro bono board member of the South African Bioproduct Organisation (SABO), advancing sustainable agricultural innovation.

As President of the AAS, a role she assumed in July 2023, Prof Korsten leads a pan-African organisation established in 1985 to promote science, technology, and innovation across all disciplines. The AAS fosters scientific excellence, supports emerging scientists, and forges partnerships with global bodies like the African Union and European Union to advance transformative scientific progress across the continent. Under her leadership, the AAS champions equitable progress and interdisciplinary collaboration to elevate Africa's scientific landscape.

Her global influence extends through her introduction of the African Frontiers Planet Prize to ensure excellence recognition across the African continent. In addition, she sits on the board of the University of Helsinki to enhance international collaboration, specifically for the African continent. She also contributes to Africa's scientific future through various boards and advisory panels, emphasising sustainable food systems and ecological resilience.

Ghent University, ranked 83rd globally by the Shanghai Index, lauded Prof Korsten's innovative approaches to sustainable food systems and food safety, safeguarding agricultural integrity and public health. This accolade highlights her profound impact in a field where she has redefined industry standards.

Her research has secured significant funding from sources like the Water Research Commission and the EU's 7th Framework project, 'Impact of Climate Change and Globalisation on Safety of Fresh Produce – Governing a Supply Chain of Uncompromised Food Sovereignty'. Further funding from the EU Horizon programme included 'Food Safety for Africa', 'Fair Food and Trade Systems for Africa through Food Convergence Innovation' (FCI4Africa), 'Safe Food Systems for Africa', and 'Innovative Technologies for African Agriculture'. National Research Foundation-funded projects further support her work.

Prof Korsten founded a research group focused on fresh produce safety and phytosanitary trade within the One Health and One Food frameworks. Her research teams focus on developing diagnostic systems and a surveillance framework for food safety. Her expertise has informed policy, notably through her presentations to the South African Parliament, where she proposed a national Food Control Authority framework. She has also contributed to ministerial groups on antimicrobial resistance and nutrition security.

Globally, she has shaped food safety standards through her work with the World Health Organization (WHO) on expert committees addressing food safety and antimicrobial resistance. Following this, her involvement with the Food and Agriculture Organization (FAO) includes serving on expert committees for food safety, contributing to risk assessment training, and participating in the Food Safety Training Initiative with Leeds University, paving the way for scarce skills development and training. She also serves on the Global Food Safety Initiative Expert Panel (STAG).

Her research programmes, such as Produce Quality and Safety (PQS) and Postharvest Innovation Research, integrate industry support, student mentorship, and extensive publications. Over two decades, she has mentored 51 MSc students, 20 PhD students, and 11 postdoctoral fellows, building a legacy of excellence.

Her innovations in plant disease control and contamination prevention have set new benchmarks. Ranked in the top 0.31% of scientists globally and 0.22% in Agriculture and Natural Resources by ScholarGPS, she has an H-index of 50, 12,419 citations, and an i10-index of 154 per Google Scholar. Her research programs have secured nearly R90 million in funding.

Prof Patricia Forbes named Editor-in-Chief of international journal '*ACS Earth and Space Chemistry*'

Professor Patricia Forbes of the University of Pretoria's (UP) Department of Chemistry has been appointed Editor-in-Chief of the internationally renowned research journal ACS Earth and Space Chemistry.

A professor of Environmental Chemistry, Prof Forbes holds the Rand Water Research Chair and leads the Environmental Monitoring and Sensing Research Group in the Department of Chemistry in UP's Faculty of Natural and Agricultural Sciences, where she has taught since 2009.

ACS Earth and Space Chemistry, published by the American Chemical Society (ACS Publications), is a monthly journal that advances the interdisciplinary application of chemistry to natural materials and processes in Earth's interior, surface and atmosphere, and space. Prof Forbes will officially assume the role of Editor-in-Chief on 1 July 2025, succeeding Professor Joel Blum of the University of Michigan in the United States, who has led the journal since its launch in 2016.

She says she will work to consolidate the journal's impact and growth, building on the success of her predecessor.

"My appointment as Editor-in-Chief of *ACS Earth and Space Chemistry* is a great honour, and I am excited for the opportunity to work with the editorial team and ACS publishing staff to take this prestigious journal to even greater heights," Prof Forbes said. "As *ACS Earth and Space Chemistry* approaches its tenth anniversary since inception, it is clear that it is well-established within the library of environmental chemistry journals, and I aim to boost its current upward trajectory further."

'Broad research expertise'

Prof Barend Erasmus, Dean of the Faculty of Natural and Agricultural Sciences, expressed the Faculty's congratulations. "This is a remarkable achievement for Professor Forbes and a moment of immense pride for the Faculty of Natural and Agricultural Sciences and the University of Pretoria," he said. "Her appointment as Editor-in-Chief of such a prestigious international journal as *ACS Earth and Space Chemistry* is a testament to her exceptional standing in the field of environmental chemistry. This recognition aligns perfectly with UP's vision to be a leading research-intensive university in Africa, globally recognised for its quality and impact, and it underscores our mission to produce impactful research that addresses global challenges."

Her predecessor, Prof Blum, also offered his support. "I am pleased to see that ACS Publications has selected Professor Forbes as the next Editor of *ACS Earth and Space Chemistry*," he said. "She brings a broad research expertise to the journal leadership position and is an experienced scientific editor. I am confident that Professor Forbes will be a good steward of the journal and will keep it moving along its current positive trajectory.

Prof Patricia Forbes

'Expansive accomplishments as editor and researcher'

Prof Forbes previously served as Editor-in-Chief of the *South African Journal of Chemistry* and is a member of the Editorial Boards for several journals.

She earned her MSc in Applied Science from the University of Cape Town and her PhD in Chemistry from UP. Her research focuses on analytical chemistry involving the development of novel sampling and analytical methods for environmental pollutants.

"We're delighted to welcome Professor Forbes and look forward to working with her to continue to elevate *ACS Earth and Space Chemistry*," said ACS Publications Senior Vice President and Chief Publishing Officer Dr Sarah Tegen. "With her strong background and expansive accomplishments as an editor and researcher, she is deeply qualified to guide the journal on the next chapter of its journey."

Prof Hettie Schönfeldt selected as UN Hub Chair for SDG 3

Professor Hettie Schönfeldt of the Faculty of Natural and Agricultural Sciences and Faculty of Health Sciences at the University of Pretoria (UP) was recently appointed as the Hub Chair for the United Nations Academic Impact Sustainable Development Goal 3 (UNAI SDG 3) – Good Health and Well-Being.

Prof Schönfeldt holds the SARChI Chair in Nutrition and Food Security at UP, is a member of the UN High Level Panel of Experts on Food Security and Nutrition of the Food and Agriculture Organisation, and was elected in October 2024 to serve on the World Health Organisation Food Based Dietary Guideline Group.

She was selected after a rigorous process, during which more than 330 applications from higher education institutions around the world were reviewed. According to the UN, UP was selected for "its leadership role in promoting health management and sustainable food systems across Africa". Prof Schönfeldt will serve a three-year term, until December 2027.

"Since the COVID-19 pandemic, the world has not been doing well delivering on SDG 3," she says. "The main reason for this is that the price of healthy food – including fruit, vegetables and animal-sourced protein – is extremely high, and the consumption of carbohydrates and fast food has concurrently sky-rocketed."

This, she says, has led to many more people suffering from malnutrition and non-communicable diseases such as diabetes, heart disease, high blood pressure, cancer and obesity.

"SDG 3 is very closely aligned to SDG 2 – Zero Hunger," Prof Schönfeldt says. "The work we'll undertake in UNAI SDG 3 will integrate both."

Good food, good health, good life

According to Prof Schönfeldt, muscle health, skeletal health and gut health are all closely linked to overall body and brain development and achievement during the full life cycle, from pre-birth to infancy to active growth, adulthood and old age.

"Eleven of the 17 underlying causes of premature mortality and morbidity are directly related to malnutrition," Prof Schönfeldt explains. "Malnutrition contributes to a vicious cycle of poor health and low productivity and an impaired ability to concentrate and learn, trapping families in poverty and eroding economic security. Healthy dietary choices and better nutrition decreases ill health and improves the ability to work, earn and progress."

Fruit, vegetables and animal-sourced food provide key nutrients such as vitamin A; minerals like iron, zinc and iodine; and amino acids necessary to build the immune system and feed the brain.

"In South Africa, which is a good example of what's happening in middle– and lower-income countries, most people are eating less than 40g of protein a day, instead of the 90g requirement for good health, as they simply cannot afford to," Prof Schönfeldt says. We're also seeing an increase in children experiencing wasting and stunting due to a consistently poor diet. These kids are unlikely to achieve their full potential as adults if they haven't received the right amount of nutrients during active growth and development periods. Whereas South Africa's stunting figures before the pandemic were going down, from 24%, they are on the rise again because people are battling to put healthy food on the table."

Compounding this is the prevalence of cheaper fast food high in sugar, salt and saturated fat.

"It has led to a situation where much of the food we consume is heavily processed, unhealthy for us and the environment, and contributes to an array of non-communicable diseases."

Addressing SDG 3 with consumer education and partnerships

"We have to encourage healthy eating, and get governments on board to raise awareness and promote the importance of healthy diets and clean, safe water," Prof Schönfeldt says. "As a matter of urgency, governments need to reduce the price of healthy foods by, for example, making sure they're tax-free, farmer-friendly, locally sourced (to ensure sustainability) while at the same time limiting the number of fast food outlets in any given area."

She emphasises the need for governments to partner with universities and research institutions to address SDG 3. An example of this sort of collaborative intervention is Prof Schönfeldt's research into what children up to age six are eating. She's been conducting this research in collaboration with early childhood development centres since 1999, evaluating and advocating for improving the nutrient quality of school feeding programmes. About 8.5 million children in South Africa are benefitting from these programmes. Prof Schönfeldt

Prof Hettie Schönfeldt

voluntarily spends most of her National Research Funding on improving such programmes. Six years ago, breakfast was added to the mid-morning meal provided in the Gauteng school feeding programme as part of the pilot study. This is now being rolled out in Limpopo and KwaZulu-Natal.

Universities around the world are involved in various impactful programmes to achieve SDG 3, but some are not explicitly identified as such. Prof Schönfeldt will encourage them to highlight what they are doing to address this particular goal and communicate it to more people.

"This contributes to scaling change as awareness of what can be achieved together increases," she says. Universities are also making inputs into high-level policy in terms of advice and analysis to help governments and society meet the SDGs.

"We need to accelerate the growth of regional and international partnerships and collaborations between our universities, industries, the private sector and governments to respond to the complex, interconnected crises that the SDGs highlight," Prof Schönfeldt says.

Sustainable food production

All food production systems are deeply entwined with other systems, such as energy, water, land use and soil fertility, all of which are over-exploited and at risk to climate change. Food waste is another issue.

"We need to be producing and marketing healthy, sustainable, affordable food, and implementing sustainable food production solutions, such as regenerative agriculture, which includes soil, landscape and water conservation based on innovative farming models that exist but need to be promoted, as do indigenous foods," Prof Schönfeldt says. "The entire system requires a dramatic change in policy, systems and finance – we are duty-bound to achieve this.

Shaping the future of volunteerism: UP and UNV partner to develop first-ever Global Volunteer Index

The Department of Statistics at the University of Pretoria (UP) is partnering with United Nations Volunteers (UNV) to develop the first-ever Global Volunteer Index, which will become part of the 2026 State of the World Volunteerism Report.

The Report will benefit from the expertise of UNV partners — Northumbria University, under the umbrella of its Centre for Global Development, will lead research, writing, and analytical work, along with vital inputs from researchers from the Global South. The University of Pretoria will lead the development of a framework for a global volunteering index, and UNV's longstanding partner, the International Labour Organization will contribute updated data on global estimates of volunteer work.

The initial phase of this project focuses on developing a framework and methodology for calculating the Global Volunteering Index (GVI). This index will be featured in the upcoming edition of the State of the World's Volunteerism Report, scheduled for release in December 2025.

The Global Volunteering Index will provide a timely and standardised measurement of volunteerism across its critical multiple aspects. It will be a valuable analytical tool to assess people's voluntary contributions to the Sustainable Development Goals. Prof Samuel Manda, from UP's Department of Statistics, will lead the project as Project Director. Professor Sollie Millard, the Acting Head of UP's Department of Statistics, will serve as Senior Researcher. The project collaborates closely with Dr Tapiwa Kamuruko, Chief of the Voluntary Advisory Services Section, United Nations Volunteers (UNV), and his team.

By partnering with UNV, this project will anchor the University's standing as an international leader in translating cutting-edge statistical sciences research excellence into volunteering settings and practice.

Toily Kurbanov, Executive Coordinator, UNV, highlighted, "There is a scarcity of data on volunteers' value for sustainable development. To address this, UNV is collaborating with the University of Pretoria to generate data and create a Global Volunteering Index as part of the 2026 State of the World's Volunteerism Report. We hope the index will assist the Member States and all other stakeholders in continuously fine-tuning national priorities for volunteer action and inform the required investments in volunteerism."

Prof Barend Erasmus, Dean of the Faculty of Natural and Agricultural Sciences at UP, echoed these sentiments. "Collaboration between UNV and UP is another example of how UP's deep expertise and international profile support scientific outcomes for impact. In this case, the effect is twofold – not only do we partner with the UN to bring our expertise to bear on a shared problem, but the research itself is on how volunteers have a global impact.

According to Prof Manda, "The project will provide a valuable tool for measuring volunteer work and its impact on individuals, their personal development, communities, and national economies worldwide. I am thrilled that UNV has partnered with us on this initiative, which holds significant national, regional, and international relevance. This collaboration will enhance UP's reputation as a world-leading university in research, innovation, and translation, positively influencing communities nationally and globally. Furthermore, this project will support the development of the methodological framework and applied research in volunteerism," Prof Manda said.

A first of its kind, the project aims to develop a framework for the construction of the GVI. The framework will be an essential first step moving towards measuring global volunteering. The framework will contain background and concept, methodology, variations,

UN Volunteers interview community members to assess basic health services in the rural areas of Rwanda. ©UNV, 2023

and practical steps for constructing the GVI. The framework will be based on similar global initiatives, volunteer work indicators, and data sources. Extensive consultations with index developers and researchers, national and international volunteer work practitioners, stakeholders and policymakers will be conducted for the validation of volunteerism indicators, dimensions and measuring instruments. It will be pretested in several countries to assess its validity and usability, provide context and reflect gaps within the data collected in countries.

Tapiwa Kamuruko, Chief, Volunteer Advisory Services Section at the UNV, shared: "United Nations Volunteers is very excited to partner with academia for the next State of the World's Volunteerism Report 2026 – aimed at offering insights and approaches to measure the contributions and value of volunteering. We look forward to the research that will help answer important questions centring on linkages between volunteering and the wellbeing of an individual, and the value of volunteers to the economic and social development of their communities and societies."

Every three years, UNV produces the State of the World's Volunteerism Report (SWVR), a flagship UN publication designed to strengthen the understanding of volunteerism and demonstrate its universality, scope, and reach in the twenty-first century. Click here to read previous editions of SWVR.

Successful collaboration on Jameel Index after seminar

Prof Ken Strzepek, a Climate, Water and Food Specialist at MIT's Jameel Water and Food System Lab and Dr Greg Sixt, Director of the Food and Climate Systems Transformation (FACT) Alliance, an MIT J-WAFS-led global network of leading research institutions and stakeholder organisations working to shorten the link between research and action, recently addressed a seminar hosted by the Faculty of Natural and Agricultural Sciences (NAS) on the Jameel Index for Food Trade and Vulnerability project.

Both Prof Strzepek and Dr Sixt addressed members from several departments in NAS, introducing them to the Food and Climate Systems Transformation (FACT) Alliance. FACT is a global research network of over 20 member institutions (UP is a member, with the Dean of NAS, Prof Barend Erasmus, as the lead person for UP in FACT. The seminar focused on utilising collaborative, convergent research to address vexing food and climate systems challenges.

During the seminar, Prof Strzepek also introduced the Jameel Index for Food Trade and Vulnerability (Jameel Index).

The Jameel Index is designed to gain an understanding of historic behaviour, forecast near-term vulnerabilities, and project future vulnerabilities using models to project how future global change scenarios will impact global food production and trade. It generates food trade vulnerability scores for over 160 countries, analysing risks across eight major agricultural commodities (wheat, rice, soy, maize, dairy, meat, sugar, and cooking oils). It integrates indicators on import dependency, supply chain diversity, supply variability, and foreign exchange, offering a customisable, holistic platform to assess exposure to global food trade shocks. The Jameel Index aims to inform and guide global and local strategies for enhancing food security through diversified sourcing, policy alignment, and sustainable investment by translating complex global trade data into actionable insights.

A key outcome of the visit is that UP has joined the Jameel Index project as a FACT member and committed in-kind support through two master's students and a postdoctoral fellow. This was a catalyst for further collaboration, and UP is now included in the proposal for Phase 2 of the Jameel Index, which will include an analysis of food trade and BRICS countries.

Two NAS professors elected as Fellows of the African Academy of Sciences

Prof Paxie W. Chirwa and Prof Eugenie Kayitesi have recently been elected as Fellows of the African Academy of Sciences (FAAS).

Prof Chirwa, Chair of Forest Science in the Department of Plant and Soil Sciences, said, "This continental recognition celebrates my contributions to research, innovation, and development across Africa. This prestigious award is a recognition of my past achievements and a catalyst for further research collaboration, policy engagement, and knowledge-sharing throughout the African continent."

With more than two decades of experience spanning the public sector, international research institutions, and academia, Prof Chirwa has been a driving force in advancing science on the continent. His leadership has significantly fostered collaborative research, secured competitive funding, and contributed to high-impact scientific publications, reinforcing Africa's scientific capabilities.

Prof Chirwa is a member of the African Forest Forum and serves as Editor, Associate Editor, and Guest Editor for renowned journals such as *Agroforestry Systems, Journal of Forestry Research, Scientific African, and Southern Forests*. In 2023, he received South Africa's "Oscars of Science"—the NSTF/South32 Award—and the Exceptional Achievers Award from the University of Pretoria.

In 2025, Prof Chirwa continues to lead through mentorship as part of the AWARD Climate Action Fellowship, and he supports doctoral scholars through the Regional Scholarship and Innovation Fund (Rsif).

Prof Kayitesi, an Associate Professor in the Department of Consumer and Food Sciences, is also excited about being elected as a Fellow of the African Academy of Science. "It is a recognition of my contribution and commitment to advancing scientific knowledge and innovation in Agricultural and Nutritional Sciences. Being named a Fellow of the AAS is a significant honour, awarded to distinguished individuals who have made outstanding contributions to science, particularly in ways that have had a lasting impact on the continent."

She added, "As a Fellow, I will participate in the implementation of key science, technology, and innovation programmes, lead in evidence-based policy formulation, and engage with governments and policymakers to promote science, technology, and innovation on the continent. My election to this esteemed group highlights my dedication to excellence in research and my role as a leader in the academic community. The recognition by the AAS not only celebrates individual accomplishments but inspires students, researchers, and academics alike."

Prof Kayitesi has earned several awards in recognition of her contributions to science, notably, she was recently among seven women scientists from the Global South who received the 2023 OWSD-Elsevier Foundation Award for their scientific research contribution to Food Security. The prestigious award was presented to her during the 5th Global Food Security Conference, in April 2024, in Leuven, Belgium.

The AAS distinguished Scholars, elected through a rigorous and merit-based process, have demonstrated excellence in their respective fields and have significantly contributed to advancing science, technology, and scholarship in Africa and globally. The newly elected Fellows represent diverse academic disciplines, spanning the Academy's ten disciplinary clusters. Their election into the AAS Fellowship underscores their commitment to scientific excellence and dedication to addressing Africa's most pressing challenges through research and scholarship.

Academic achievers in Department of Chemistry shine at SACI awards ceremony

Several staff and students from the Department of Chemistry at the University of Pretoria received awards for academic excellence at the first Achievers Recognition Ceremony and Plenary Lecture of the South African Chemical Institute (SACI) North Section, hosted in March at the University of Limpopo.

Several staff and students from the Department of Chemistry received awards for academic excellence at the event.

Megan de Beer received the 2024 SACI James Moir Medal as the top performing Chemistry honours student at UP. Dr Luke Invernizzi was awarded a 2024 SACI Sasol Postgraduate Medal based on his PhD studies under Prof Vinesh Maharaj's supervision. Beyond his research, Luke had made significant contributions to education and community outreach.

Dr Rethabile Tekane (Chemistry Lecturer in the UP ENGAGE Five Year Engineering Programme) received the 2023 SACI Chemical Education Medal for her contributions towards a better understanding of student misconceptions in chemistry, the evaluation of models in teaching and learning, as well as research-informed teaching practices such as the blended learning teaching approach.

Prof Henrietta Langmi (DSI/NRF South African Research Chair (SARChI) in Advanced Materials and Sustainable Energy and Prof Patricia Forbes (Rand Water Research Chair) both received awards for being listed by Stanford University as among the World's Top 2% of Scientists in 2024. Prof Langmi's primary research interests include hydrogen storage, porous materials, green chemistry and carbon dioxide capture and utilisation; whilst Prof Forbes leads the Environmental Monitoring and Sensing research group which focuses on the development of novel sampling and analytical methods for environmental pollutants, including polycyclic aromatic hydrocarbons, pesticides, mercury and emerging chemical pollutants.

To top it all, Prof Patricia Forbes also gave the plenary talk at the event entitled "Chemistry lights the way to sustainable energy provision". The presentation highlighted the pivotal role chemistry has to play in addressing the global energy challenge, including contributing towards determining the impacts of fuel combustion in terms of air pollution, global warming and climate change; and on the other hand, enabling the development of less polluting technologies for energy provision and storage. The need for developing economies to map the way to a just energy transition was also discussed, with examples of the contributions of analytical chemistry to evaluating different energy options. The talk clarified that collaborative transdisciplinary research efforts are needed to achieve the goal of clean, sustainable energy.

The event aimed to inspire the next generation of chemistry academics and researchers, in addition to celebrating successes, which was achieved by the attendance of undergraduate chemistry students from the host institution.

Prof Patricia Forbes (middle) receiving her award from SACI members.

Prof Henrietta Langmi (middle) receiving her award from SACI members.

Academic achievers in Department of Chemistry at the SACI awards ceremony.

Chané Pretorius

PhD candidate in Food Science wins prestigious Brian Koeppen scholarship

Chané Pretorius, a PhD candidate in Food Science, recently received the Brian Koeppen Memorial Scholarship from the South African Association of Food Science and Technology ( ) for furthering her doctoral studies.

This scholarship, based on academic excellence, is in honour of the late Prof Brian Koeppen, who headed Stellenbosch University's Department of Food Science until 1980. Only one PhD student at a South African university that offers degrees in Food Science or Food Technology is eligible for this scholarship annually.

"Being awarded the SAAFoST Koeppen Memorial Scholarship is a tremendous honour, and I am deeply grateful. On a personal level, I never imagined I could be worthy of such recognition, especially since balancing academics and becoming a mom at the start of my PhD journey has been a challenge. But through perseverance and faith, I've learned not to underestimate my capabilities. Professionally, this scholarship inspires me to keep pushing boundaries and strive toward making a meaningful impact in my industry, Chané explains.

One of her recent achievements was presenting an academic poster at the International Dairy Federation's (IDF) World Dairy Summit in Paris, France, in 2024. "In 2024, I became a member of the IDF's Standing Committee on Food Hygiene to engage with leading professionals in the field and gain valuable insights into global dairy issues."

During her master's studies, she presented at the 2017 SAAFoST Biennial Congress in Cape Town and the South African Society of Dairy Technology's (SASDT) Symposium in 2018. She graduated with an MSc in Food Science from UP at the end of 2018, after which she joined the Dairy Standard Agency. In 2021, she was elected the postgraduate Student of the SASDT for 2020.

Chané concluded, "I hope this achievement can inspire me to not let circumstances in life stand in the way of achieving academic goals and to have faith above all else."

Laréna Oosthuizen scoops up Pieter van Twisk Award in Food Science

Laréna Oosthuizen, a recent UP graduate in Food Science, is the recipient of the Pieter van Twisk Academic Achievement Award from the South African Association for Food Science and Technology (SAAFoST) for the most outstanding final-year student in BSc Food Science.

"Receiving this Award is a major honour for me, personally and professionally. It's a reminder that the hard work, long hours in the lab, and countless study sessions were all worth it. To be recognised by SAAFoST — an organisation I am proud to be part of as a Food Scientist — is incredibly encouraging and motivates me to keep pushing myself in this field of study."

She added, "On a professional level, this award represents more than just academic success; it signifies my potential to contribute meaningfully to the food science industry in South Africa and beyond, to develop new techniques and products that will lighten the burden of food insecurity. It shows that I'm on the right path and can make a meaningful contribution to the industry. Being recognised as one of the top-performing students in my year motivates me to pursue further studies and professional opportunities with even greater innovation and responsibility."

Laréna graduated with a BSc in Food Science (with distinction) in May and was also the recipient of the SAAFoST undergraduate bursary, which supported her academic journey and deepened her connection to the food science community in South Africa. "Besides theoretical learning, I gained hands-on laboratory experience through extensive practicals and food science projects, ranging from shelf-life testing and colour analysis to microbial plating techniques and new product development. I also completed internships at MJ Labs and Formulation Creations, assisting in flavour matching, formulation, and product development. My internship at Woodlands Dairy offered valuable insight into industrial microbiological testing and laboratory operations. These experiences have strengthened my scientific foundation, teamwork, and technical skills, and inspired me to contribute meaningfully to the food industry through research, innovation, and quality improvement."

Laréna concluded, "Reflecting on how far I've come, especially when I wasn't sure I would make it, fills me with deep gratitude. First and foremost, I want to thank my Lord and Saviour, Jesus Christ, for granting me the ability and opportunity to study and for being my rock through every challenge. I am incredibly grateful to my parents, family, and friends for their unwavering support, constant encouragement, and for always believing in me and showing up when it mattered most. To SAAFoST, thank you for the financial support and motivation through this award, and for creating valuable opportunities that connect students like me to the food industry. I also want to express my appreciation to UP's Department of Food Science and my lecturers — thank you for the knowledge you share, the dedication you show, and the guidance you offer," she concluded.

Laréna Oozthuizen

NAS researchers lead the way in 2024/25 NSTF finalists list

Ten of the fourteen University of Pretoria (UP) finalists for the 2024/2025 National Science and Technology Foundation (NSTF) Awards hail from the Faculty of Natural and Agricultural Sciences (NAS).

The NAS researchers are Prof Nigel Bennett, Prof Lise Korsten, Prof Tjaart Kruger, Prof Namrita Lall. The Department of Animal Science and the Mammal Research Institute (MRI) Whale Unit is also on the list of NSTF finalists.

Prof Lise Korsten (Department of Plant and Soil Sciences) is a finalist in four categories. She and Prof Nigel Bennett (Department of Zoology and Entomology) are finalists in the Lifetime Award category.

Prof Korsten is also a finalist for the NSTF-Water Research Commission (WRC) Award, the Science Diplomacy for Africa Award, and the NSTF-Agricultural Research Council (ARC) Award.

Prof Tjaart Krüger (Department of Physics) is also a finalist in two categories: TW Kambule– NSTF Awards: Researchers and the Special Annual Theme Award: Quantum Science and Technology.

The **Mammal Research Institute (MRI) Whale Unit (Dr Els Vermeulen)** is a finalist in the Data for Research Award, and **Prof Namrita Lall** (Department of Plant and Soil Sciences) is a finalist for the Innovation Award: Small, Medium and Micro Enterprise (SMME)

Other nominations from NAS were:
Dr Samkelo Malgas (Department of Biochemistry, Genetics and Microbiology) and **Dr Alseno Mosai** (Department of Chemistry) were nominated in the TW Kambule-NSTF Awards: Emerging Researchers Category. **Prof Hettie Schönfeldt** (Department of Animal Science) and **Prof Martin Steyn** (Department of Plant and Soil Sciences), were also nominated for the NSTF-Agricultural Research Council (ARC) Award.

The awards honour and celebrate outstanding contributions to science, engineering and technology (SET), and innovation. They aim to recognise professional, innovative research that helps to provide solutions to the challenges of South Africa's socio-economic growth in a sustainable manner to improve people's lives.

The 2025 NSTF theme is Quantum Science and Technology and in alignment with the United Nations (UN) proclamation of 2025 as the International Year of Quantum Science and Technology. The NSTF is making a special award this year for an outstanding contribution to SET and innovation through quantum science and technology in SA. The 27th annual Awards Gala Event taking place on 31 July 2025.

Department of Animal Science

Internationally renowned Prof Nigel Bennett celebrates more than 500 publications

Professor Nigel Bennett, the current Austin Roberts chair of African mammalogy and past DSTI-NRF chair of Mammal Behavioural Ecology and Physiology, celebrated his 500th publication in October 2024.

When asked about reaching this milestone, he replied, "Never in my wildest dreams did I think I would be an author on this number of publications; it has been the result of a huge amount of work and determination".

Prof Bennett has published with over 100 of his close international and national colleagues that span the continents of Africa, Europe, Asia, America and Australasia.

"Each publication represents a fascinating study exploring how species function and survive, often in quite inhospitable environments," Prof Bennett says.

"Each piece of work brings back memories of working with either a student or a research colleague and the fun they had collecting data". Much of the research has involved field work in beautiful and remote regions. Indeed, Prof Bennett says "that each paper has resulted in a long-term friendship with his co-author (s) and this has been important".

On a professional level, it represents a highlight in his career, but personally, he is just excited that he has managed to share the research with the scientific community. His passion is nurturing and training up research students and sharing his wealth of knowledge on African mole-rats, for which he was acknowledged by the university with the Exceptional Supervisor award.

Prof Bennett has been awarded the University of Pretoria (UP) Chancellor's Medal for his research on four occasions and received the Exceptional Academic Achiever Award for the past twenty years. He is a fellow of the Zoological Society of London, a fellow of the Royal Society of South Africa, a member of the Academy of Sciences of South Africa, and a Fellow of the African Academy of Sciences.

He has been the recipient of the Gold Medal from the Zoological Society of Southern Africa and the Havenga Prize for outstanding contributions to Life Sciences, awarded by the Academy of Science and Arts of South Africa. The University of Pretoria awarded him the UP Commemorative Research Medal for being one of the top 100 scientists in 100 years of its existence. In 2021, he was made an honorary member of the American Society of Mammalogists (fewer than one hundred luminaries have been awarded this title in a century). In 2022, Prof Bennett received the prestigious JFW Herschel Medal from the Royal Society of South Africa for his outstanding contribution to research on African mammals.

Prof Bennett has now published 510 papers and has a Web of Science h index of 53 and a Google h index of 64. He says this is "not too bad for a mammologist that has a small research group", but is quick to comment that the metrics are not important to him, what really matters is that his job has in effect been a hobby and as he quite rightly states it is rare for someone to be paid for a hobby! Bennett's two passions in life are African mole rats and mountain and eastern lowland gorillas. He loves to travel to Rwanda, Uganda and the eastern Democratic Republic of Congo to see the magnificent gorillas of central Africa.

Prof Cobus Visagie receives prestigious Johanna Westerdijk Award

Prof Cobus Visagie from the Department of Biochemistry, Genetics and Microbiology and the Forestry and Agricultural Biotechnology Institute (FABI) recently received the prestigious Johanna Westerdijk Award for outstanding contribution to the culture collection of the Westerdijk Fungal Biodiversity Institute in the Netherlands.

The Award is presented on special occasions to an individual who has made an outstanding contribution to the culture collection of the Institute, marking a distinguished career in mycology. Nominees are evaluated on the quality of their contributions to the collection and based on associated mycological research in general.

"It was a great honour to receive the Johanna Westerdijk Award. As a mycologist whose research is strongly focused on fungal biodiversity and taxonomy, it is part of my job to develop culture collections into national and international assets and make these reference strains available to other researchers to study their biology, ecology and many other aspects."

He added, "On a personal level, receiving this award from an institute that played a big role in my life was extra special. It was the place where I completed a postdoctoral fellowship, met my life partner, did a sabbatical, and where many of my close friends and collaborators work," Prof Visagie explained.

Prof Visagie has received significant recognition for his research outputs. The taxonomy he has helped to create for *Eurotiales* has made it easier than ever for the community to identify important species classified in *Aspergillus* and *Penicillium*, and resulted in the description of 100's of species since. He introduced names for 209 fungal species, including 103 *Penicillium*, 59 *Aspergillus*, 23 *Talaromyces*, and many others, most of which were from South African environments. The NRF recently awarded him a B3 rating after holding a P-rating.

Prof Cobus Visagie

He also helps manage the culture collection of FABI which is a recognised BioBank in the National Science Collections Facility (NSCF) of South Africa. Furthermore, he co-directs the National Grain Research Platform (NGRP). The NGRP connects stakeholders from academia, industry and government, with a vision to drive fundamental and solution-oriented research that supports South Africa's food security and bioeconomy.

Dr Baloyi attend FEBS-Enable Conference 2024

Dr Itumeleng Baloyi

Dr Itumeleng Baloyi, a postdoctoral fellow from the Bio-catalysis and Processing group in the Department of Biochemistry, Genetics and Microbiology, received the IUBMB Millipore Sigma ENABLE-Africa Fellowship to attend the FEBS-Enable Conference at the end of 2024. It took place at the Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore.

This USD 2,000 fellowship allowed her to attend this prestigious international event. The conference brought together PhD students and postdoctoral fellows from around the world to explore cutting-edge developments under the theme *Artificial Intelligence: Reshaping Biomedical and Healthcare Research*.

Dr Baloyi presented a flash talk and a poster on *α-Glucosidase inhibitory potential of Citrus reticulata peel-derived flavonoids – a prelude for the management of type 2 diabetes*. This study investigated the potential therapeutic effects of flavonoids from citrus peels by inhibiting amylolytic enzymes and understanding their mechanism of action through *in vitro* and *in silico* approaches.

The conference provided an excellent platform for sharing her findings with a global audience and engaging in thought-provoking discussions with fellow researchers and professionals. During the poster session, she had the opportunity to engage in one-on-one conversations with attendees, fostering deeper exchanges of ideas and providing new perspectives on our approach. The event offered a fantastic networking opportunity, featuring a career day that included sessions on career sharing and workshops focused on career planning and funding opportunities. The diverse group of participants created a rich environment for exchanging ideas and learning about research conducted in various regions worldwide. This experience has deepened her understanding of global challenges in biomedical research and broadened her horizons.

Dr Baloyi's participation in the FEBS-Enable Conference 2024 has been invaluable, both in terms of expanding her professional network and gaining new perspectives in biomedical research. She is excited to continue a journey of discovery, driven by the knowledge she has gained and the inspiring interactions she has had with so many talented researchers. Dr Baloyi sincerely appreciated the incredible opportunity provided by her postdoctoral fellowship host, Dr Samkelo Malgas, FEBS-Enable and the University of Pretoria.

NAS excels at annual Academic Achievers Awards

Department of Consumer and Food Sciences

Researchers in the Faculty of Natural and Agricultural Sciences (NAS) displayed excellence again in the academic arena at the annual University of Pretoria's (UP) Academic Achievers gala event at the end of 2024, with their exceptional achievement.

Prof Jacek Banasiak (Department of Mathematics and Applied Mathematics) and Prof Namrita Lall (Department of Plant and Soil Sciences) were awarded Exceptional Academic Achievers, while Dr Chimere Anabanti (Department of Mathematics and Applied Mathematics) and Dr Samkelo Malgas (Department of Biochemistry, Genetics and Microbiology) walked away with Exceptional Young Researchers awards.

Dr Carel Oosthuizen (Department of Zoology and Entomology) scooped up a Teaching Excellence Award, and Dr Colleta Gandidzanwa (Department of Agricultural Economics, Extension and Rural Development) won The Conversation award for science communication as the UP author with the single most-read article.

The Department of Consumer and Food Sciences won a new award – The *RE.SEARCH* magazine award. This award is for consistently communicating their science and research by providing submissions relating to the theme of each edition and being published over the preceding academic year.

Prof Jacek Banasiak

Prof Namrita Lall

Dr Chimere Anabanti

Dr Samkelo Malgas

Dr Colleta Gandidzanwa

Dr Carel Oosthuizen

Four NAS Professors on Clarivate Web of Science Highly Cited Researchers list for 2024

Prof Mike Wingfield

Prof Pedro Crous

Prof Yves van de Peer

Prof Rashid Sumaila

Four professors affiliated with the Faculty of Natural and Agricultural Sciences (NAS) are on the Clarivate Web of Science Highly Cited Researchers list for 2024. Prof Mike Wingfield, Prof Pedro Crous, Prof Yves van de Peer and Prof Rashid Sumaila.

It is the eighth consecutive year that Prof Mike Wingfield, Founding Director of the Forestry and Agricultural Biotechnology Institute (FABI) and Advisor to the UP Executive, is included on the Clarivate Web of Science Highly Cited Researchers list. This is a significant achievement and recognition of Prof Wingfield's passion for plant pathology and tree health. He is one of only eight South African academics to be included on the list of 6 886 researchers recognised globally for their excellence in their respective fields and the only permanently appointed staff member at the University of Pretoria included on this year's list.

Two more Extraordinary Professors in the Department of Biochemistry, Genetics and Microbiology and the Forestry and Agricultural Biotechnology Institute (FABI), Prof Pedro Crous of the Westerdijk Fungal Biodiversity Institute and Prof Yves van de Peer of Ghent University, are also included on the recent list.

Another world-renowned researcher and extraordinary professor from NAS, Prof Rashid Sumaila of the University of British Columbia (UBC), is also on the Clarivate Web of Science Highly Cited Researchers list. He is an extraordinary professor in the Department of Agricultural Economics, Extension and Rural Development.

Highly Cited Researchers have demonstrated significant and broad influence in their field of research. Each researcher selected has authored multiple Highly Cited Papers, ranking in the top 1% by citations for their field and publication year in the Web of Science over the past decade.

Dr Karuaihe moderated sessions at SA MACS-G20 National Dialogue

Dr Selma Karuaihe from the Department of Agricultural Economics, Extension and Rural Development was recently invited to moderate sessions of the G20 National Dialogue towards the Agricultural Working Group engagement and the G20's Meeting of Agricultural Chief Scientists (MACS-G20).

The Agricultural Research Council (ARC), in partnership with the Department of Agriculture, and the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), held the G20 National Dialogue towards the Agricultural Working Group engagement and the G20's Meeting of Agricultural Chief Scientists (MACS-G20) on 18 March 2025. This event was held at the Agricultural Research Council Vegetable Industrial and Medicinal Plants Institute (ARC-VIMP) facility in Pretoria.

Dr Karuaihe moderated two of the themes, focusing on: Reinforcing Climate Smart Agriculture for resilience, mitigation, and early warning systems; and Building resilient Agricultural bio-economies in Africa. The dialogue unpacked key questions identified as crucial to assist South Africa, holding the current Presidency of the G20, in its preparation towards hosting the G20 meetings later this year.

The primary objectives of the National Dialogue were to discuss the priorities identified in the issue note for South Africa's G20 Agriculture Working Group (AGW) and strengthen South Africa's policy and research position within international agricultural science fora. Furthermore, it also aimed to contribute towards prioritising key thematic areas for discussion in the MACS-G20, elaborating key issues under each theme, and enhancing collaboration between researchers, policymakers, and industry stakeholders to align national research priorities with global trends.

Dr Karuaihe's presence at the event shows the University and the Department's commitment and role in guiding national and global policy debates, using its capacity for diverse skills to offer high-level expertise on topical issues.

Dr Selma Karuaihe

Follow at: https://x.com/DrSelmaK/status/1903117206763810915

Three NAS researchers receive prestigious NRF-ratings

Prof Andrew McKechnie

Prof Andrew McKechnie, Professor in the Department of Zoology and Entomology and the holder of the South African Research Chair in Conservation Physiology (co-hosted by the South African National Biodiversity Institute and UP), was recently awarded a prestigious A2-rating by the National Research Foundation (NRF), becoming the eighth A-rated researcher currently in the Faculty of Natural and Agricultural Sciences (NAS).

Another feather in the cap for the Faculty is Dr Daniel Hart, also from the Department of Zoology and Entomology, who received a P-rating, with Prof Mike Wingfield, Founding Director of the Forestry and Agricultural Biotechnology Institute (FABI)) and Advisor to the UP Executive, receiving his A1-rating for the sixth consecutive time.

Prof McKechnie states,

"Receiving an A-rating is my major career highlight. I am thrilled that the research programme I have built with my collaborators, postdocs and students has been recognised in this way."

"It is deeply gratifying to know that colleagues worldwide consider our work at the field's cutting edge. Climate change has profound negative impacts on global biodiversity, and I am one of many scientists trying to predict (and hopefully, find ways to mitigate) these effects on birds and other animals. Receiving this rating tells me that my team and I are making a difference," Prof McKechnie said.

As a thermal physiologist by training, he co-leads the Hot Birds Research Project (HBRP), a research programme that seeks to understand and predict the impacts of climate change on birds both within southern Africa and globally. The physiological and behavioural focus of the HBRP has expanded in recent years to include new areas such as biophysical modelling, ecotoxicology, vegetation modelling and molecular work on heat shock proteins. No fewer than four PhD graduates from the HBRP have gone on to permanent academic positions at research-intensive South African universities.

Prof McKechnie's outputs include ~170 papers in peer-reviewed journals, which over the last five years have included papers in *Proceedings of the National Academy of Sciences*, *Nature Communications* and *Science*. He is a Subject Editor for the high-impact journal *Global Change Biology* and serves on two IUCN Species Survival Commission specialist groups. An elected Honorary Fellow of the American Ornithological Society since 2022, he is also a Fellow of the Royal Society of South Africa and a Member of the Academy of Science of South Africa.

Dr Daniel Hart

Dr Hart was also elated about the fantastic news. "Receiving a P-rating is profoundly meaningful to me on both a personal and professional level. It marks the culmination of an eight-year journey defined by dedication, perseverance, and the unwavering support of my mentors, especially Prof Nigel Bennett, to whom I am deeply grateful," Dr Hart said.

"Personally, it reflects years of sacrifice, not only my own, but also that of my loved ones, as I remained focused on achieving this long-term goal. Professionally, it is a significant honour to be recognised by a panel of national and international experts in my field. I hope this recognition will help elevate the profile of African mammals as a vital source of evolutionary insight, conservation importance, and biomedical promise," Dr Hart concluded.

Dr Hart received the NSTF TW Kambule-NSTF Award for Emerging Researchers for 2022/2023. This award recognises significant research contributions and outputs within the first six years of a research career, primarily conducted in South Africa. In 2024, he was appointed full-time lecturer in the Department of Zoology and Entomology. His recent work has been published in high-impact, peer-reviewed journals including Science, Nature Aging, and Nature Communications.

Prof Mike Wingfield

Prof Wingfield shared that he received his first NRF rating – a President's award (P) in 1988, amazingly 37 years ago. He noted that having been through the NRF rating system eight times and received an A-rating six consecutive times felt somewhat unreal, yet appreciated.

"I am also passionately committed to pursuing every possible opportunity to promote research excellence at UP, directly as an advisor to UP Executive and through mentorship of young faculty and students."

A-rating

Researchers who their peers unequivocally recognise as leading international scholars in their field for the high quality and impact of their recent research outputs.

P-rating

Young researchers (usually younger than 35 years of age), who have held the doctorate or equivalent qualification for less than five years at the time of application and who, based on exceptional potential demonstrated in their published doctoral work and/or their research outputs in their early postdoctoral careers are considered likely to become future international leaders in their field.

The strong research ethos of the Faculty is re-emphasised by the fact that more than 200 NAS scientists are formally recognised by the NRF peer evaluation system for the high quality and impact of their research, nationally and internationally. Our academics and researchers are internationally recognised as leaders in their respective fields. The Faculty currently boast eight NRF A-rated researchers: Prof Nigel Bennett, Prof Don Cowan, Prof Pedro Crous, Prof Andrew McKechnie, Prof James Raftery, Prof Yves Van de Peer, Prof Brenda Wingfield and Prof Mike Wingfield.

ENHANCED ACCESS AND SUCCESSFUL STUDENT LEARNING

NAS proudly hosted two inaugural addresses

Prof Chris Weldon and Prof Irene Barnes delivered their inaugural addresses during the first few months of 2025. We are very proud of them, as this is a significant achievement in a researcher's career.

Understanding bug behaviour to tackle Africa's food challenges – Prof Chris Weldon delivers inaugural lecture

A thorough understanding of insect physiology and ecology can influence sustainable farming practices throughout Africa in the future. This idea formed the basis of the recent inaugural lecture delivered by Professor Christopher Weldon, an entomologist in the Department of Zoology and Entomology at the University of Pretoria (UP).

Titled "Using Insect Behaviour and Temperature Responses for Precision Pest Management and African Food Security", Prof Weldon's impactful address focused on how better knowledge about the biology of tiny pests could solve some of Africa's most significant agricultural challenges.

"Africa's population is surging toward 3.8 billion by the century's end, and the demand for nutritious food will increase too," he said. "But this doesn't have to come at the expense of ecosystems. If we can manage insect pests with greater precision, we can simultaneously protect food systems, biodiversity and livelihoods."

The primary focus of his research is on developing better, more sustainable pest management approaches, taking into account insect behaviour, temperature sensitivity, water requirements and nutrition. Using this information, Prof Weldon and his research team create biologically-based control plans, surveillance systems and forecasting models to reduce the harm that pest species like thrips, fruit flies and citrus psyllids cause. Consider the Mediterranean fruit fly (*Ceratitis capitata*), one of the world's most widely distributed and damaging agricultural pests. According to Prof Weldon, these insects rot fruit from the inside out using their gut microbiota, making it unmarketable before it leaves the farm. They spread quickly; under the right conditions, they can produce up to 12 generations in a year, he explained.

"We must comprehend the biology of pests to effectively control them," Prof Weldon said. "To effectively control pests, we need to understand their biology in detail – everything from their mating behaviours and thermal tolerance to how they respond to lures and environmental cues."

Temperature is critical. It has an impact on every aspect of insect life, including metabolism, reproduction and flight activity. According to his team's research, insect populations exhibit varying behaviours based on their local environments, necessitating customised solutions. To reduce pesticide use and its adverse effects on the environment, Prof Weldon's laboratory can now identify pest hotspots and vulnerable periods through machine learning and spatial mapping.

His academic accomplishments outside the lab are equally remarkable: he's had more than 80 peer-reviewed journal articles published and has an H-index of 24. Prof Weldon has also supervised 18 master's students (six with distinction) and seven PhD candidates,

From left: Prof Loretta Feris (Vice-Principal: Academic), Prof Chris Weldon and Prof Barend Erasmus (Dean: Faculty of Natural and Agricultural Sciences)

The Mediterranean fruit fly, also called Ceratitis Capitata

mentoring them in his core areas of expertise and across diverse research interests. He attributes much of his success to his collaborators, students and the farming communities that allow him access to their land for research trials.

The lecture concluded with reflections on future goals, including advancing the sterile insect technique and exploring how climate change could affect pest physiology and food production systems.

"We're just scratching the surface," Prof Weldon said. "But if we keep asking the right questions – and listening to the insects – we might find smarter, more sustainable answers."

Prof Irene Barnes addresses forest threats through genetic research

From left: Prof Loretta Feris (Vice-Principal: Academic), Prof Bernard Slippers (Director: FABI), Prof Irene Barnes, Prof Barend Erasmus (Dean: Faculty of Natural and Agricultural Sciences) and Dr Pam de Waal (Acting Head: Department of Biochemistry, Genetics and Microbiology).

On 9 April 2025, the University of Pretoria (UP) proudly hosted the inaugural lecture of Professor Irene Barnes, a world expert in forest pathology. The lecture marked a major professional milestone – she was promoted to full professor in the Department of Biochemistry, Genetics and Microbiology (BGM) in the Faculty of Natural and Agricultural Sciences.

The lecture "Strengthening Forest Health through Population Genetic Insights and Global Networks" culminated an incredible 25-year career in research and academia. In her address, Prof Barnes demonstrated how her work in genetics and related science protected forest ecosystems in South Africa and globally from invasive pathogens that are destructive to forests.

"As a constant threat to forests everywhere, pathogens of trees are easily spread around the world because of the international movement of plants," Prof Barnes explained. She described how invasive tree pathogens can be followed through a multi-staged process of introduction, colonisation, establishment, and spread, and how each stage leaves a distinct genetic fingerprint. By examining disease patterns, scientists can understand how pathogens disperse, which can assist in developing specific and effective biological invasion responses.

Prof Barnes began her career developing molecular detection tools to study invasive species. Her research involves sophisticated DNA sequencing and population genomics genetic studies to determine how pathogens move and change over time because of their relevance to sustainable forest management. Her studies on tree diseases like Ceratocystis wilt and Dothistroma needle blight have advanced the development of local and international disease mitigation frameworks.

As part of the welcome address, the Vice-Principal: Academic, Prof Loretta Feris, congratulated Prof Barnes on being a remarkable scholar and for her dedication and investment towards teaching future scientists. She highlighted that Prof Barnes has 125+ peer-reviewed journal articles and three book chapters, and 54 postgraduate students supervised—152 of whom she currently supervises.

"As the first Forestry and Agricultural Biotechnology Institute (FABI) honours student, Prof Barnes's life is a testament to the limitless possibilities of a global scientist and a leader ever since," Prof Feris added. In addition to her roles at UP, Prof Barnes holds key positions in several international scientific organisations, including executive council membership in both the International Mycological Association and the African Mycological Association. She also has a managerial position in the International Union of Forest Research Organizations (IUFRO). At FABI, she is a research leader in the Tree Protection Co-operative Programme and RGE-FABI Tree Health Programme, and runs the Kiwifruit Protection Programme.

Prof Barnes also focused on the role of collaboration, be it scientific or interpersonal, in achieving a well-rounded research career. "My career is built on teamwork," she remarked. "The endeavour of dealing with global forest health challenges is highly cooperative."

Concepts revolving around the socio-scientific commitment of UP were also discussed in relation to supra-regional problems. In this case, Prof Barnes emphasised working on protecting and securing forest and food resources, as well as biodiversity, through her research on the genetics of pathogenic invaders, the preservation of biodiversity, and the resilience of long-term ecosystems.

At the end of her talk, it became evident that Prof Barnes's impact goes far beyond scholarly publications. She is developing the field of forest health science, training the next generation of scientists, and creating international networks vital to long-term environmental sustainability through her creative research and leadership.

NAS career expos foster South Africa's future scientists

Swami Vivekananda, an Indian philosopher, once said, "If the poor boy cannot come to education, education must go to him."

This philosophy drives the Faculty of Natural and Agricultural Sciences (NAS), actively bringing career guidance and academic opportunities to learners across South Africa.

February 2025 saw NAS engaging with Grade 9 to 12 learners across Gauteng and KwaZulu-Natal, offering insights into the University of Pretoria (UP)'s courses, career paths, and available support structures.

The career expos for 2025 began early February in Pretoria, with Hoërskool Waterkloof hosting the first event, drawing learners from surrounding schools. Hoërskool Menlopark, Hatfield Christian School, Sutherland High School, and Afrikaanse Hoër Meisieskool, Pretoria, were next on the list. Each event buzzed with enthusiastic students eager to explore their futures and engage directly with Faculty representatives.

At the end of February, a joint team from NAS and the Faculty of Engineering, Built Environment and Information Technology (EBIT), consisting of Faculty experts and marketing representatives, embarked on a recruitment drive in KwaZulu-Natal. The week kicked off in Pietermaritzburg with a career expo at Carter High School, where over 500 learners participated in interactive sessions. That same evening, Durban Girls' High School hosted a parents' session, where the Dean of NAS, Professor Barend Erasmus, outlined the Faculty's offerings. The UP team continued their recruitment trip at Durban Girls' High and welcomed Grade 9 to 12 learners from surrounding schools for another well-attended expo. The tour concluded at Hoërskool Richards Bay with a parents' evening and a career expo. NAS reached more than 30 KwaZulu-Natal schools, inspiring future scientists.

As part of the recruitment drive in KwaZulu-Natal, an alumni event was hosted in Durban with Prof Francis Petersen, sharing his vision as the fourteenth Vice-Chancellor of the University. Alumni from the faculties of NAS, EBIT and Veterinary Science enjoyed the evening while University representatives updated them on the latest developments at their alma mater.

On 15 March, NAS, in partnership with JuniorTukkie and EBIT, moved their recruitment efforts to Flora Park High School in Polokwane. Over 800 learners from the Capricorn District attended, gaining exposure to university life, Faculty programmes, career opportunities, and scholarships.

Through these initiatives, NAS remains committed to ensuring that education reaches those most in need. Bill Frist, Physician and former Majority Leader of the United States Senate, once said, "Every child should have the opportunity to receive a quality education." The Faculty of Natural and Agricultural Sciences upholds this mission, fostering South Africa's next generation of scientists and innovators.

Collaboration agreement between EHEDG and Department of Consumer and Food Sciences adds competitive edge

A collaboration agreement between the European Hygienic Engineering and Design Group (EHEDG) and the University of Pretoria (UP) marks a significant milestone in the food safety/hygiene education field in South Africa and Africa. This agreement is even more noteworthy because UP is the first African university to sign up for this.

This agreement was further cemented with a recent lecture on hygienic design for final-year Food Science students. Indeed, a big step forward for food safety education in the region.

Peet Grobler, Chair EHEDG Regional Section South Africa and Authorized Trainer, explains that "By integrating hygienic design modules into the University's Food Engineering third-year and postgraduate curriculums, both institutions are paving the way for a new generation of food scientists and food engineers in Africa who are well-prepared to address the critical issues of hygiene and food safety. By including specialised modules on hygienic design ensures that students are equipped with the technical skills needed and gain in-depth understanding of how hygienic principles and practices are implemented to contribute to the efficiency, safety, and sustainability of the food processing industry."

He added, "Subject matter experts and authorised trainers certified by EHEDG are involved in teaching and guiding the students, ensuring they are exposed to the latest technology and best practices in hygienic design. The content of these modules goes beyond theoretical knowledge, offering students practical insights and hands-on learning experiences."

EHEDG's efforts in education have been instrumental in spreading the importance of hygienic design worldwide across several continents, with contributions from major stakeholders in various food science and engineering disciplines. To empower and cultivate the inclusion of a new generation of hygienic design leaders, fostering innovation and collaboration to revolutionise the industry, EHEDG recently launched their GenEHEDG initiative, and UP is at the forefront of this remarkable project with two other international universities from Vienna and Cardiff.

According to Prof Gyebi Duodu, Head of the Department of Consumer and Food Sciences, "This will equip students with essential skills directly applicable to their future careers in the food industry. These skills are critical, as food safety regulations are becoming stricter, and companies are increasingly prioritising hygienic design to minimise the risk of product contamination. It helps future professionals understand the vital link between hygienic design and food safety by embedding hygienic design principles within the programme. Graduates with expertise in hygienic design are highly sought after by food manufacturers, equipment suppliers, and consultancy firms," Prof Duodu explained.

Mr Grobler concluded, "Educating students in hygienic concepts and principles so they understand the importance of hygienic design will certainly contribute to more sustainable and efficient food production processes. This collaboration has the potential to grow beyond the current scope, and there are opportunities for developing additional modules or courses that focus on emerging trends in food safety, sustainability, and innovative food processing technologies."

Prof Duodu emphasised that 'The partnership with EHEDG enhances the University/Department's reputation as a leader in food science and food engineering education. It also strengthens the relationship between academia and industry, creating further research and development opportunities."

Prof Gyebi Duodu

Mr Peet Grobler

NAS Extended Programmes now hosted on Hatfield Campus

A new chapter for the BSc Extended Curriculum Programmes (ECPs) started in 2025, welcoming the latest cohort of BSc four-year and BScAgric five-year programmes to the Hatfield Campus.

The Faculty of Natural and Agricultural Sciences (NAS) has been involved in the offering of BSc (ECPs) since 2008, with the first two semesters based at Mamelodi Campus and the third and later semesters at Hatfield Campus. At the end of the second year, students had to apply for a transfer to a mainstream degree of their choice.

Prof Paulette Bloomer, Deputy Dean of Teaching and Learning at NAS, explained that, "While students in the ECPs benefitted from excellent facilities, the team of dedicated lecturers and professional support staff, smaller class sizes and time to master content at Mamelodi Campus, many students struggled with the demands of travel between the two campuses, the transition from the Mamelodi Campus to the Hatfield Campus between year one and two, and the challenges of adapting to the Hatfield campus in their third semester. In addition, the compulsory transfer to a different degree programme after the first two years had negative NSFAS funding implications for the students."

The programme targets successful matriculants from under-resourced (quintile 1 and 3) schools, who have, despite the disadvantages, obtained APS scores and subject-specific achievements, which are just below the requirements of mainstream entry into the BSc and BScAgric studies, Prof Barend Erasmus, Dean of NAS, said," These foundational programmes are designed to allow scholars who have the ability, but did not have the advantage of attending a well-resourced high school. We have many examples of successful students going on to impactful careers."

Prof Bloomer added, "The new first-year curriculum is foundational, with modules in Biology, Chemistry, Physics, Mathematics and Statistics, as well as the fundamental Academic Information Management and Language and Study Skills modules. The new cohort will build on this foundation in year two with the full year of 100-level regular modules. Ideally, students will graduate in the specialisations they first enrolled in (eight BSc and two BScAgric options). At the end of year two , transfer opportunities will still be available for students who excelled and who may have discovered a different academic passion they want to pursue."

"The 2025 academic year for the foundation programmes began with all academic activities centralised on the Hatfield Campus. Lecturers can now attend departmental meetings on campus without the need to travel from Mamelodi. Eliminating the commute between Hatfield and Mamelodi has freed up valuable time, allowing for more hours in the timetable, benefiting lecturers, tutors, and students. My impression of the first quarter of the foundation programmes on Hatfield Campus was a smooth integration," Dr Jeanine Mwambakana-Mutombo, Head of Academic Programmes for NAS and the Faculty of Economic and Management Sciences, stated.

Departmental Administrator, Ms Mmabatho Mabena, confirmed these sentiments, "All indications are that students commenced the year with high energy and staff collaborate effectively across departments. It is a strong start to the year, laying a solid foundation for continued success." From the Department of Plant and Soil Sciences, Dr Johanna Bapela observed that the students were motivated, actively engaged in the lab experiments and participating meaningfully in class discussions.

The Academic Success Coach dedicated to NAS ECPs, Mr Vincent Mabuza, shared, "Generally, we have noticed a cohort of students who show a bit more dedication and independence compared to cohorts in the few previous years. We can only hope that part of this positive change is due to the sense of belonging and social support we wish our foundational programme students can experience with the transition to the Hatfield Campus."

Two more ECP lecturers also perceived the transition to Hatfield Campus as positive. Dr Christine Mundy, a chemistry lecturer, noted that lecture halls are full of active and engaged students who love using apps during lectures to participate. Dr Gideon Brits, the module coordinator of the two Foundational Mathematics modules, added, "The revised WTW137 and WTW147 modules provide the students with the opportunity to prepare them thoroughly for mainstream modules in Calculus."

Dr Edwin Mapasha, a module coordinator for Foundational Physics, mentioned that the revised programmes and modules adopt a more interactive, inquiry-based approach, describing it as provocative and eye-opening. He notes that students are highly engaged during class sessions and enthusiastic about deducing physics concepts from experiments.

The last word belongs to Ms Xolile Kunene, Head of NAS Student Administration, saying, "We have recruited and admitted candidates who exhibit potential to succeed in a BSc or BScAgric degree, and the foundational programmes will empower students with academic excellence to ensure their full potential is realised."

UP and Leeds University introduce new series of Food Safety short courses

Food safety specialists Dr Willeke de Bruin and Prof Lise Korsten from the Faculty of Natural and Agricultural Sciences have, over the past 18 months, collaborated with Comprehensive Online Education Services (COES) to co-develop three online short courses in food safety.

This collaborative project involved a diverse team of academics and learning designers from the University of Leeds, United Kingdom – one of UP's strategic international partners and a globally recognised institution with extensive expertise in Food Systems research and, more specifically, Food Safety Systems.

The courses that were developed are: *Comprehensive Food Safety from Field to Fork, Food Safety Regulations: An African Perspective, and Food Recall and Traceability*.

Each year, approximately 91 million people in Africa fall ill from foodborne diseases, with an estimated 137,000 deaths, accounting for nearly one-third of the global mortality rate from such illnesses. These figures are on par with those from major infectious diseases like HIV/AIDS, malaria and tuberculosis, underscoring the critical importance of food safety.

Dr De Bruin explained, "As African diets evolve, urbanisation accelerates, and global food supply chains become increasingly complex, staying informed and trained in food safety practices is more vital than ever. Despite this urgency, Africa continues to lag in food safety training. While efforts across the continent often focus on ensuring access to adequate and nutritious food, the Food and Agriculture Organization (FAO) reminds us that "there is no food security without food safety." Unsafe food cannot be considered true food. Recognising this, the South African Government has declared food safety a scarce skill and a strategic priority for the agriculture and food sectors, both nationally and across the broader African region."

Delivered online by experts from UP and the University of Leeds, the courses focus on the African context – an area often overlooked in other training programmes. Learners will explore critical topics such as best practices across the food supply chain, the functioning of food control systems, and the significance of local and international food laws and standards. The courses also cover systems safeguarding food safety and enabling traceability throughout the agri-food chain.

The three courses combine interactive activities, expert interviews, curated readings, videos and peer discussions to offer an engaging and comprehensive learning experience. What sets this course apart from other short courses is the global perspective with local content, ensuring informed, relevant, fit-for-purpose training, yet a locally grounded approach. Designed to support career development and further academic study, these flexible, self-paced courses provide the knowledge and competencies required to succeed in food safety roles -anytime, anywhere.

The courses will be launched during the second half of the year.

Workshop successfully equips administrative staff

As part of its ongoing commitment to staff training, the Faculty of Natural and Agricultural Sciences (NAS) recently hosted the second 'Empower Your Office' series, following an externally presented workshop late last year.

This series, now being presented by in-house experts, aims to equip administrative staff with the skills and knowledge needed to excel in their roles. The April workshop focused on Customer Orientation and Ethical Professional Principles and welcomed administrators from across the Faculty's 13 departments.

The presenters were Prof Adré Schreuder, Chair of Customer Experience Management, and Ms Michelle Bheemraj, from the Office of the Deputy Dean: Teaching and Learning in NAS. Prof Schreuder's comprehensive presentation on customer centricity provided strategies to understand and improve customer experience. Meanwhile, Ms Bheemraj's interactive session equipped staff with key motivational coping mechanisms, tips, and tools to excel in administrative roles.

This workshop is part of a broader series designed to take administrative skills to the next level. Upcoming sessions include a third workshop on 4 July, focusing on 4IR and Future Skills, and Personal Success and Higher Education, while the fourth workshop on 3 October will focus on Administrative Procedures, Record Keeping, and Behavioural Competencies.

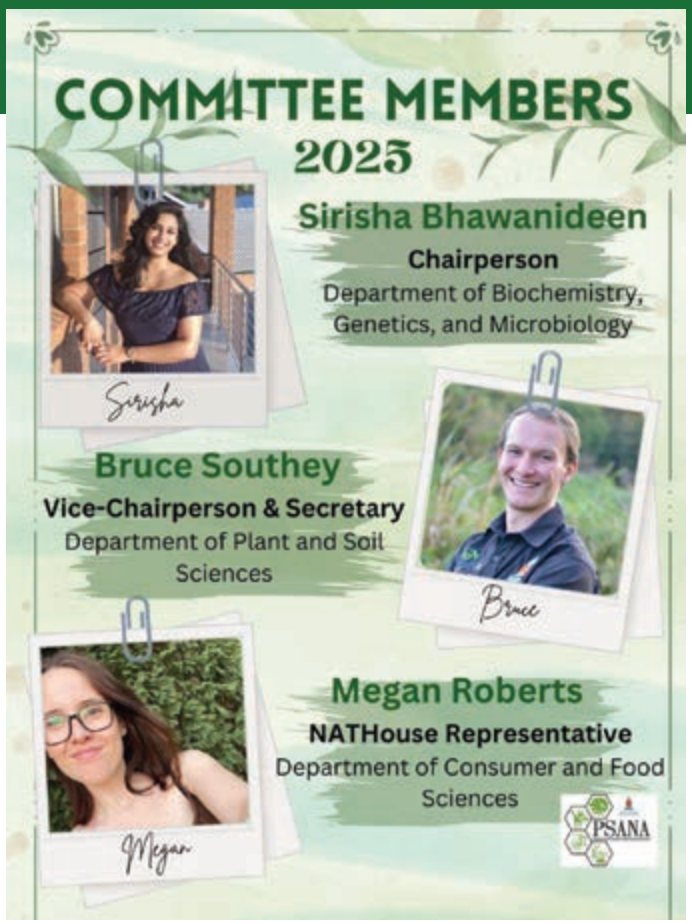
These workshops aim to enhance the skills and knowledge of administrators in delivering exceptional service, aligning with the University's values and principles. The workshops will also focus on practical application, demonstrating how to apply the skills learned to meet Key Performance Indicators (KPIs) and embody the University's values and principles (the UP Way), in daily work, ensuring administrators are equipped to excel in their roles while aligning with institutional goals.

By investing in the growth and development of its administrative staff, the NAS Faculty demonstrates its dedication to achieving administrative excellence and providing exceptional service to students, staff, and external stakeholders.

Prof Adré Schreuder

Ms Michelle Bheemraj (left)

PSANA Committee Members 2025



Successful Autumn 2025 graduations

May has marked the successful graduation of thousands of undergraduate and postgraduate students at the University of Pretoria. It marked a proud moment for thousands of undergraduate and postgraduate students. Read more in the next edition of the Faculty newsletter about the two honorary doctorates conferred and other interesting graduation stories from the Faculty.

The Faculty of Natural and Agricultural Sciences (NAS) boast the following statistics:

1 279 Total degrees conferred	770 Undergraduate degrees conferred	509 Total postgraduate	1 174 South African students
59 PhD degrees conferred	140 MSc degrees conferred	310 Hons degrees conferred	105 International students

NAS awards teaching excellence and best lecturers of 2024

Awards in four clusters for excellence in teaching and learning, and the NAThouse awards for Best Lecturers, were awarded at the Faculty of Natural and Agricultural Sciences (NAS) Annual Awards ceremony at the end of 2024.

The Teaching Excellence Award for Biological Sciences went to Dr Samkelo Malgas, and Prof Johan Ferreira and Dr Seiti Makgai shared the Award for the Mathematical Sciences Cluster. Dr Nadine Sonnenberg walked away with the Agricultural and Food Sciences Cluster Award. A full award could not be made in the Physical Sciences cluster, instead four development incentives were created to lecturers in different departments: Prof Shankara Radhakrishnan (Department of Chemistry), Dr Rene Stander (Department of Statistics), Prof Janette Bester (Department of Human Physiology) and Dr Gideon Brits (Department of Mathematics and Applied Mathematics).

Dr Markus Wilken and Dr Jandeli Niemand, both from the Department of Biochemistry, Genetics and Microbiology, respectively, won the NATHouse Best First-year Lecturer award and the NATHouse Best Lecturer for Senior Courses.

Dr Markus Wilken

Dr Jandeli Niemand

Dr Samkelo Malgas

Prof Johan Ferreira

Dr Seite Makgai

Dr Nadine Sonnenberg

Prof Shankara Radhakrishnan

Dr Rene Stander

Prof Janette Bester

Dr Gideon Brits

Dr Markus Wilken new Guardian for NATHouse

Dr Markus Wilken, senior lecturer in the Department of Biochemistry, Genetics and Microbiology, has been appointed the new Guardian for NATHouse, the Faculty student house for undergraduate students.

"I am honoured and humbled to take on the role of NATHouse Guardian. This is an exciting opportunity, and I am fully aware of its responsibility. I enjoy working with students and find great inspiration in their enthusiasm and creativity. I look forward to collaborating with NATHouse's Executive Committee (EC) and engaging with the Faculty of Natural and Agricultural Sciences student community."

Dr Wilken envisages that NATHouse enhance its presence and impact from the beginning of a student's academic journey. "I believe that by actively engaging first-year students from their first semester, NATHouse can play an important role in fostering a sense of belonging and community early on. Additionally, I aim to support the EC in organising academically enriching and socially engaging events, reinforcing the idea that NATHouse is not just a group of students studying together, but a supportive and dynamic community." "NATHouse can play a pivotal role in enriching the student experience at NAS by engaging students from the beginning of their academic journey. Introducing first-year students to NATHouse and, by extension, the broader support systems available at UP can help them feel welcomed and empowered from the outset. Student-led events—designed for students, by students—can foster a sense of belonging and inclusivity through meaningful social interactions that reflect the diversity of our Faculty. These events also provide valuable opportunities for students to connect with one another and faculty members in an informal, collaborative environment. In addition, NATHouse offers a platform for leadership development among its EC and volunteers, helping students cultivate critical soft skills that are not only beneficial during their time at university but also in their future professional careers," Dr Wilken added.

Concluding, Dr Wilken said, "I am excited about the journey ahead and the opportunity to contribute to the growth and success of NATHouse. Together with the EC, I believe we can create a more inclusive, engaging, and supportive environment that empowers every student to thrive academically and personally.

Dr Markus Wilken

Dr Wilken took over the reins as Guardian from Dr Carel Oosthuizen (Department of Zoology and Entomology), who also did a sterling job as Guardian.

Postgraduate students wins Catalyst 2024 competition with Nutra Pectin

Nutra Pectin, a biotech project developed by NAS postgraduate students, has been announced as the winner of the Catalyst 2024 competition, a prestigious pitch event for early-stage biotech start-ups organised by Immobazyme in partnership with UVU Bio.

The announcement occurred during a live pitch event at UVU Africa's innovation hub in Cape Town late in 2024. Nutra Pectin impressed the judges with its innovative approach to extracting bioactive compounds from food and agricultural waste, targeting lifestyle diseases such as diabetes.

The competition featured seven finalists, all competing for a start-up launchpad valued at over R350 000. Nutra Pectin's unique solution distinguished itself due to its potential to tackle significant health challenges while promoting sustainability. The event showcased Nutra Pectin's accomplishments and provided a platform for other participants to present their innovations, fostering a spirit of collaboration and growth within the biotechnology industry.

In response to the win, Dr Samkelo Malgas, a senior lecturer in the Department of Biochemistry, Genetics, and Microbiology, who supervises the postgraduate students who developed Nutra Pectin, expressed gratitude for the recognition and underscored Nutra Pectin's achievements. He also reinforced the importance of university research in fostering innovations across various sectors, particularly in technology and health. The University's contributions extend beyond traditional education, impacting economic development, sustainability, and technological entrepreneurship.

The support offered by the Catalyst programme includes six months of free lab space, a R50 000 credit account for reagents and consumables, access to business courses and seminars, hands-on mentorship from Immobazyme's executives, and specialised training. These resources and infrastructure will aid in developing and scaling Nutra Pectin's production processes.

Nutra Pectin members, from left: Kadima Tshiyoyo (PhD student), Marni Oberholzer (MSc student) and Ryan Bosch (MSc student).

Introducing Digital Transformation Team: (Transforming) Teaching and Learning at NAS

The Faculty of Natural and Agricultural Sciences (NAS) is excited to introduce the Digital Transformation Team, a Teaching and Learning Subcommittee project of RETHINK@NAS.

This team is tasked with driving innovation and excellence in digital education, aligning with the Faculty's vision for a future-ready teaching and learning environment.

The Digital Transformation Team's mandate is to spearhead the integration and the ethical use of cutting-edge digital technologies and pedagogies in teaching and learning, enhancing the student experience and fostering academic success.

The team will focus on identifying best practices, developing strategic initiatives, and supporting staff and students in effectively using digital tools.

Stay informed

You can expect to find the latest from the Digital Transformation Team through the Faculty's various platforms, including:

- Screens in the foyer of the Agricultural Sciences and the Faculty of Health Sciences buildings
- Faculty newsletters
- Email updates and
- Announced events

Keep an eye on these channels for updates on the team's initiatives, workshops, and resources. We encourage all staff members to stay informed and engaged with the latest trends and developments in digital education.

Join the journey

As we embark on this digital transformation journey, we invite all staff members to participate, contribute, and share their ideas. Together, let's shape the future of teaching and learning at NAS and create a more engaging, effective, and enjoyable learning experience for our students.

MEET THE TEAM

Prof Paulette Bloomer (NAS Dean's Office)

Ms Michelle Bheemraj (NAS Dean's Office)

Dr Evangeline Nortje (Department of Physiology)

Dr Barend van der Merwe (Department of Geography, Geoinformatics and Meteorology)

Mr Edwin Mapasha (Department of Physics)

Mr Erik Harkema (Department of Actuarial Science)

Mr Michael Kleynhans (Department of Physiology)

TRANSFORMED AND INCLUSIVE COMMUNITY

Successful 2024 for RETHINK@NAS provides guiding light for 2025

RETHINK@NAS is the transformation vehicle in NAS. With a holistic approach to transformation, RETHINK@NAS focuses on addressing systemic issues in the Faculty of Natural and Agricultural Sciences (NAS) and bringing a transformative lens to traditional teaching, learning, and research aspects.

2024 in review: Where effort met outcomes

In 2024, RETHINK@NAS core and subcommittees completed 27 activities. Six of these activities came from the ideas of staff and students in the Faculty, who submitted them to the committee for consideration. This is a remarkable improvement from previous years and is indicative of the commitment of all the committee members of RETHINK@NAS. 2024 saw the end of the first three-year cycle of the initiative, with many committee members choosing to stay on for another cycle. The subcommittee membership boomed in 2024, with all subcommittees well represented by the four clusters in NAS.

Outreach

In 2024, RETHINK@NAS committed to impacting the NAS community, the wider UP community and the community through partnerships with external organisations. The Outreach Subcommittee, which Dr Nadine Sonnenberg leads from the Consumer and Food Sciences department, exceeded expectations. The Buckets of Hope project quadrupled its goal, raising R20 000 and delivering 40 food parcels, all in collaboration with external organisations. The Santa Shoebox campaign, aimed at underprivileged children, was another success story from the Outreach subcommittee. The Faculty contributed 84 festive boxes, bringing a smile to the children during the festive season. In partnership with FLY@UP, Clothing drives ran year-round and saw increasing engagement, with staff filling up more than five full donation boxes with clothing, which all went to the FLY@UP thrift initiative.

Soft skills development for NAS undergraduate students

The anti-discrimination and gender-based harm subcommittee's efforts in the previous year impacted the skills development of NAS students. Employability workshops equipped over 80 students with tools to navigate professional spaces in preparation for the students' journey ahead once they complete their degrees.

Panel discussion

Other noteworthy activities included the postgraduate panel discussion at the NAS Research Symposium, and a guest lecture with Mr Jacob Modiba from Anglo American Platinum, which led to three internship opportunities for NAS's honours students.

Women's Month in NAS

Various activities were implemented for Women's Month in NAS. The Faculty hosted the inaugural Women in Science Talk presented by Prof Namrita Lall from the Department of Plant and Soil Sciences. The talk was attended by staff, students, and external stakeholders, sparking critical conversations about women scientists and their academic journeys. The Faculty looks forward to hosting an equally engaging talk in 2025.

The first of its kind Women's Month march was well attended by over 60 staff members – both male and female, academic and professional staff, with some attendees being colleagues from other faculties. The march received positive reviews and was featured in the University's official student newspaper, Perdeby, and social media posts.

The month was rounded off with a Women's Month quiz. The quiz was well received. Three lucky winners were drawn from the pool of respondents who answered all questions correctly. Prof Jackie Nel (Department of Physics), Dr Valisoa Rakotonarivo and Dr Mihaja Ramanantoanina (both from the Department of Mathematics and Applied Mathematics) were the three winners.

The Faculty is sincerely grateful to all the committee members, participants and volunteers who made 2024 a resounding success for RETHINK@NAS—2025 promises to be another impactful year. We look forward to all the triumphs and challenges ahead this year. Together, we can bring about meaningful change in NAS and have a positive impact.

If you would like to sign up to be a part of RETHINK@NAS, click on the link.

Looking ahead

Leveraging on what worked in 2024

2025 isn't about reinvention—it's about sharpening tools already in hand. Many 2024 activities are evolving into annual calendar fixtures: the Women-in-NAS March will be held again for the second time on 6 August 2025, GBV awareness initiatives will be annual events aligned with the Transformation Office, and the Women in Science colloquium will be presented by another inspiring female scientist on 20 August.

Food insecurity takes centre stage

The Fresh Produce Project is breaking ground – literally – with SNAPP and Moja Gabedi. A student food garden will support several identified students while empowering students with the skills to plant their own crops and harvest fresh produce. A recipe workshop, utilising the project's produce, facilitated by the Department of Consumer and Food Sciences, will teach students and staff nutritious and affordable meal preparations.

Staff well-being and wellness

The Wellness Subcommittee, now re-energised with new members, plans a Faculty Wellness Day on 31 July featuring mindfulness, hydration, nutrition and creativity stations. Weekly rooftop mindfulness sessions have also been piloted during May and soft-launched on 15 May in partnership with STARS@NAS.

The culture conversation deepens

Departmental visits to unpack institutional culture survey findings kick off in May, to influence real behavioural change across the departments. The Men's Dialogue, planned for 13 August, and a Town Hall meeting for students on 25 July, will add to the year's cultural footprint, pushing beyond performative moments into lasting dialogue.

Final thoughts

RETHINK@NAS is not about ticking the boxes and meeting targets; instead, it focuses more on the NAS community (staff and students) and hearing the voices of all who belong in the community. 2024 laid down the roots and was impactful; 2025 will be even more successful. Let us all be mindful of our actions, and RETHINK a better, inclusive community for our staff and students.

Shipping container farms – How UP is revolutionising mushroom growing in SA

Research by the University of Pretoria (UP) is helping South African producers find new ways to grow white button mushrooms sustainably – including a project aimed at growing white button mushrooms in repurposed shipping containers.

"Many people think of mushrooms as a luxury item, without realising that they are a superfood packed with nutrients and represent a good alternative to meat products," says Prof Lise Korsten, who leads mushroom studies in the Plant Pathology Research Group of the Faculty of Natural and Agricultural Sciences (NAS) and is co-director of the Department of Science, Technology and Innovation/National Research Foundation Centre of Excellence in Food Security.

"Biting into a freshly picked mushroom has the same crunchiness, earthy volatiles and unique taste as biting into a freshly harvested apple," she adds. "Eating fresh mushrooms is healthy, fun and good for you."

Prof Korsten explains that a private investment company is funding a new cycle of mushroom-related research at UP. The focus is on developing innovative technologies to replace the use of peat (an organic material often used in mushroom cultivation), and to find new solutions for developing, testing and commercialising transportable, small-scale mushroom farming units. Efforts also aim to prevent disease outbreaks in such units through best practices, integrated control and early disease diagnosis.

"This unique concept could offer future small business operators the opportunity to produce mushrooms for their community and sell locally, thereby supporting the national mushroom industry to expand production volumes and provide people with an important food source," Prof Korsten said.

Current projects build on expertise previously developed through funding in previous years from the South African Mushroom Farmers' Association (SAMFA). During this period, the concept of a small-scale production unit, patented alternatives to peat, and a disease diagnostic service for the industry were developed. The disease diagnostic programme, MushDrops, was extended to include the monitoring of bacterial and fungal diseases on farms and provide farmers with advice on how to continually improve their production systems.

For the current funding cycle, Prof Korsten's team has partnered with a composting company and growers to upscale the programme. They aim to prove that white button mushrooms can be grown productively under controlled conditions in repurposed shipping containers.

Tapping into existing research

Dr Nazareth Siyoum of UP's Department of Plant and Soil Sciences, who is co-principal investigator of the Mushroom Research Project, is thankful that existing expertise on growing mushrooms is once again being tapped into. Dr Siyoum's previous research focused on the monitoring of the microbial ecology of casing material and mushrooms.

Existing infrastructure is also being reused, such as a container production unit conceptualised around 2010 but never commercialised because of a lack of funds.

Mini-farm project feeding needy students

As an extra bonus, fresh mushrooms being produced in a fit-for-purpose mini-farm in a shipping container are being donated to UP's Student Nutrition and Progress Programme (SNAPP) – an initiative that supports students in need.

"SNAPP aims to address the short-term food needs of students who experience food insecurity while they wait on bursary and other payouts. Our help improves their overall well-being and ability to focus on their studies," says SNAPP project coordinator Bhaviksha Ramouthar of UP's Department of Student Affairs.

She adds that donations from various sources, including companies, currently allow SNAPP to provide 375 UP students with daily meal credits at TuksRes food outlets. Bi-monthly food parcels containing non-perishable items are also distributed. "Contributions such as the donated mushrooms are invaluable. They allow us to include nutritious fresh produce in the food parcels we distribute to students placed on our programme. It helps us to better support the health and well-being of our students," she says. "The collaboration between various departments highlights the importance of a unified approach in tackling food insecurity and promoting student success."

Looking beyond peat

Dr Siyoum says that different agricultural waste products are again being tested in search of homegrown, sustainable and commercially viable casing mediums as viable alternatives to peat.

Peat, a scarce natural resource, is found in wetlands and moors and is made up of decayed plant matter. To curb its unsustainable use, authorities identified peat as a major environmental priority for biodiversity and natural resource protection and stopped its mining in 2007, Dr Siyoum explains. South African producers have since imported peat from Europe, with a subsequent impact on the price of fresh mushrooms. To help restore degraded peatlands, new European Union regulations about the mining and exporting of peat from Europe for horticultural use are expected by 2026, with the aim of phasing out its use completely by 2030.

Harvesting for good

Those involved in the SNAPP mushroom project say it is a bonus to know that their research endeavours are also helping UP students meet their nutritional needs and complete their postgraduate studies.

"During our first harvest, we picked around 18 kilograms of mushrooms, or four picking crates full. We expect bigger harvests during the next round," says research assistant Justin Clayton, who oversees the day-to-day running of the mini-farm.

"When it was realised how much fresh produce could be harvested, we decided that the excess should not go to waste but be put to good use. It is a privilege to support existing projects such as SNAPP in their efforts to help UP students. Our students are, after all, the engines of this institution," says Nokwazi Mtsweni, coordinator of the Faculty of Natural and Agricultural Sciences' RETHINK@NAS transformation initiative, through which the food donations were made.

Ultimately, Prof Korsten says, "We hope to help grow a new generation of consumers that will love fresh mushrooms and thereby support our local mushroom farmers."

Research assistant Justin Clayton, Prof Lise Korsten and Dr Nazareth Siyoum at the shipping container that was turned into a small-scale mushroom farm

Mushrooms grown in the shipping container that was turned into a small-scale mushroom farm

INSTITUTIONAL SUSTAINABILITY

Biodiversity specialist appointed as new HoD for Department of Zoology and Entomology

Prof Ara Monadjem, a biodiversity specialist from the Department of Biological Sciences at the University of Eswatini, has been appointed as the new Head of the Department of Zoology and Entomology at the University of Pretoria from 1 June 2025.

When asked how he feels about his new position, he said: "After 32 years of teaching at the University of Eswatini (UNESWA), it is with mixed feelings that I have taken up this new challenge. Leaving my home country of Eswatini will be tough, but moving to South Africa is both challenging and exciting. UP's Department of Zoology and Entomology is arguably the most productive zoology department in Africa and indeed houses some of the top zoologists in the region. Being given the chance to work and collaborate with them is something that I look forward to."

Prof Monadjem added, "However, I will be moving into a position requiring strong administrative expertise and people skills, no doubt with a steep learning curve. I am thrilled to be given this opportunity and am keen to get started at UP, meeting all the department staff members and interacting with the students."

His research focuses on the ecology and conservation of African mammals and birds. Prof Monadjem specialises in field-based studies whose objectives are to obtain biological and taxonomic insights on rare and threatened species or to understand the ecological roles and ecosystem functions of these species in natural and agricultural landscapes.

"Over the past 30 years, I have worked in remote locations across the African continent including the rain forests of tropical Africa, and the savannas of Southern and East Africa, including Madagascar. I also maintain long-term ecological field sites in Eswatini."

Prof Monadjem has published widely, including eight books and more than 220 scientific (peer-reviewed) papers. He is currently supervising (or has supervised) more than 35 MSc and PhD students worldwide, including 20 from Eswatini.

He has also directly contributed to the Government of Eswatini's conservation initiatives by participating in the National Biodiversity Strategy and Action Plan and its revision. Furthermore, Prof Monadjem worked closely with the Eswatini National Trust Commission by conducting applied research on their protected areas, such as intensive baseline biodiversity surveys for the SNPAS project. He was the first chairperson of the Kingdom of Eswatini Academy of Science.

Prof Ara Monadjem

Prof Monadjem has developed long-term and productive collaborations with ecologists in South Africa, Europe and the USA during his academic career. He is a Courtesy Faculty at the University of Florida, USA, and a Research Fellow at the Mammal Research Institute, University of Pretoria, South Africa.

As a researcher, he wants to further enhance our understanding of African savanna and forest ecosystems, emphasising the conservation of mammals and birds. He also wants to teach, mentor and share his enthusiasm for, and knowledge of, Africa's wildlife with students, colleagues and the general public.

Herbarium and Botanical Gardens celebrate 100 years at UP with joint symposium

The Department of Plant and Soil Sciences celebrated the joint Centenary of the Manie van der Schijff Botanical Gardens and the H.G.W.J. Schweickerdt Herbarium on 4 March 2025 with a joint, day-long symposium in the Plant Sciences Complex Auditorium.

The day featured 18 presentations from postgraduate students, staff and affiliated academics highlighting the role of plant collections in research, teaching and learning, and community engagement, at the University of Pretoria (UP) and beyond.

It was an honour to have six high-profile international and local researchers as keynote speakers, giving presentations about collections as vital assets for their respective institutions. Keynote speakers who joined us in person from the USA were Distinguished Professors Pam and Doug Soltis (Florida Museum of Natural History, University of Florida), Prof Barnabas Daru (Stanford University), and Prof Jim Leebens-Mack (University of Georgia). Local keynote addresses were given by UP's Prof Braam van Wyk and Dr Ernst van Jaarsveld of Babylonstoren Gardens.

Nearly 100 invited delegates associated with our collections attended in person, and many more attended online (full video).

Guests were treated to a fantastic lunch featuring edible plants from the UP Gardens, prepared by Dr Hennie Fisher and his team from the Department of Consumer and Food Sciences.

The Manie van der Schijff Botanical Gardens is one of only five University-attached Botanical Gardens in South Africa.

The garden maintains about 4 000 plant species, and is highly active in local community engagement projects regarding African indigenous and orphan crops. It also includes the country's most species-rich Arboretum (planted tree collection) (777 taxa from 116 plant families), more than the Pretoria and Kirstenbosch Botanical Gardens. These plants are used by over 700 students and 40 staff members across ten departments and two faculties at UP.

The Gardens house the specimen of South Africa's national flower, *Protea cynaroides*, whose genome was recently sequenced by UP researchers. UP also boasts an exceptional collection of cycads, many of which are highly endangered in the wild. These include an *Encephalartos transvenosus* specimen gifted to UP by Queen Modjaji the third in 1921, as well as "the loneliest plant in the world", a sucker of the only surviving specimen of *Encephalartos woodi*. The Gardens also provide a platform for conserving and reintroducing our threatened flora, such as the Critically Endangered *Aloe peglerae*.

The H.G.W.J. Schweickerdt Herbarium is the fourth largest University Herbarium in South Africa, with approximately 130 000 specimens and over 100 types. The Herbarium serves multiple departments and institutes across two faculties at UP. It is used directly by multiple second-year, third-year and honours courses, which together with staff collections ensure that the collection is a growing resource. It serves as a voucher repository to allow valid publication of our research in high-impact factor journals. It is an irreplaceable archive of plants in space and time, especially in an age of high biodiversity loss and global change.

The Centenary Symposium was made possible thanks to the Natural Science Collections Facility sponsorship, the National Research Foundation, the Department of Plant and Soil Sciences, the UP Heritage Committee, and the DIPLOMICS 1KSA project.

Cutting-edge new South African Whale Centre set to be developed in Hermanus

A new South African Whale Centre is planned to be constructed in the heart of Hermanus, whale capital of South Africa, which will house the Whale Unit of the University of Pretoria's (UP's) Mammal Research Institute (MRI).

The board of trustees of the Old Harbour Museum, in partnership with a dedicated project development team and the UP MRI Whale Unit, recently announced plans to redevelop the Whale House Museum into the cutting-edge South African Whale Centre (SAWC). This state-of-the-art facility is set to become a global beacon for marine conservation and education.

The UP MRI Whale Unit, which was previously hosted in an off-campus field station of the MRI in Main Road, Hermanus, will form part of the SAWC upon completion.

The SAWC will also feature ground-breaking technology, including a 3D immersive dome experience, interactive exhibits, and augmented reality displays that will vividly illustrate whale behaviour and migration. Visitors will have the opportunity to engage in virtual whale encounters and explore the fascinating world of whale song, fostering a deeper appreciation for these majestic creatures.

Hub for international whale research

In addition to its educational offerings, the centre will function as a hub for international whale research. Its partnership with the UP MRI Whale Unit will ensure that the SAWC remains at the forefront of scientific advancements, maximising its educational outreach with the latest research findings.

"The University of Pretoria has been a cornerstone of whale research in Hermanus for many years, and our partnership with the SAWC represents a significant step forward in our shared commitment to marine conservation," said Dr Els Vermeulen, Research Manager of the UP MRI Whale Unit. "This new centre will not only provide a world-class platform for research but also offer unparalleled educational opportunities, inspiring future generations of marine scientists and conservationists. We are excited to continue our long-standing collaboration and contribute our expertise to the SAWC, ensuring its success as a leading centre for whale research and education."

Grahame Lindop, Conceptualisation Lead at the SAWC, said, "Our mission is to create a world-class facility that not only showcases the beauty of whales but also educates the public on marine conservation. We believe in the power of community, collaboration, and legacy to drive awareness and conservation efforts."

History of the UP MRI Whale Unit

The MRI Whale Unit was established in 1985 as a global, African research, conservation, and education facility that researches the ecology, population dynamics, and behaviour of the diverse cetaceans (whales, dolphins and porpoises) in the southern African sub-region and surrounding oceans. Its main objective is to provide knowledge that will promote cetacean conservation. "For 40 years, the UP MRI Whale Unit has been dedicated to understanding and protecting these incredible creatures," added Dr Vermeulen. "The SAWC provides an exciting opportunity to build on this legacy, expanding our research capabilities and reaching a wider audience with our vital conservation message. We look forward to a future of impactful research, education, and collaboration at the SAWC."

Dr Els Vermeulen

Looking ahead

The project enjoys valuable support from the provincial departments of Cultural Affairs and sport, and finance and economic opportunities, which recognise the centre's potential to boost tourism and economic growth in the region.

The South African Whale Centre team says it will focus on creating a world-class whale science and education centre in Hermanus, with the goal of inspiring every visitor to protect our oceans through education, conservation projects, and community engagement.

Newly renovated UP Stable Isotope Laboratory back in action

Over the last year, the UP Stable Isotope Laboratory (UPSIL) located in the Botany Building has undergone a significant renovation costing approximately R4.7 million.

According to Dr Grant Hall, UPSIL Manager, "The interior of the lab was changed to accommodate an additional isotope ratio mass spectrometer (IRMS) kindly donated to the University from iThemba Labs in Johannesburg, bringing the number of mass spectrometers to three."

He explained that the sample processing and preparation area, where students and visitors work, has been reduced but has received a vibrant makeover. The existing gas bank has been modified and upgraded, allowing us to safely use several new gases, such as hydrogen and carbon monoxide. These renovations will have far-reaching consequences for multi-disciplinary collaborative stable isotope research in southern Africa.

This is very exciting for the isotope science community, but what exactly are stable isotopes, and what type of research/work does the UPSIL carry out?

Dr Hall explains, "In a nutshell, stable isotopes (no radioactive decay) are atoms of the same element with the same number of protons and electrons, but different numbers of neutrons, which means that atoms of an element will have small differences in their atomic weight. The most commonly measured isotopes are of carbon, nitrogen, oxygen, hydrogen and sulphur. Due to tiny mass differences in their mass, isotopes of a chemical element (e.g. carbon or nitrogen) behave slightly differently during biological, chemical or physical reactions, resulting in different ratios of each isotope in the products of these processes. These naturally produced variations are very small. Still, they can be measured using an isotope ratio mass spectrometer (IRMS), which allows us to calculate isotope ratios of many types of samples. The variability of isotopic ratios can be used to understand, for example, plant and animal responses to climatic/environmental change, movement patterns, dietary behaviour, food adulteration and wildlife forensic applications."

Dr Hall also highlighted that, "Now that the UPSIL has an additional mass spectrometer and peripheral equipment, we can provide more efficient regular isotope analyses for users of the facility, as well as providing some additional analytical techniques across multiple disciplines, from archaeology, botany, zoology, entomology, chemistry and geology. The laboratory will once again be analysing samples ranging from algae to baobabs, millipedes to southern right whales and everything in-between and providing state-of-the-art analytical services and training for UP students and researchers, as well as many external users."

Dr Grant Hall

The mass spec room is in the process of being set up

Revamped Student Admin Offices officially opened

The newly renovated Faculty's Student Administration offices in the Agriculture Sciences Building were officially opened on 31 March 2025.

At the official ribbon-cutting ceremony, Prof Barend Erasmus, the Dean of the Faculty of Natural and Agricultural Sciences (NAS), emphasised the importance of a positive and ergonomically efficient working environment. "This is the beginning of something much larger – more refurbishment developments of this building will follow in due course. The purpose of this renovation was not only to make this space more functional but also to optimise and modernise the space for our colleagues in Student Administration."

He added, "This space (ground floor of this Building) will eventually provide a 360-degree student-centred space, where we also want to have space for our Academic Success Coaches.

Ms Xolile Kunene, Head of NAS Student Administration, expressed her gratitude and excitement and said, "The staff morale has increased incredibly since moving into the newly renovated space.

Prof Barend Erasmus and Ms Xolile Kunene officially opened the Student Administration Offices

NAS experts and volunteers spearhead first large-scale Magaliesberg aloe reintroduction

Rare-plant experts from the University of Pretoria (UP) are spearheading the reintroduction of thousands of critically endangered Magaliesberg aloe (*Aloe peglerae*) seedlings into the wild. The project, supported by the Botanical Society of South Africa (BotSoc), is the first major reintroduction effort involving an endemic South African aloe species.

The Magaliesberg aloe is a slow-growing species and is known for its spectacular red flowers. The aloe only grows on north-facing slopes of the Magaliesberg mountains to the north of Pretoria. A small population also exists around Krugersdorp in Gauteng's West Rand. It was listed as critically endangered after a survey in 2016 found its overall population numbers to have dropped by an estimated 43% within a decade, particularly because of illegal harvesting.

"The Magaliesberg aloe has a very narrow distribution range, as it is particularly well adapted to the very hot, dry conditions experienced on top of the Magaliesberg," explains Richard Hay, curator of the Future Africa Campus gardens and the Future Africa Indigenous and Orphan Crops Collection of the Manie van der Schijff Botanical Garden (MvdSBG) at UP, as well as BotSoc's Conservation Project Coordinator for the Northern Region.

Hay says the idea is to continuously reintroduce young plants only into areas where the aloe once grew naturally, but no longer occurs.

"From historical records we know that this aloe used to grow on the mountain above Mamelodi. None are left at this particular location today. We therefore know that by reintroducing seedlings into the area there is no risk of interfering with the genetics of existing wild populations," Hay explains.

Since November 2024, more than 1 500 seedlings, all the size of a R5 coin, were planted at intervals along the foothills of the Magaliesberg mountains above Mamelodi. The area is managed by the Mothong African Heritage Trust, which was founded by traditional health practitioner Dr Ephraim Cebisa Mabena to protect the natural vegetation of the mountain and to engage with the wider community about preserving the natural environment.

"The heavy rainfall over the northern parts of South Africa in December did not cause rot or in other way damage the seedlings that we have already planted out. They all seem healthy," Hay reports.

It will take approximately ten years before these seedlings will flower for the first time. The replanting process is guided by best practices developed through the research of Arnold Frisby, a PhD candidate in botany at UP and curator of its cycad and indigenous plant nursery.

"Planting seedlings within their natural distribution range in sheltered spots, for instance next to or under grasses, greatly improves their [chances of] survival," Frisby says.

Conversations lead to conservation

The idea behind the reintroduction project was sparked through initial informal conversations about plant conservation between Hay; Jason Sampson, Head Curator of the MvdSBG; and Quinton Bean and Andy de Wet, owners of the specialist nursery The Aloe Farm near Hartbeespoort, north of Johannesburg. The Aloe Farm donated 8 000 one-year-old Magaliesberg aloe seedlings in July 2023. These were

then nursed over many months in the greenhouses at the Manie van der Schiff Botanical Garden on UP's Hatfield Campus by UP staffers, volunteers from BotSoc and the Johannesburg Succulent Society, and interns from the Tshwane University of Technology. Many of these team members later helped to replant the seedlings above Mamelodi.

Dr Martina Treurnicht, BotSoc's national conservation project manager, says the project team is inspired by the example set by other South African plant reintroduction projects in support of the survival and persistence of critically endangered species, such as the Clanwilliam cedar tree and Cape Town's *Erica verticillata*.

"Citizen science and volunteer engagement is crucial to the success of programmes aimed at ensuring the survival and persistence of species," Dr Treurnicht says. "Volunteers play a key role in hands-on conservation, from planting initiatives to raising awareness in local communities – and it is great to see people working together for this purpose. Collectively, these efforts strengthen conservation actions, support biodiversity, and help prevent species loss, which is critical in the current biodiversity crisis where many plant species face ongoing decline in the wild."
About The Aloe Farm's involvement in the project, Bean says: "We strongly believe in conservation through propagation. Preserving species diversity is important. It's the right thing to do."

Extinction risk

"*Aloe peglerae* is on the Red List of critically endangered species due to, almost exclusively, illegal collecting, rather than the impact of disturbance or development," adds De Wet.

Sadly, the aloes seldom fare well as a garden plant, as people tend to overwater them or plant them in areas that are not optimal to their development.

"From a conservation perspective, the plants are very important sources of food to animals of the Magaliesberg during winter, when not much else flowers. Added to this, when adult plants are removed from the already small existing populations, it completely disrupts the generational recruitment of the species," Hay notes. "I believe that all species that are part of South Africa's important natural heritage have the right to exist, irrespective of their benefits to us or not. They exist the same way we do. It is really our duty as South Africans to protect them and to take pride in them."

The way forward

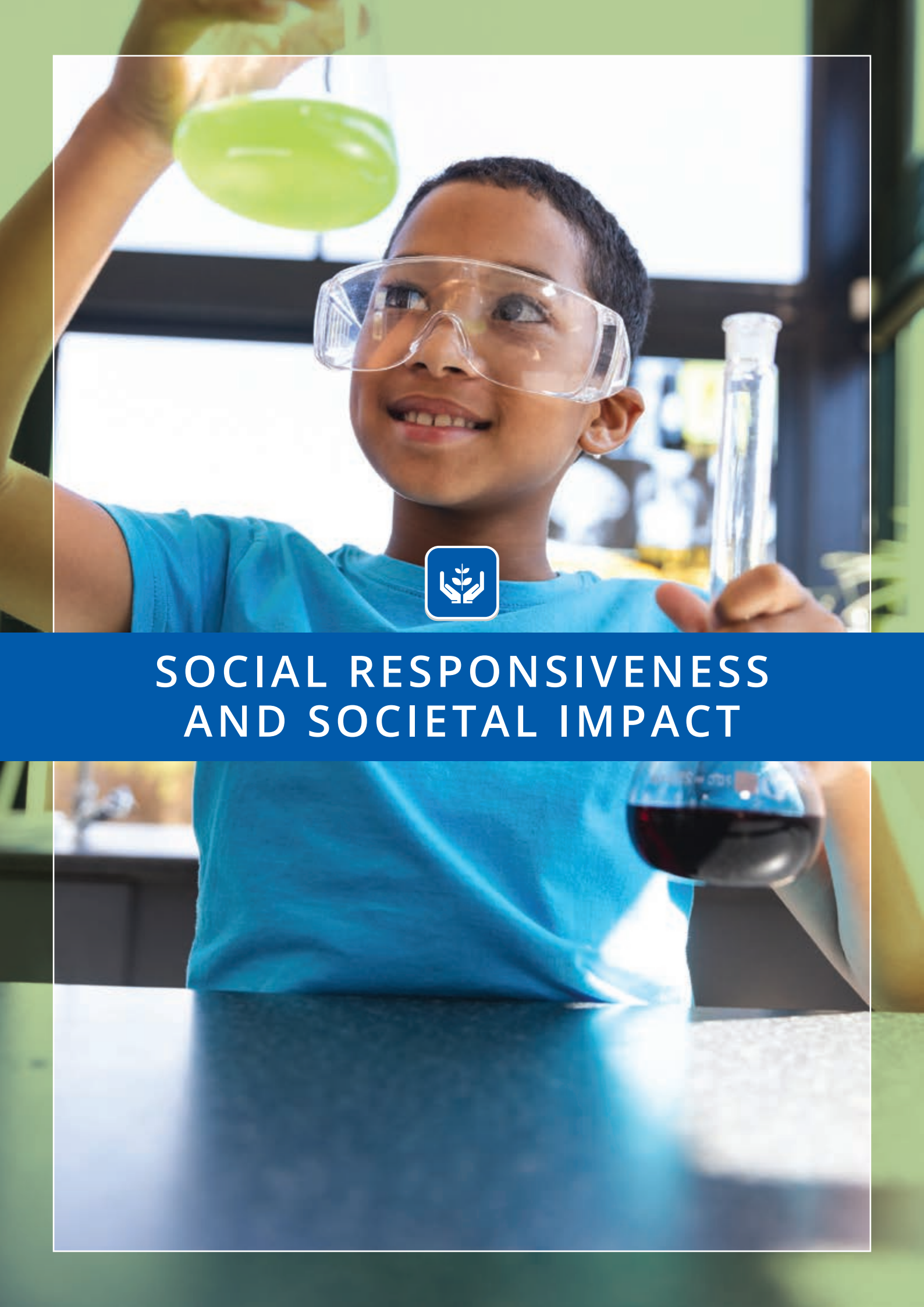
All seedlings not yet planted out by the end of February were temporarily moved to the rooftops of UP's Future Africa Campus.

"There they can bake in the sun until next summer, as they would in their habitat. This aligns their growth going forward more closely with their growth in nature. It will help tough tissues develop, thereby increasing resistance to aloe cancer caused by mite infections," Hay explains.

Bigger plants that Frisby raised as part of his PhD research will be planted in the Future Africa gardens. These could flower within eight years. Seeds collected from this new satellite population will sustain efforts to continuously reintroduce the species into areas where the species is wiped out, to help establish populations of varying ages.

Richard Hay (right), curator of the Future Africa Campus gardens and the Future Africa Indigenous and Orphan Crops Collection of the Manie van der Schijff Botanical Garden (MvdSBG) at UP with Dr Ephraim Cebisa Mabena of the Mothong African Heritage Trust in Mamelodi.
Photo credit: Kayleigh Murray

UP staff members, volunteers from the Botanical Society of SA and the Joburg Succulent Society and TUT interns. Photo credit Richard Hay



SOCIAL RESPONSIVENESS AND SOCIETAL IMPACT

Story Lab: Exploring science one tale at a time

Stories told, new and old, to the inquisitive and bold. With experiments in hand, fun was had to uncover the science the stories hold.

Stories and storytelling

'Once upon a time!', 'Nere!', 'Keleketla, keleketla!' No matter how you start the imagination machine, the mind straps in and prepares to go on a journey. Storytelling is as old as language and is intrinsically woven into human culture.

Stories are powerful vehicles of communication, expression and our experience with the world. In its pursuit to make sense of the world around us, science intersects with storytelling in this regard. Stories, whether cultural or otherwise, have not only sparked our imagination but continue to ignite the fascinating research pursued by humanity.

Thus, the Sci-Enza team decided to inspire learners to embark on a scientific journey that uncovers the science within stories.

The programme

Sci-Enza Science Centre was pleased to host the grade R to 6 learners during the school holiday programme at the end of March. One of the main aims of this programme was to introduce inquiry-based learning through storytelling. So, you spark curiosity as stories do and make learning science more engaging through a learner-centred approach to teaching.

Throughout the programme, children participated in various interactive workshops that combined scientific concepts with the power of storytelling. The learners were challenged to think beyond just the story to question the processes and phenomena in the stories they learn.

A question-explore approach was emphasised by developing the skills to ask relevant questions and seek possible answers.

Speakers

The Centre had fantastic guest speakers from the Department of Animal Science, Ms Lize Mari Erasmus, and Ms Rimbilana Shingange, who gave a well-received, engaging presentation sharing their experiences as animal scientists.

Given the age range of the children that attended the holiday programme, Ms Erasmus articulated and adjusted her presentation well to suit the foundation phase (Grades R-3) and intermediate phase (Grades 4-6). For example, the presentation taught the children about livestock animals' digestive and respiratory systems.

The children also participated in song and dance to reinforce their learning, and some shared personal stories about their encounters with livestock.

Sci-Enza collaborations with other departments

Sci-Enza is constantly seeking opportunities to collaborate with other departments, and due to our recent holiday programme, the team is delighted to have collaborated with the scientists from the Department of Animal Science to showcase agricultural science. As a result, the learners gained a more profound understanding of animals' vital roles in food production and sustainable farming, helping inspire curiosity and promote learning in meaningful ways.

Sci-Enza's programmes are thus immensely enriched with expert knowledge and real-world context, making such collaborations invaluable. The team looks forward to more joint efforts with the Department of Animal Science and other departments that bring science to life for our community.

A Perfect Blend of Art, Math, and Love: Valentine's Day at Sci-Enza

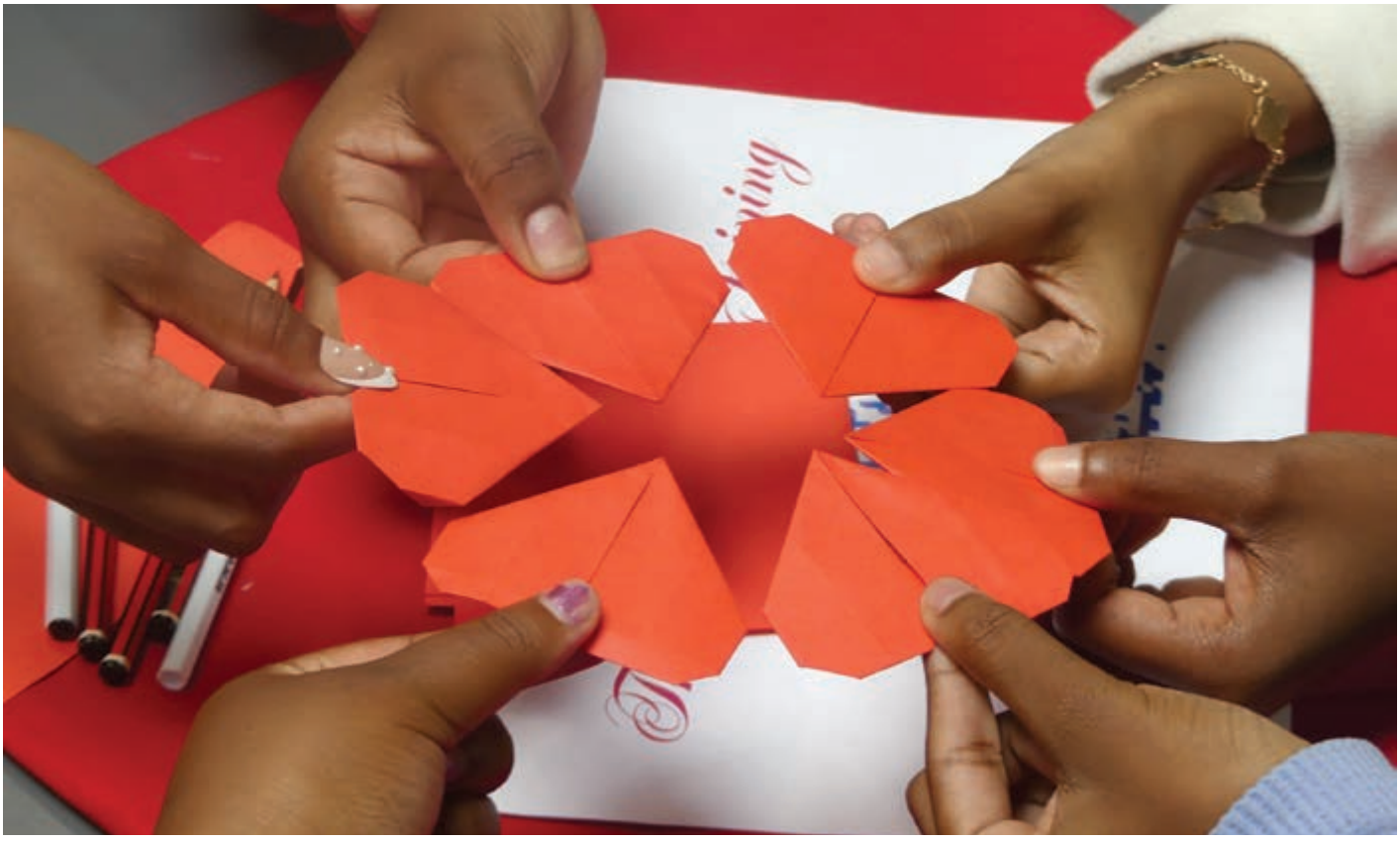
This Valentine's Day, Sci-Enza Science Centre opened its doors to an event that brought together the worlds of art, mathematics, and romance. Guests gathered to explore how these seemingly varying fields intersect, celebrating love in scientific and creative forms.

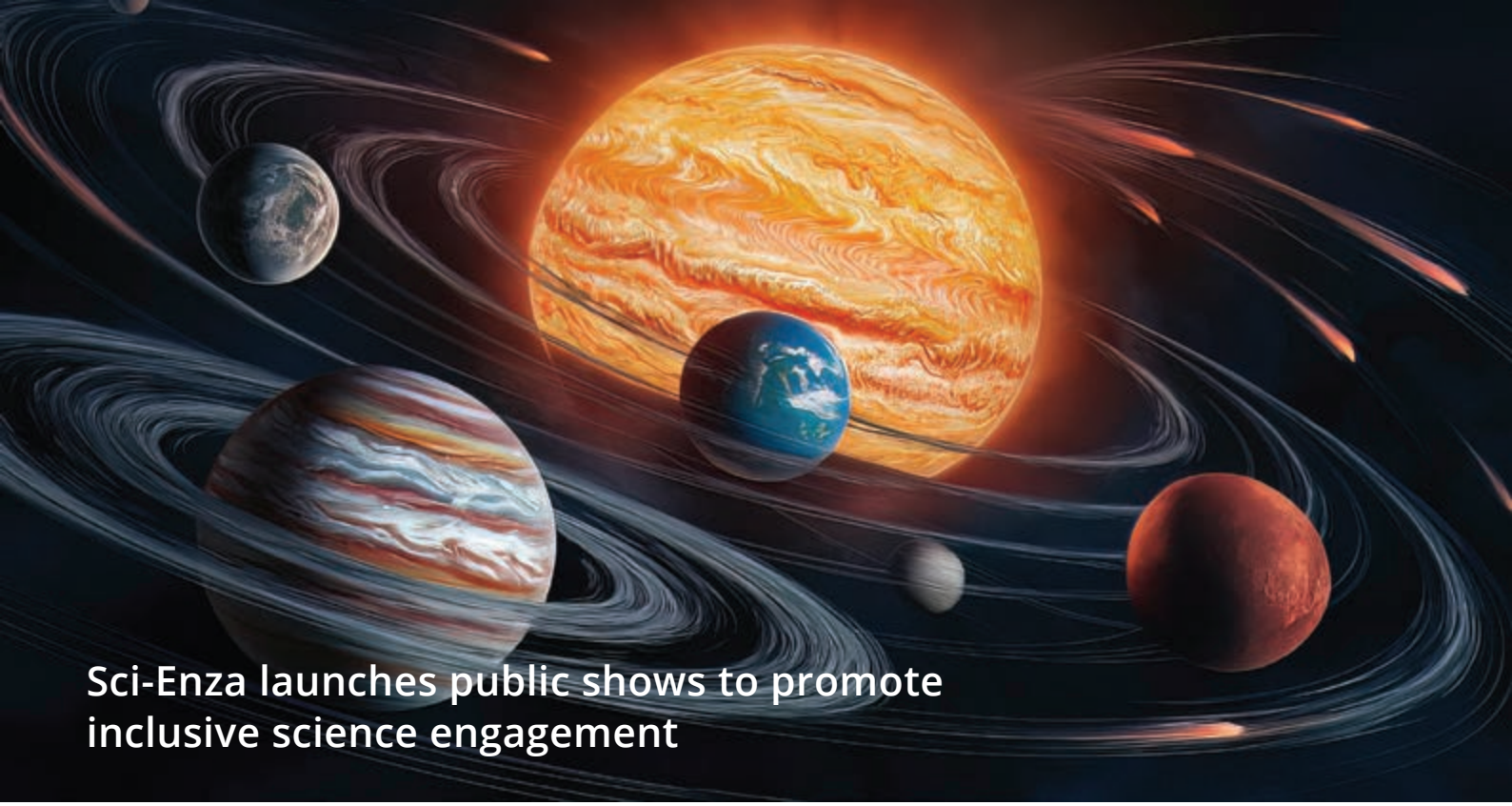
The event started with an engaging talk highlighting the connections between art and mathematics, showcasing how mathematical concepts are innate in many beautiful art forms. From the elegance of geometric patterns to the subtlety of symmetry found in nature, participants learned that love and art can be expressed through mathematical precision.

One of the day's highlights was the hands-on origami heart-making workshop, where guests had the chance to fold their creations from colourful paper with the guidance of knowledgeable Sci-Enza staff, experiencing the joy of transforming a simple square into a symbol of love. As they carefully followed the intricate steps, laughter and conversation filled the air, creating a community spirit that embraced the essence of Valentine's Day.

Adding playful excitement to the festivities, raffle prizes of sweet treats were awarded, and as the event concluded, attendees left with broadened perspectives, handcrafted origami hearts, sweet treats, and new connections - reminders of the day's exploration of art, math, and love.

This unique Valentine's Day celebration was a delightful journey of discovery, highlighting Sci-Enza's commitment to fostering a passion for learning. It showed how the convergence of seemingly diverse fields, each with its complexities, can be explored with creativity and joy.





Sci-Enza launches public shows to promote inclusive science engagement

In March 2025, Sci-Enza proudly launched its first-ever ticketed public shows, marking a significant step forward in our ongoing commitment to making science accessible and engaging for everyone.

Guided by our mission and vision to be inclusive in our offerings, this new initiative reflects a deeper introspection around how we serve both school groups and the broader public.

A look back at our March launch

Our first show took place on 20 March – a science show themed *Light* that explored the fascinating properties of light through stunning, interactive experiments. Attendees were captivated by demonstrations on stroboscopic light, optical fibre, UV light, primary colours, and more. It was an electrifying experience for audiences, young and old.

One week later, on 27 March, we reached for the stars with our second offering: *Beyond the Sun*, a planetarium show that used cutting-edge technology to explore planets beyond our solar system. This visually rich and family-friendly experience left our guests in awe, and asking for more.

What's Next?

These successful events confirmed a public demand for engaging science programming beyond the classroom. In response, Sci-Enza will continue hosting regular public shows, with various science themes and topics designed to ignite curiosity and inspire wonder.

All upcoming shows will be advertised on our social media platforms and website, so be sure to follow us to stay informed.

Sci-Enza is proud to be on this new journey of inclusive, public science engagement, and we can't wait to welcome you to our next show.

NAS students transform food waste into high-end products at UP-Cycled Food Experience

Final-year students from the Department of Consumer and Food Sciences recently showcased their ability to transform rescued food ingredients into high-quality retail and restaurant products during the second UP-Cycled Food Experience #waste2wonder. During the evening, attendees enjoyed an immersive retail and fine dining experience.

This event served as both a practical exam and an exhibition, highlighting the potential of academic research and innovation to create valuable food products from rescued foods, thus benefitting communities. South Africa contributes 10 million tonnes to the 1.3 billion tonnes of food wasted globally each year.

"Impact is a fundamental value at UP," said Dr Nadene Marx-Pienaar, a senior lecturer in the department, in her opening remarks. "In alignment with this, we sought to move beyond the conventional written exam by offering students the chance to showcase their skills to industry leaders, demonstrating their ability to shape the future and promote a more sustainable food system."

Nutrition and health lecturer Dr Adeline Pretorius explained that the initiative began last year with the first UP-Cycled Food Experience #wastenotwantnot, when Dr Marx-Pienaar, whose research focuses on food waste, was approached by the NGO SA Harvest with the idea of finding innovative solutions to tackle this issue and address food insecurity.

"We then brought together students from food retail management, hospitality management, and culinary science to develop retail products and a menu using rescued ingredients," PhD candidate Nadine du Piesanie added. "This resulted in innovative and delicious food offerings."

Bachelor of Consumer Science students Lerato Maine and Kayla Bishop expressed their pride in being young scientists at the forefront of innovation to address the global food waste crisis.

They highlighted the stark contrast between the millions of tonnes of food wasted worldwide and the fact that many still go to bed hungry due to poverty and social challenges. They also pointed out that South Africa's food retail industry alone produces about 1.4 million tonnes of food waste annually, with 19% occurring during post-harvest handling and storage, 49% during processing and packaging, and 32% at consumer level. In the hospitality industry, 65% of food is wasted each year, mainly due to overproduction (40 – 50%), poor planning and improper storage (5 – 15%), and staff knowledge gaps and guest waste (20 – 30%).

Culinary Arts lecturer Dr Hennie Fisher taught students advanced food preparation, plating skills and how to merge science with culinary art. At the same time, Dr Marx-Pienaar trained food retail management students on consumer behaviour, visual merchandising principles and food retail strategies. Behind the scenes, Dr Pretorius guided students in recruiting and managing support staff, while Du Piesanie honed their event management skills.

"As a group of lecturers, we take great pride in our students and their remarkable creativity and commitment to using their knowledge to address real-world challenges," Dr Marx-Pienaar said.

"Their ability to transform food waste into high-quality dishes demonstrates not only their culinary skills but also their commitment to making a positive impact," Dr Fisher added.

The successful development of the retail products and meals relied on the contributions of industry sponsors and collaborators such as SA Harvest.

"SA Harvest is proud to partner with UP on the UP-Cycled #waste2wonder initiative, supporting the next generation of leaders in tackling food waste," said Ozzy Nel, Chief Operating Officer of SA Harvest. "Our collaboration involves mentoring students, sharing insights into food waste and value chains, and providing opportunities to connect with our extensive network in the food and sustainability sectors."

He added that other sponsors included FarmWise, Glamour Veg Packers, Simply Garlic, Sunspray Solutions, Savannah, Cavalier, Mondanette, Kelly Jayne cakes, Time4Wine, Pico Grow, InToFoods, Schoonbee Landgoed, Graham Beck, Veld, Yara, The Tasting Room, UCook, Food Lovers Market, Best Before, Imbali cut flowers, Joekels, and Garden of Eden. Dr Marx-Pienaar expressed her gratitude to all the sponsors, whose support, she said, equipped the students with the necessary resources and fostered an enriching learning experience.

On the menu

Starter: The Glean
The starter symbolised a field or garden ready to be gleaned, bringing nature's bounty to the plate. It featured a homemade vegetable stock mousse, covered with dried olives and lentils and topped with roasted baby beetroot, carrot puree and sautéed asparagus off-cuts. The dish was garnished with edible flowers and microgreens.

Main: The Salvaged
The main course was served in a tin to encourage guests to think about where unused ingredients could end up if changes are not made. Inside each of the tins, which were salvaged from local recyclers, was a beef ragu made of meat sourced from sausage and patty production and flavoured with leftover wine. The dish was paired with rescued seasonal vegetables and topped with a crispy potato rosti and crispy fried leeks

Dessert: The Wonder
This dessert featured coffee ice cream made from cauliflower and used coffee grounds, with a chocolate mousse insert. This was served on a vanilla cake made from cake off-cuts and drizzled with chocolate caramel sauce made with cocoa powder. The dish was garnished with an orange crumble and candied oranges.

On the shop floor

The following five retail products were developed:

- **WTF (Waste to Food)** is an instant drink mix that requires rehydrating one of three fruity flavours. It is made from dehydrated fruit skins and trimmings.
- **Ubuntu Blends:** This trio of spice, salt and meat rubs consists of used onion skins, carrots and other vegetable trimmings.
- **Joy in a Jar** is a sweet grape and chilli jam made from gleaned grapes collected after the harvest.
- **Eco-Bokkies** is a healthy breakfast alternative made from various rescued vegetables and trimmings.
- **Bush Bites:** These clusters of dehydrated potato, carrot and green veg waste and noodles are ideal for hiking packs.

Sonique Deysel and Junhao Fu, second-year students from the Department of Consumer and Food Sciences, harvesting Jerusalem Artichoke flowers in the Giving Garden.

UP's Giving Garden helps community gardeners think differently about growing edible plants

The University of Pretoria's Giving Garden remains true to its name. In 2024 it provided around 100 community food gardens in Gauteng with free cuttings, seedlings and tubers of lesser-known and easily grown crop plants. Situated in the heart of the Manie van der Schijff Botanical Garden on the Hatfield Campus, it is also a valuable space for practical training and research on edible orphan and indigenous crops for UP students and staff.

The 2 300m2 garden is a "living library" of lesser-known crop species, and a "supply store" to home and community gardeners who want to cultivate such edible plants in their gardens. Visitors are encouraged to take plant material, as sharing is central to the garden's philosophy.

"Our Giving Garden is both a living garden and a philosophy, through which we introduce gardeners to the potential of orphan and indigenous crop plants as sources of food," says Richard Hay, Curator of the Future Africa Indigenous and Orphan Crops Collection at the Manie van der Schijff Botanical Garden.

Orphan crops

Orphan crops were in the past grown for food, but nowadays are seldom cultivated due to various socio-political and socioeconomic factors. Such plants' genetic and phytochemical diversity, knowledge about their cultivation, and the heritage they represent are therefore at risk of being lost forever. Over the past century, approximately 75% of the world's crop agrobiodiversity has already been lost. Only six crop species now make up 58% of all agricultural produce grown worldwide.

"Orphan crops were historically domesticated for and by the use of people, without access to the myriad inputs required to produce modern food crops," says Jason Sampson, Head Curator of UP's Manie van der Schijff Botanical Garden and an expert on alternative crops and sustainability practice. "Such plants are thus eminently suited to an agricultural practice that is closer to nature."

Hay and Sampson started the Giving Garden in 2022 on land previously used for flower identification studies. They selected some of the 250 species growing in a specialist collection housed in the Future Africa Campus Orphan and Indigenous Crop Collection (itself Sampson's brainchild, with Hay as curator).

Community outreach

"We are always trying to propagate as much crop material as possible with the biggest potential to feed communities," Hay says. "This is done in consultation with communities, to make sure that they would like to grow and eat such plants. This requires interaction with community groups to raise awareness about agro-biodiversity. We help them select crops that are fairly low maintenance and easy enough for even beginner gardeners to grow, yet still yield enough to eat."

Plant material is donated regularly to community gardeners, such as those supported by the ABBA Embrace Foundation, an NGO that supports community food gardens to improve household food security.

The most recent donation, in December 2024, was of chaya (*Cnidoscolus aconitifolius*) cuttings. This small, hardy South American tree spinach has protein-rich leaves and is very pest-resistant. It's one of the few plants that produces an abundance of edible leaves, which can shade each other out and slow growth.

"The domesticated form is reliant on human intervention. It must be cropped regularly to grow well, or else it stunts itself," Sampson explains.

The garden also houses leafy vegetable Brassica species such as Ethiopian Kale and Mutshaina (a leaf vegetable from Venda), Egyptian Walking Onions (an ancient Silk Road hybrid between the common bulbing onion and the spring onion that produces bulbs on flower stalks instead of seed), Sunchokes (a North American tuberous sunflower), Tsenza (*Coleus esculentus*, an indigenous African root vegetable that was once hugely important to people in Southern Africa before being replaced by such crops as potato and taro), water chestnuts (*Eleocharis dulcis*, an aquatic vegetable native to Asia naturalised in South Africa), water spinach (*Ipomea aquatica*), Kenyan cabbage tree (*Moringa stenopetela*) and Kei apples (*Dovyalis afra*).

Learning space

UP's Consumer and Food Sciences Department uses the garden's plants for teaching purposes and is set to start consumer taste preference trials on some crops. It provides a practical research space for Future Africa researchers interested in, among others, climate-hardy plants and crop interaction using different kinds of leafy vegetables. It is also a teaching and learning space for second-year students doing practical work as part of the undergraduate module in agroclimatology and sustainable crop production systems.

"Students are tasked with growing a crop in a little plot and making a vlog of their learning journey during the course of a semester," Hay explains.

Staff involvement

Earlier this year, UP professional services staff were part of a focus group and tasting session organised through the Transformation Office. Their input on the acceptability of some leafy vegetable cultivars will inform future planting and propagation work.

"The Giving Garden coordinates a skills transfer opportunity for staff and students looking to grow their own food, while facilitating the inclusion of often marginalised members of the University community into research projects that address issues related to their work, everyday lives and their overall well-being. It is a renewed approach to social justice interventions that is holistic, inclusive and affirming," says Tumelo Duke Rasebopye, a Diversity and Inclusion Specialist in the UP Transformation Office.

Sharing the message

Sampson and Hay run workshops and readily provide advice to home and community gardeners and small-scale farmers looking to diversify their cropping options. They recently started writing a column about the cultivation of orphan species for the Botanical Society of South Africa's website, aptly named 'The Giving Garden'.

"In two short years, the 'giving gardens' concept has become part of the 2030 University of Pretoria Spatial Development Plan," Sampson says. "Similar developments on all UP campuses are expected, guided by the successes and lessons learned from the original Giving Garden on the Hatfield Campus."

Richard Hay standing in the Giving Garden on UP's Hatfield Campus

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