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Newsletter of the Faculty of Natural and Agricultural Sciences

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Faculty of Natural and

Make today matter

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NAS inaugural Open Day shows learners how scientists can change the world

"The impact of science extends far beyond the confines of our classrooms and textbooks. It has the power to transform lives, uplift communities, and shape nations' destiny." These wise words were shared by Prof Barend Erasmus, Dean of the Faculty of Natural and Agricultural Sciences (NAS) at the University of Pretoria (UP), on 16 March at the Faculty's first Open Day with the theme, Become a Scientist – Change the World.

More than 600 Grade 11 and 12 learners from as far as the Free State and Limpopo Province, accompanied by their parents, rocked up for the event to learn more about science and how the University make STEM (acronym for science, technology, engineering, and mathematics) education more accessible for learners. See more on page 5

The Dean added, "To unlock the full potential of Africa, we need more than just dreams; we need scientists - brave, curious, and relentless in their pursuit of knowledge. And that's where you, as learners, come in. Here, within the walls of our University, lies a world of opportunity waiting to be explored. From Actuarial Science to Zoology and everything in between, the possibilities are endless, and the choice is yours."

Learners saw science in action, with all 13 departments exhibiting and hosting nine tours to NAS state-of-the-art facilities. This ranged from uncovering the mysteries of the Universe through Physics and exploring the wonders of space, time, and beyond. At Zoology and Entomology, learners and parents were informed how their diverse studies can help build a sustainable future for the African ecosystem. Research in food security, botanical medicines, and plant biodiversity conservation was showcased, and opportunities were provided to explore the wonders of the animal kingdom at Animal Science. Other exciting experiences included thrilling minerals and rock demonstrations at Geology, learning about drones and how real meteorologists forecast the weather by putting weather apps to the test.

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 Social Responsiveness and Societal Impact

IN MEMORIAM



Read more about our ground-breaking research

Matilde Beresford50

RE.SEARCH is a digital magazine where the University of Pretoria highlight some of its impactful research, knowledge and solutions. Researchers from the Faculty of Natural and Agricultural Sciences (NAS) are featured on pages 2, 18, 20 and 28 in this eighth edition, with this issue's theme being CONNECT. Visit the Research Matters website for the first, second, third, fourth, fifth, sixth and seventh editions and more NAS and UP research.

Message from the Dean

Prof Barend Erasmus

This is the first Message for the newsletter since my second term as Dean commenced late in 2023. I had the opportunity to take an extended break, which allowed me time to reflect, envisage what NAS can look like in the next few years, and, most importantly, rest and recharge for the next four years.

Financial sustainability and the acceleration of transformation are still two of the priority focus areas for this Faculty, and we need everybody to work together towards these common goals.

The Faculty's traditional strengths in the complete food and agricultural value chains, one health, natural resource management and environmental change, supported by deep scholarship in the basic sciences, are unlikely to change. In the future, the Faculty must bring these strengths to bear on contemporary societal challenges, and it must do so with exciting new value propositions that will entice new donors and sponsors to share in the NAS's success.

Furthermore, from the Quinquennial Quality Review and data analytics, the Faculty's tactical priorities within which we need to develop these new value propositions are undergraduate student success, postgraduate student recruitment and -success, internationalisation and transformation, with financial sustainability as a cross-cutting thread.

We are proud to share that the Faculty hosted its first Open Day with the theme, 'Become a Scientist - Change the World' in March. During this event, more than 600 Grade 11 and 12 learners had the opportunity to explore the impact of science extending far beyond the confines of our classrooms and textbooks (page 1).

I always enjoy graduations, not just the gravitas of the event that recognises the effort and commitment to graduate, but also the collective joy of achieving this milestone. UP awarded 12 511 gualifications during its Autumn graduation ceremonies, with 1 353 graduates hailing from NAS in five ceremonies. Our PhD output was remarkable again; 53 of the 270 PhDs awarded were from NAS (page 37). The Faculty can boast that it graduated with its first PhD in Astrophysics (page 29) and illustrated the principle of lifelong learning with an 80-yearold soil scientist who received his PhD (pages 31).



To emphasise our commitment to conservation and sustainability, the Faculty has awarded world-renowned conservation scholar Professor Stuart Pimm, the Doris Duke Distinguished Professor of Conservation Ecology at the Nicholas School of the Environment at Duke University in the US, with an honorary doctorate for his outstanding contribution to conservation biology (page 20). Of particular interest is how Prof Pimm shaped the discipline of conservation and how we applied it worldwide at several study sites where ecosystems are endangered.

Prof Belinda Reyers further highlighted progress linking environment and development issues despite enormous challenges in the recently released Human Development Report (HDR 2023-24) titled: "Breaking the gridlock: Reimagining cooperation in a polarized world" is an eye-opening call to action (page 41).

The Faculty is proud to have been part of the International Food Systems



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NAS social media



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

Research Week hosted at the University of Leeds, England. The event sought to enable research and innovation collaboration opportunities across strategic research, industry and priority policy themes (page 26). The collaboration with Leeds is one of the outcomes of an intentional effort at UP to reach out to like-minded international partners for a more significant global impact.

Our female researchers also keep on making inroads internationally. Prof Hettie Schönfeldt was appointed to the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security (page 22), Prof Lynne Pilcher was awarded the 2024-2025 award by the American Chemical Society's Committee for Environment and Sustainability (page 19), and Prof Patricia Forbes has been elected as the National Representative of the Analytical Chemistry division of the International Union of Pure and Applied Chemistry (page 24).

Innovative approaches to teaching and learning remain a high priority. Prof Johan Ferreira and Dr Seite Makgai set a new standard for innovation with their statistics storybook, in which they, as academic statisticians, challenged others to think of new and novel ways to advocate for their discipline (page 33). Another highlight was the recent opening of the newly renovated Industrial Sewing Lab in the Department of Consumer and Food Sciences, which allowes students to excel further in teaching, learning, and research activities (page 36). This renovation is another excellent example of how long-standing relationships with industry, in this case, Bernina, can transform facilities for better student outcomes.

Our research endeavours continue to reach new heights. NAS researchers rise to the challenge of sharing their transdisciplinary research in the latest edition of the University's Re.Search magazine (page 3). We feature many research highlights relating to food security and conservation focus areas in NAS. Our global engagement is evidenced by the awards to NAS staff and students.

Please also take note of the next NAS Research Symposium, which will take place early in September. Keep an eye on the Faculty website for more information and updates.

We pay our respects to those who lost loved ones and colleagues in the past few months. Ms Matilde Beresford, a former Head of NAS Student Administration, is one of them (page 50).

To all the NAS students who are writing examinations, I wish you well in your preparations and assessments. To our NAS staff, collaborators, funders, donors, and colleagues at UP, we thank you for your continued commitment and support and wish you a productive end to the first semester.

From <u>page 1</u>

Alumni and industry members in many of the sciences offered by NAS also attended the day and shared their experiences and possible career opportunities with qualifications from the Faculty.

The Dean encouraged learners with his final words, "Our continent, Africa, offers boundless opportunities, and we are at the forefront of harnessing its potential. But to do this, we need knowledge that transforms into action."





Bringing the benefits of genome editing to Africa

Genome editing is heralded as a ground-breaking technology. It was brought into the limelight in 2020 by the Nobel Prize in Chemistry award for the discovery. In February 2024, the FDA in the USA approved the first gene therapy using this technology. In this medical landmark, patients are treated for sickle cell anaemia, a debilitating genetic disease.

Genome editing is also being applied by plant breeders in agriculture to improve crops, a process that has become known as precision breeding. However, there is concern that Africa is falling behind in access to genome editing technologies.

In an opinion piece in *Nature Biotechnology*, Prof Dave Berger, Head of the Department of Plant and Soil Sciences and a member of FABI, joined a call by African scientists and colleagues in Europe by outlining what is needed to make genome editing a success in Africa. Key issues that need to be addressed are public consultation, appropriate regulatory frameworks, North-South publicprivate partnerships, and laboratory centres where there is a critical mass of expertise.

Many countries, such as the USA, UK, Australia, Japan, Kenya and Nigeria, to name a few, have adapted their regulatory frameworks for GMOs

to recognise that genome editing can used to breed improved crops without the insertion of foreign DNA, and therefore are regulated as non-GMOs. This dramatically reduces commercialisation costs and has boosted innovation in these countries. The decision by the South African government to regulate all genome-edited products as GMOs is of concern to many scientists in the country. Prof Berger and other colleagues previously coordinated a petition by local researchers to the Minister to revise the policy. Engagement with the regulators by academics and industry is ongoing in attempts to assist with a policy that is aligned with international best practice and facilitates South Africa's access to the benefits of genome editing.

Prof Dave Berger



NAS researchers involved in discovery of nine trapdoor spider species

Researchers at the University of Pretoria's (UP) Department of Zoology and Entomology and the Agricultural Research Council (ARC) discovered nine new trapdoor spider species in the Great Karoo. This brings the count of members of the Stasimopus genus, which is endemic to Southern Africa, to 56 distinct species.

News about the discoveries was announced in the journal *Zootaxa*.

"A distinguishing feature of trapdoor spiders is how they cover their underground burrows with a trapdoor-like lid made of soil, silk and plants," explains lead author Dr Shannon Brandt, a recent PhD graduate from UP. "These burrows can be up to 30 centimetres deep. Depending on the species, some burrows are wide enough for a R5 coin to fit in, while a smallish orange could easily be dropped into others."

Once sexually mature, males leave their burrows to mate. Females and immature males generally remain within the burrows, from which they pounce within a millisecond on passing prey such as grasshoppers, beetles and even small frogs, and inject them with venom (which is not harmful to humans).

The exemplars used to describe the new species were collected across the Great Karoo during 2018 and 2019. Fieldworkers focused on drainage lines, as trapdoor spiders favour these. Survey work took place at 79 sites on farms in the Northern Cape, Western Cape and the Eastern Cape, around towns such as Beaufort West, Richmond, Murraysburg, Jansenville and Willowmore. All the samples are being kept in the National Collection of Arachnida at the ARC in Pretoria.

Thanks to subsequent genetic and taxonomic work by Dr Brandt,





the tally of trapdoor spider species known to be found in the Great Karoo is now 23 species. Experts believe finding more species in the arid region is possible.

The survey work was supported through the Karoo BioGap project, led by the South African National **Biodiversity Institute in the late** 2010s and funded through the National Research Foundation. It saw researchers from a host of South African research institutes, including UP, pool their efforts to survey and research the plants and animals of the Great Karoo region. The aim was to better understand this notoriously under-surveyed arid region's interconnected ecosystems and sensitive habitats. The endeavour has led to the description of various new species of trapdoor spiders and scorpions, aloes, and freshwater fish, which are new to science.

"Through projects like the Karoo BioGap Project, we can truly start understanding South African biodiversity," says Robin Lyle of the ARC, who led spider research during the project. "It's important to know as much about the region's biodiversity as possible, given the potential that shale gas fracking, mining, farming and general land-use changes could have on the environment. This foundation biodiversity data could eventually help to understand the impact of climate change within the region."

In recognition of the impetus that Karoo BioGap gave to the study of spiders, the researchers involved in the *Zootaxa* paper named one of the new species *Stasimopus Karooensis*, specimens of which they collected in the Eastern Cape part of the Karoo, around the towns of Jansenville and Pearson.

Another new species was named *Stasimopus venterstadensis* – The only known specimens of the species were collected in 2018 near Venterstad in sandy soil among buffalo grass and Karoo shrubs.

A male sample of *Stasimopus ignis* was serendipitously collected from under a doormat at Toonbothasfontein, a farm near Richmond, where the survey team slept during one of their collection trips. A female specimen was found near Hanover, also in the Northern Cape.

"'Ignis' refers to the Latin word for fire or flame," Dr Brandt explains. "The word alludes to the increased frequency of fire in the Nama Karoo. Such events were historically rare but likely to increase because of climate change. It also refers to the fact that the female's body is much redder than most other species."

Dr Brandt's interest in trapdoor spiders began during her time as an honours student at UP. She received a PhD in Zoology at UP in 2023 and has since taken up a postdoctoral position in Bordeaux, France at INREA. This public research institution focuses on agriculture, food and the environment. She has published four papers on the trapdoor spiders of the Great Karoo, including one in Evolutionary Biology, in which she sets out guidelines on how to use the relative size and position (called the average ocular pattern) of trapdoor spiders' eyes to distinguish between Karoo species.

She named *Stasimopus dylani* after her husband, Dylan, in recognition of his support and encouragement during her postgraduate studies. The species was collected in sandy soils around Murraysburg, Jansenville and Willowmore, and is thought to be widespread across the Western Cape and Eastern Cape parts of the Karoo.

Stasimopus theaei is named after Lyle's eight-year-old daughter, Thea, while Stasimopus finni was named after Finn Pirk, the three-year-old son of co-author Professor Catherine Sole of UP's Department of Zoology and Entomology.



Trapdoor spiders hide in underground burrows. Each is covered with one cork-like lid made of soil, silk and plants.



They are found in seven South African provinces and Lesotho.



56 species of trapdoor spiders of the Stasimopus genus are known to be endemic to Southern Africa.

The species developed in the region during the early Paleocene era, some 66 to 56 million years ago.

Dr Brandt's PhD supervisor, Prof Sole, says her son loves "all creepy crawlies". Examples of both species were first collected around Somerset East, in an area dominated by low shrubs and aloes.



Click on the video to watch a trapdoor spider catch its prey, or read the infographic to learn some facts about spiders or click on the gallery to see how they burrow under their trapdoors.

From quiver trees to kelp, watch for "species-on-the-move" amid climate crisis



"Fish don't need passports; they can just move." And boy, are they moving, says <u>Dr Romina Henriques</u>. She is a marine biologist in <u>UP's Department of Biochemistry, Genetics and Microbiology</u> who knows very well how different ocean species in South Africa are shifting. That is why she joined <u>a global chorus of scientists calling</u> on citizens to watch for "species-on-the-move".

"We are amid the largest redistribution of species in the shortest geological time frame ever," she says. "Most species adapted to their environments over millions of years of evolution. And now we ask them to do the same in just a few generations. It is no longer thousands and millions of years; you're looking at 10 to 20 to 50 years," she says.

From quiver trees to kelp, on land and underwater, resource or pest, the climate crisis is pushing and pulling biodiversity in a way that is already having dire consequences for humans.

"This is happening. It's not in 2030, and it's not *if* we don't meet our targets for emissions. We are already amid species-on-the-move. We are in the midst of climatic change at planetary level. And we must find a way to mitigate and adapt to it," says Henriques.

In South Africa, for instance, some of our most important industrial fishery systems are distributed along the west coast and into the Eastern Cape. "What happens if or when those fish start moving away?"

"Anchovies are shifting out of the West Coast into the South Coast because the change in the marine systems of South Africa is quite complex." She explains that because of the way the Benguela and Agulhas currents interact, not only are rainfall patterns shifting inland, but parts of the west coast and southern Cape will cool, while the eastern coast will become warmer.

"Kelp has already moved into the southern Cape, being seen in De Hoop," says Henriques.

All of this means that the resources that commercial fishing trawlers, as well as recreational and subsistence fishers rely on, are leaving to find a better niche. As are garden birds, malariacarrying mosquitoes, bees and other pollinators that food and flower crops depend on, and even large and small game worldwide. Grasses, trees and shrubs - the food and homes of people, insects and other animals are also finding greener pastures.

We can, and must, sit up and pay attention to these species-on-themove, says Henriques.

She and her fellow scientists have honed in on this warning sign of the climate crisis because of how it pulls at our heartstrings: most of us have an intrinsic sense that other living things have value; we all have cultural and spiritual connections to our land and waters; and our daily struggle to survive, just like these other specieson-the-move, will be threatened by new diseases or a lack of water.

"We don't know how we will thrive in a completely different environment," says Henriques. "What was once there, is going to change."

But watching for species-on-themove at home, at work or on holiday is really a way to empower the public toward productive climate action, and not something that should leave citizens with unproductive worry and feelings of hopelessness and fear.

Inspired by Senegalese forest scientist, Baba Dioum, Henriques believes that people will ultimately galvanise to protect what they know and love.

In 1968, Dioum wrote: "In the end, we will conserve only what we love; we will love only what we understand, and we will understand only what we are taught."

Henriques mentions the recent example of communities in the Eastern Cape banding together on shared values, indigenous knowledge and a love for their land, to stop oil company Shell from conducting seismic surveys.

"So what power do we have? We have power! What did Siya Kolisi say? Our power comes from being stronger together."

Besides encouraging our observationist tendencies in our own backyards, work or recreational spaces (which may lead to grassroots community movements and even national political pressure), Henriques says citizens can also help scientists map species-on-the-move.

She says that by using an app called iNaturalist, anyone can record species and provide a geographical (location) reference for it.

"So if you see something interesting that has never been there, definitely please do it because we also use it as a teaching tool here at UP where students can download the information and map it," she says.

Ultimately, species-on-the-move in the context of the climate crisis is not just about not seeing a lion at the Kruger Park or not catching your favourite kabeljou on a fishing trip, says Henriques.

"Species-on-the-move can impact ecosystem structure and function, food security, human health, livelihoods, culture and even the climate itself through feedback to the climate system, presenting a wide variety of potential pathways for people to understand that climate change affects them personally as individuals," she writes jointly with her colleagues.

New app will tell SA potato farmers exactly when, where and how much to water

South African potato farmers rely on irrigation, but with the country's electricity and water challenges, precise irrigation guided by science is key to sustaining the industry. (Photo: Prof Martin Steyn)

With unpredictable electricity, rainfall and municipal water supply, South African farmers may need faith like potatoes to manage crop irrigation. But, scientific suggestions from their smartphones to prevent under- or over-watering would also help.

University of Pretoria researchers say that for the first time in South Africa, data from satellite imagery and local weather stations have been "calibrated" to inform irrigation strategies on potato farms in the western Free State. The data will be available as an app that shows simple indicators of exactly how much irrigation is needed on a particular day.

Once the technology is fully available to potato growers, it will also be fairly easy to adapt it to other crops like maize and onions, as well as for other farming regions.

"Farmers will be benefiting directly, and also the researchers and agronomists supporting the growers," says Alex Mukiibi, a PhD candidate at UP's Department of Plant and Soil Sciences.

While the idea of using remote sensing (satellite images) and weather data for more precise irrigation is not new, says Mukiibi, the technology had not been properly adapted for local soil conditions, local potato varieties and local weather patterns until now.

He explains that the application of remote sensing data must be validated for any unique set of conditions, meaning that it must be checked against true measurements taken on the ground, so that farmers can trust it.

For the scientifically-minded, Mukiibi describes the technical details of this work in the journal *Remote Sensing*, alongside his supervisor at UP, Prof Martin Steyn, and Prof Angelinus Franke of the University of the Free State.

But for the rest of the country's potato lovers, this advance essentially means that farmers will save on power and water costs, improving sustainability and ensuring that we can enjoy our chips and mash at a reasonable price. "If we go out for dinner, the team has to eat chips; they cannot choose any other starch," jokes Steyn.

"I've been working in this field of crop irrigation management, and on potatoes, for my whole life," says Steyn. "Potato is a drought-sensitive crop, and it is expensive to grow, so the risk is very high. We see the negative effects of water, pumping and load shedding costs on farmers."

In the 1970s and 1980s, says Steyn, only about 50% of potato growers were irrigating their crops, whereas now it is closer to 85%.

However, most farmers are still not using the many tools and technologies already available to enable "smart farming" because they are expensive, difficult to use for non-experts, or unavailable in a single app.

Recognising this gap, researchers like Steyn, Mukiibi and others are now working with the industry to deliver remote sensing-based crop water-use data simply and quickly to farmers' smart devices.

Potatoes SA funded this first "ground truthing" calibration step, in which Mukiibi and his technical assistants, Nozi Radebe and Stéfan Steenekamp, collected soil and crop data directly on the ground at specific farms in the western Free State.

The research team then checked their ground observations against satellite images and weather data for the same time periods and locations.

The type of satellite data they use is known as "normalised difference vegetation index", or NDVI, which essentially shows how green and healthy a field is.

This ground-truthing process allows them to optimise, or calibrate, the mathematical model used to directly glean crop water needs from the

remote sensors and local weather station data, without requiring any ground measurements in the fields.

"We are now busy with the next phase," says Steyn. "We've joined up with a fertiliser company called Yara Africa Fertilizer, and they are sponsoring this final step, where we do a final validation in a different region with independent data."

The company already has an app that shows management information and NDVI images for individual fields. The added functionality will then be able to automatically "suck" in weather data from the closest weather station, and use that in combination with the satellite data to calculate the water use of that crop for the previous day or days.

Steyn says a network of new, local weather stations in the potatogrowing Sandveld region of the Western Cape is currently being set up by a local service provider to help with this.

Of course, even this smart technology has its limitations, especially when it's cloudy. But Steyn says there are ways around this: because new satellite images and weather measurements are taken frequently, any gaps in the data will quickly fill up again to give farmers real-time, reliable information.

Mukiibi says that since embarking on this research as part of his PhD, in particular, spending time with South Africa's potato growers, he's come to understand what this technology will mean for the industry.

"On the farm you can see the impact it makes and the desire the growers have to help you execute your work," he says.

"You can see they want to be involved, and they want this to work."

RESEARCH

New study finds that adult female southern right whales visiting Cape Town are 25% lighter than 30 years ago, and are giving birth less often. The southern right whale's name is reminiscent of the heyday of the whaling industry in the first half of the 19th century, when they were said to be the 'right whales' for hunting because of their docility and pattern of swimming close to shore.

As a result, southern right whales (*Eubalaena australis*) and their two closest relatives — the even-more endangered North Atlantic right whale and the North Pacific right whale — only narrowly escaped extinction. But while the numbers of southern right whales have stuttered upwards over the past decades, climate change may be kicking the whales while they're still recovering.

In fact the breeding females visiting Cape Town and surrounding shores of South Africa for their annual calving migration have dropped 23% of their body weight since the 1980s, according to a paper published in *Scientific Reports*. They are also giving birth less frequently, dropping from every three years to every four to five years.

The findings are based on a photogrammetry analysis in which researchers compared aerial

images taken in 1988 and 1999 with those in 2019 and 2021. Scientists were able to calculate the whales' body conditions from estimates of body length, width and height.

The Whale Unit of the Mammal

Research Institute (MRI) at the University of Pretoria first started a simple headcount of the southern right whales (SRWs) in 1969 using a helicopter, but then evolved to identifying individual whales and using drones and autogyro for counting and photogrammetry. "A strong focus is given to females with a calf for reasons of population monitoring," explains Dr Els Vermeulen, the research manager of the Whale Unit and lead author of the study.

Over the years, the Whale Unit has amassed a catalogue of over 2,500 females, estimated to account for about 70% of the total number of females in the South African population. Based on this data, the researchers have also concluded that the females are giving birth less often, which could be attributed to either additional resting years between calving periods to build up fat reserves, or the loss of a foetus. The weight loss could be the result of shrinking food sources, notably krill in the Antarctic. It's a theory Vermeulen and others first proposed in a 2020 paper titled "Decadal Shift in Foraging Strategy of a Migratory Southern Ocean Predator."

This would explain why, as recent findings with the Cape Town SRWs indicate, whales are also leaving coastal areas earlier than in previous seasons to go back to eat as they don't have enough energy or food to sustain them.

Read more about right whales

This article first appeared in Nature Africa on 26 March 2024.

Can a wearable silicone rubber band detect TB through human skin?

Can we detect tuberculosis (TB) through human skin? A wearable silicone rubber band has the answer. Portia Makhubela, MSc graduate, under the supervision of Dr Yvette Naudé and Prof Egmont Rohwer from the Department of Chemistry set out to investigate if tuberculosis-associated compounds can be detected from human skin.

Tuberculosis (TB) is a contagious disease that spreads through the air when an infected person coughs or sneezes.

TB is one of the leading causes of death in low- and middle-income countries. A challenging public health concern is that people often do not know they are infected until symptoms become severe, unknowingly spreading the disease. Once diagnosed, TB is highly curable, thus emphasising the need for early detection. Blood or sputum remains the primary diagnostic material. These materials are infectious, sampling procedures are invasive, and require skilled medical staff in clinical settings for sampling.

A skin emanations sampling patch developed in the laboratory by the research team consisting of silicone rubber (polydimethylsiloxane (PDMS)) bands, covered with a Mylar® shield (to minimise exposure to the background) and secured with

Skin emanations sampling for TB-biomarkers: (A) wearable silicone rubber sampling bands are placed on the inner wrist. (B) Mylar® shield covers the bands. (C) Hypoallergenic Micropore[™] surgical tape covering secures the patch on the skin surface.

hypoallergenic surgical tape was placed on clinically TB-positive and TB-negative participants. Participants wore the skin sampling patch for an hour, freeing them to go about their usual routine.

Dr Naudé said, "The silicone rubber bands containing the trapped organic compounds emitted by the body during the sampling period were then analysed by thermal desorption coupled with comprehensive gas chromatography-mass spectrometry. The analysis confirmed 27 compounds known to be associated with TB in conventional biofluids, and identified 16 new potential TB-biomarkers. Using predictive modelling techniques, these compounds could discriminate between TB-positive and TBnegative groups."

"The sensitivity and specificity of the noninvasive skin patch test compared excellently to that of the gold standard GeneXpert. Human skin emanations are an attractive substitute for invasive sampling procedures of infectious materials, with the benefit that the safety and simplicity of the sampling patch allows application by non-healthcare workers in nonhealthcare settings."

This research was recently published in the *Journal of Chromatography B* and *The Conversation*.

African scientists secure major grants to accelerate drug discovery

A network of world-class scientists across Africa has entered the global drug discovery arena following a US\$7.2 million joint investment by the medical research charity LifeArc and the <u>Bill & Melinda Gates</u> <u>Foundation</u> in the Grand Challenges Africa Drug Discovery Accelerator (GC ADDA) programme.

Grand Challenges is a family of initiatives fostering innovation to solve key global health and development problems. GC ADDA will leverage US\$4.7 million (about R85 million) of the funding to develop new drugs in the fight against malaria and Tuberculosis (TB) – two of the top killers that disproportionally affect Africans – by supporting two teams led by scientists from the Universities of Ghana (UG), Pretoria (UP) and Stellenbosch (SU).

While African countries have made remarkable progress in the fight against malaria and TB, the continent still bears the brunt of infectious diseases burden, with these two age-old diseases killing almost one million people on the continent each year. According to the World Health Organisation, of these, about 600 000 deaths are due to malaria and 400 000 due to Tuberculosis. The continued development of treatment-resistant forms of these diseases means that there is a critical need for innovative tools to eliminate them.

GC ADDA has two main objectives: to support exciting drug discovery projects in Africa and create a project-driven virtual African drug discovery network that advances Global Health. GC ADDA brings together and leverages on partnerships that support strategic and scientific leadership.

Leading research efforts on malaria and TB in Africa

Leading the drive to deliver novel malaria drug candidates are

Dr Richard Amewu, head of the Drug Innovations Group at the University of Ghana, and Prof Lyn-Marié Birkholtz from the University of Pretoria Institute for Sustainable Malaria Control (UP ISMC) in South Africa.

Prof Birkholtz says the need for antimalarial drugs in Africa is critical since malaria cases are increasing. "We have to propel existing discoveries forward by building on our existing capacity and expertise."

According to Dr Amewu, this funding will support ongoing efforts by African scientist in contributing to the global efforts to address this problem," he says. These efforts will expand the capabilities on the content and build on the leading contributions in drug discovery that stemmed from the Holistic Drug Discovery and Development Centre (H3D) based at Cape Town University in South Africa.

The network of scientists working on malaria also includes Prof Fabrice Boyom at the University of Yaoundé in Cameroon; Prof Amanda Rousseau at the University of the Witwatersrand; Dr Winston Nxumalo from the University of Limpopo; Prof Laurent Dembele and Dr Dinkorma Ouloguem from the Université des Sciences, des Techniques et des Technologies de Bamako in Mali. They will interact closely with experts from the University of Dundee's Drug Discovery Unit in Scotland, the biotech company Lgenia (USA), the Malaria Drug Accelerator, and the Medicines for Malaria Venture as well as the H3D.

In reaction to the announcement, Dr James Duffy, senior director of drug discovery at MMV, said it is going to be a game changer for African scientists and drug development on the continent: "A unique environment and opportunity has been created where world-class scientists from disease endemic countries can collaborate to discover new drugs to address unmet patient needs on their doorstep."

In the fight against multi-drug resistant TB, the effort will be led by Prof Erick Strauss from the Department of Biochemistry at Stellenbosch University (SU), in partnership with Dr Gabriel Mashabela at the South African Medical Research Centre for TB Research, (also at SU), and teams led by Prof Adrienne Edkins at Rhodes University and by Prof Rajshekar Kapoormath at the University of KwaZulu-Natal in South Africa, as well as Dr Elizabeth Kigondu and Dr Edwin Murungi at the Kenya Medical Research Institute.

According to Prof Strauss, the aim is to pursue new, previously unexplored avenues for discovering effective treatments against TB. These efforts will complement the many existing drug development efforts led by other international consortia, such as the Tuberculosis Drug Discovery Accelerator (TBDA).

Dr Clif Barry, chief of the Tuberculosis Research Section at the National Institutes of Health in the United States, says TB and especially multidrug-resistant TB, continue to be a significant health burden in African countries: "It is only fitting that an investment of this scale should be made to support scientists on the continent who are working to develop new antituberculosis treatments."

Both the malaria and TB projects will be supported by the Pan Africa DMPK (Drug Metabolism and Pharmacokinetics) Centre of Excellence led by Professor Collen Masimirembwa, African Institute of **Biomedical Science and Technology** (AiBST) in Zimbabwe, and a funded member of the GC ADDA. The remainder of the funding will go to Dr Fidele Ntie-Kang from the University of Buea in Cameroon. He will be creating a set of 400 natural products found in Africa for screening against a range of diseases, including TB and malaria.

H3D director Prof Kelly Chibale said the grant is a major leap forward towards building a critical mass of scientists fighting these diseases on the African continent. H3D plays a leading role along with H3D Foundation and Science for Africa Foundation in the Grand Challenges Africa (GC Africa) initiative.

While African countries have made remarkable progress in the fight against malaria and TB, the continent still bears the brunt of infectious diseases burden GC ADDA will leverage this funding to develop new drugs in the fight against these diseases.

Prof Lynne Pilcher honoured with international sustainability award

Prof Lynne Pilcher from the University of Pretoria's Department of Chemistry was recently honoured with a 2024–2025 award by the American Chemical Society's (ACS) Committee for Environment and Sustainability (CES).

This award recognises those who have made exemplary contributions to modernising the chemistry curriculum to include sustainable development, circularity, green chemistry, and life cycle thinking.

"It is an honour to be recognised internationally, as it affirms that our work at UP is globally relevant. The award validates my decision to change from being a locally recognised organic chemistry researcher to a new field on the belief that I could have an immediate impact," Prof Pilcher said when asked what such a prestigious award means to her.

She added that the Faculty of Natural and Agricultural Sciences (NAS) has long embraced discipline-based tertiary education research, and this award recognises the benefit of including education research in this Faculty. "This research aligns with the University's strategic vision for research-informed teaching, aimed at fostering student success and cultivating graduates equipped to address societal challenges, particularly in sustainability."

Having received a C2 rating from the NRF in organic chemistry in 2019, Prof Pilcher, an associate professor in the Department of Chemistry, shifted her research focus to Chemistry Education. The convergence of calls from the International body governing the discipline (International Union of Pure and Applied Chemistry) to introduce 'Systems Thinking' in chemistry education coupled with overseeing a challenging PhD project in physical-organic chemistry highlighted the deficit of fully reductionist chemistry education and the need to introduce systems thinking in undergraduate teaching.

Thus, her recent research, the subject of two MSc projects in tertiary chemistry education, has centred on designing, implementing and evaluating systems thinking interventions for first-year chemistry students.

The first project, conducted with MSc student Micke Reynders and Prof Marietije Potgieter as co-supervisor, delved into the chemical system of surfactants found in common laundry detergents. It applied chemistry course content to explore the properties of the surfactant in the laundry tub and the environment, looking at its impact on the economy and benefits and hazards for society and the environment. The topic was useful for highlighting the idea that chemicals benefit humanity but have hazards that must be managed. The intervention emphasised the role of chemistry in working towards a more sustainable future. This project was chosen to represent UP in the International Visualize Your Thesis competition in 2022. A refined iteration of this project, implemented in 2022 and 2023, has garnered recognition with the ACS award. The second project, a more recent endeavour, involved developing an intervention for firstyear engineering students in collaboration with Dr Dorine Dikobe, focusing on utilising green chemistry metrics and life cycle assessments to examine aspirin production through a systems-thinking lens for sustainability.

Prof Pilcher emphasised that "Achieving Sustainable Development Goals, such as zero hunger, good health, clean water, and affordable and clean energy, requires an understanding of chemical substances, their transformations and their interactions within the earth system. Furthermore, the planetary boundaries framework underscores nine critical processes regulating Earth's stability and resilience (1.) These processes are directly linked to chemistry through the measurement of substances or the management of chemical transformations. While chemistry has enhanced countless aspects of human life through medicines, fertilisers, plastics, etc., overlooking environmental implications has led to significant harm. Integrating sustainability into chemistry education lays a foundation for chemistry's constructive role in sustainable development.

1. Steffen W, Richardson K, Rockstrom J. and Cornell SE, Fetzer I, Bennett EM, Biggs R, Carpenter SR, de Vries W, de Wit CA, Folke C, Gerten D, Heinke J, Mace GM, Persson LM, Ramanathan V, Reyers B, Sorlin SS. Planetary boundaries: guiding human development on a changing planet. *Science.* 2015, 347, 6223, 1-10.

The University of Pretoria (UP) has awarded world-renowned conservation scholar Professor Stuart Pimm with an honorary doctorate for his outstanding contribution to conservation biology.

The Faculty of Natural and Agricultural Sciences conferred the doctorate on Prof Pimm, the Doris Duke Distinguished Professor of Conservation Ecology at the Nicholas School of the Environment at Duke University in the US, during UP's 2024 autumn graduation season. He studies why species become extinct, the rate of extinction and the global patterns of habitat loss, among other areas.

"I am honoured to receive an honorary doctorate from the Faculty of Natural and Agricultural Sciences," Prof Pimm said. "Having collaborated with researchers and students at UP for more than 25 years, it is clear that the conservation impact of my work aligns with the vision and mission of the University of Pretoria. We share a commitment to advancing innovations in conservation globally for a better society."

"What makes Prof Pimm's scholarship particularly impactful is that his early theoretical work evolved into

very practical conservation management guidelines, which he has implemented and refined at various sites across the world," said Prof Barend Erasmus, Dean of the Faculty of Natural and Agricultural Sciences. "His work on transboundary elephant conservation in Africa, together with that of the late Prof Rudi van Aarde, remains a scholarly benchmark and guides regional conservation frameworks. Having this level of translation from theory into practice on a global scale is exceptional."

To date, Prof Pimm has published more than 350 peerreviewed scientific papers in leading journals such as *Science*, *Nature* and the *Proceedings of the National Academy of Sciences*. He has also published six books, including *The Balance of Nature? Ecological Issues in the Conservation of Species and Communities* (1991) and *The World According to Pimm, a Scientist Audits the Earth* (2001).

Prof Pimm's academic career began in 1971 at Oxford University in the UK, where he obtained an honours degree. He received a PhD from New Mexico State University, US, in 1974. After that, he held academic positions at several US-based institutions – Clemson University, Texas Tech University, University of Tennessee and Columbia University – before finally taking up his current position at Duke University in 2002.

In addition, Prof Pimm is an Extraordinary Professor in UP's Conservation Ecology Research Unit within the Department of Zoology and Entomology, a position he held from 2001 to 2010 and then from 2016 to date.

"Throughout his career, Prof Pimm has provided stimulating and insightful lectures, developed high-quality graduate students, and expanded the theoretical understanding of conservation science, which he then applies to conservation efforts across the globe," Prof Erasmus said. "For example, he mapped in increasing detail where biodiversity remains using geographic information systems and satellite imagery. His innovations in using these tools provide researchers, land managers and legislators critical insights into remaining refuges of biodiversity."

Through his NGO, Saving Nature, which he founded in 2007, Prof Pimm combines his theoretical understanding of large-scale patterns of biodiversity loss, the implementation of practical conservation solutions, and his engagement with policymakers, managers, the public and the media to prevent biodiversity loss.

Saving Nature's mission is to rescue endangered habitats and vulnerable communities from environmental destruction. This is done by targeting the most biologically rich and threatened places on Earth. The NGO has projects in Brazil's Atlantic Forest, Colombia's Western Andes Mountains, the Ecuadorian Amazon, Tanzania's Eastern Arc Mountains, Sumatra's Leuser Ecosystem and India's Hoollongapar Gibbon Sanctuary.

"For each of these projects, Saving Nature partners with wellestablished local conservation groups that purchase, restore and manage the protected areas," Prof Erasmus explained. "Moreover, through his academic efforts and the efforts of Saving Nature, Prof Pimm has generated leading research, which he has integrated into community outreach conservation programmes in several countries across four continents."

In addition to his contribution through Saving Nature and his academic work, Prof Pimm has testified on several occasions to US congressional committees on the Endangered Species Act. He has also led many congressional briefings and routinely engages with US politicians on biodiversity loss, deforestation and climate change.

His engagements within the political and policy spheres go beyond the US – Prof Pimm has also advised the South African government on elephant management, and is engaging with practitioners who manage protected areas in China.

"Thanks to his work with UP scientists, the total population of elephants and the details of where they occur and where they have conflict with humans are known for southern Africa," Prof Erasmus said. "This knowledge is key to map migration corridors and support regional and cross-boundary conservation planning."

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Prof Hettie Schönfeldt appointed as one of 15 global experts to international committee on food security

Prof Hettie C Schönfeldt, a professor in the Department of Animal Science in the Faculty of Natural and Agricultural Sciences (NAS) at the University of Pretoria (UP), was recently appointed to the High-Level Panel of Experts on Food Security and Nutrition (HLPE-FSN) of the Committee on World Food Security (CFS). She is the only appointment from South Africa.

Prof Schönfeldt is also an extraordinary lecturer in the School of Health Systems and Public Health and has held a Tier 1 Department of Science and Innovation/National Research Foundation (DSI/NRF) Research Chair (SARChI) in Nutrition and Food Security since July 2018.

When asked how she feels about this prestigious appointment, Prof Schönfeldt said, "The appointment as one of the 15 members of the HLPE-FSN's Steering Committee for the next biennium is a remarkable achievement that shows the high regard in which I am held in the FSN community. It publicly acknowledges and recognises the outstanding and unique contributions I have made in expanding the scientific research base of existing knowledge and crafting new solutions to food composition, nutrition and food security during my career. Furthermore, it underscores my dedication and commitment to advancing nutrition and food security locally, regionally and globally."

She added, "Recognising the critically important role of nutrition and food security to all agricultural and health sciences sectors, UP has made and continues to make substantial and long-term strategic interventions designed to position itself at the forefront of this rapidly developing frontier field. In striving to achieve high impact, UP encourages exploring local challenges within global and regional 21st-century contexts."

HOW ARE CANDIDATES APPOINTED?

Candidates must be internationally recognised experts in food security and nutrition-related fields. Apart from a proven record of publications and a solid background in research management, they should have substantial experience in managing groups or networks of experts and have good communication and interpersonal skills. The South African Department of Science and Innovation nominated her.

After the careful selection process of the members of the

CFS HLPE Steering Committee by the CFS Bureau, following the recommendations of an Ad Hoc Technical Selection Committee (AHTSC) taking into account both individual and collective criteria, and after a one-month non-objection procedure, Prof Schönfeldt was informed of **the CFS Bureau's decision regarding the proposed membership for the HLPE Steering Committee.** Her term of office started at the closure of the CFS's 51st session (23–27 October 2023).

The HLPE-FSN's Steering Committee is important in shaping global food security and nutrition policies. The HLPE-FSN is the United Nations body that assesses the science related to world food security and nutrition.

Prof Schönfeldt advocates for nutrition research, promoting excellence through creating, translating and disseminating science-based information into policies, programmes and training programmes both nationally and internationally. She was a co-director of the African Research Universities Alliance (ARUA) Centre of Excellence in Sustainable Food Systems. She is an NRF-rated scientist and a principal investigator at the Department of Science and Technology/National **Research Foundation Centre of** Excellence in Food Security.

Her work has been widely recognised. Recent awards include recognition from the industry in which she was honoured as a Pioneer Woman in Agriculture in March 2024. At the 13th International Food Data Conference in 2019, she received the distinguished Nevin Scrimshaw Award and a shared Success Story Award for the FAO/ INFOODS Food Composition Table for Western Africa.

Chair appointment: Prof Maano Ramutsindela

The University of Pretoria (UP) and the University of Cape Town (UCT) proudly announce the appointment of Professor Maano Ramutsindela as the Future Africa Research Chair in Sustainability Transformations, effective from 1 April 2024. Professor Ramutsindela, currently serving as Professor of Human Geography in UCT's Department of Environmental and Geographical Science, will also hold the position of Extraordinary Professor in the Faculty of Natural and Agricultural Sciences at UP.

This appointment signifies a historic collaboration between UP and UCT, both top-ranking research-intensive South African universities committed to advancing academic excellence and supporting social change and equitable, sustainable development. Recognising the potential of African sciences in addressing global sustainability challenges, both institutions understand the importance of fostering pan-African research collaboration and capacity development.

Transdisciplinary research becomes paramount in the current global context, where there is an urgent need for research that can foster a better understanding of societal transformations and profound systems change. Future Africa, a pan-African platform for collaborative and transformative research located at UP, provides the ideal vehicle to achieve these mutual interests and ambitions.

"Our collaboration with UCT to advance Future Africa's work in the challenge domain of sustainability transformations holds immense potential and benefits for both universities," says Professor Sunil Maharaj, Vice-Principal: Research, Innovation, and Postgraduate Education at UP. "This collaboration not only serves the needs of South African and African universities but also establishes a powerful model for realising the potential of Future Africa."

Future Africa research chairs are academics of high standing, who play a crucial role in advancing transformative research and having an impact at the science-policy-practice interface. The chairs work at a pan-African level and collaborate with global partners to set African agendas, build African capacities, create African networks of expertise and influence, and co-design and deliver high-impact transformative research in and for Africa. "Prof Ramutsindela's extensive experience and commitment to socio-ecological relations and the political ecology of peace parks make him the ideal candidate to lead Future Africa's efforts in sustainability transformations," notes Dr Heide Hackmann, Director of Future Africa. "His appointment is an exciting milestone for the platform and represents a significant step forward in our collective pursuit of global sustainability."

As part of his role in leading and further developing activities in Future Africa's Sustainability Transformations domain, Prof Ramutsindela will be co-director for the ARUA-GUILD Cluster of Research Excellence on the Politics of Sustainability. This cluster, co-led by the University of Pretoria and the University of Oslo, engages in collaborative research to address critical issues related to sustainability.

UCT's acting Deputy Vice-Chancellor: Research and Internationalisation, Professor Jeff Murugan, describes this appointment as a significant milestone that underscores both institutions' unwavering commitment to advancing knowledge and innovation. "As we strive towards realising our Vision 2030, this collaboration with UP reinforces our dedication to fostering interdisciplinary research and driving positive change that transcends borders and empowers future generations. We are confident that Professor Ramutsindela will serve as a beacon of excellence, driving impactful research and innovation that addresses the complex challenges facing Africa and the world," says Murugan.

"I am truly humbled and honoured to be appointed as the UP-UCT Future Africa Research Chair in Sustainability Transformations and excited about the opportunity to harness the transformative potential of African sciences in addressing sustainability challenges and working collaboratively towards a sustainable future for Africa and a just society, says Professor Ramutsindela."

Chemistry professor elected as national analytical chemistry representative

Prof Patricia Forbes

Professor Patricia Forbes from the University of Pretoria has been elected as the National Representative of the Analytical Chemistry division of the International Union of Pure and Applied Chemistry (IUPAC).

Prof Forbes, a Full Professor who holds the Rand Water Research Chair in the Department of Chemistry, said, "It is an honour to represent South Africa in this prestigious international forum". Those studying chemistry come to hear about IUPAC as undergraduate students, as IUPAC is the world authority which sets the nomenclature and terminology used in chemistry, including the naming of new elements in the periodic table. IUPAC has been creating the common language of chemistry for more than a century.

One of the contributions of IUPAC national representatives is involvement in projects initiated by the different divisions.

Prof Forbes is a member of a project team looking into the current status of analytical chemistry education worldwide. "The aim is to better understand the *status quo* and how this translates into educational requirements in the analytical sciences to ensure that the university chemistry curriculum meets the needs of both chemistry graduates and future employers", said Forbes.

"As the project objectives state, this is important as a deep and fundamental understanding of analytical chemistry is required to foster the next generation of analytical scientists with the insight, capacity and creativity to contribute to novel developments and disruptive technologies in this field. Prof Forbes noted that it is insightful to compare the local situation to that of her global counterparts concerning funding availability, proportion of professorships in analytical chemistry, and the quality of analytical chemistry education. "It is vital for Africa to have a voice on these international platforms," Prof Forbes concluded.

Master's student in Chemistry excels at #RSCPoster Conference 2024

Petra van der Merwe

Petra van der Merwe, a master's student in Chemistry, recently represented the Department of Chemistry at the global #RSCPoster (Royal Society of Chemistry) event and was selected as one of the <u>poster pitch</u> winners.

This 24-hour, annual event was held on LinkedIn, with 1 700 delegates from over 80 countries participating. In true social media fashion, numerous interesting posters and pitches were uploaded, discussed, and liked. In addition to the interactive poster uploads, webinars were held on contemporary issues, such as ethical considerations of AI in publishing.

'It was a great experience to connect with the international research community and read about the fascinating projects of my peers across the globe in such a modern and creative way', Petra said. Her poster discussed using in-house synthesised thin films to extract haloacetic acid disinfection byproducts from water.

This forms part of her master's research project, funded by the Rand Water Professorial Chair of Prof Patricia Forbes, in which she explores analytical methods to monitor these potentially carcinogenic compounds. In the accompanying poster pitch, a short video briefly presents the poster content, and she explains that these compounds may form as a result of source water disinfection before drinking water distribution.

She is no stranger to awards as she won the Sub-Saharan regional section of the International Organization for Chemical Sciences in Development (IOCD) Essay Competition: Young Voices in the Chemical Sciences for Sustainability in 2023. Ms Van der Merwe's winning essay, 'Science - a chess game against time', was published in the RSC Sustainability journal.

Petra is grateful to the Environmental Monitoring and Sensing Research Group and Prof Forbes for all the support and encourages young chemists to join the next #RSCPoster event in 2025!

Prof Berger heads Department of Plant and Soil Sciences

Prof Dave Berger was appointed on 1 January 2024 as the new Head of the Department of Plant and Soil Sciences. He also leads the Molecular Plant-Pathogen Interactions (MPPI) research group in the Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria (UP).

"Plants and healthy soils underpin life on earth. South Africa has an exceptional botanical biodiversity. Therefore, the Department of Plant and Soil Sciences has a critical role in developing the next generation of plant science professionals. As 'plant enthusiasts', we can advocate for sustainable solutions to the world's grand challenges." Prof Berger explained.

"My vision for the Department starts with the professional and academic staff. I look forward to guiding each team member to reach their potential and contribute to the bigger picture of the Department. The current academic staff are an interesting mix of highly productive staff with established research programmes, some strong mid-career researchers, and quite a few young staff. Mentorship is one of my passions."

Prof Berger joined UP in 2000, where he set up the ACGT Microarray Facility in the Faculty of Natural and Agricultural Sciences (NAS). This was one of the early genomics technologies for gene expression profiling and a service was provided nationally and for some international groups. The Facility also contributed to national training in the emerging field of bioinformatics, which was essential for handling the genomics data.

Currently, he works in plant biotechnology, conducting collaborative research on crop diseases of economic importance in Africa and globally. Prof Berger's research group interrogates grey leaf spot disease of maize as a model system to understand molecular mechanisms of plant host resistance and fungal pathogenicity. Genomics and data science approaches integrate and interpret field and laboratory data from maize and the pathogen. His main research aim is to develop sustainable management strategies for long-term food security.

Prof Berger is an NRF B-Rated Researcher and a Fellow of the Pan-African Scientific Research Council, the Southern African Society for Plant Pathology, and the Royal Society of South Africa. His research was recognised with the 2016 Special Award for Crop Science and Food Security from the National Science and Technology Forum and South 32. His contributions to capacity building in Biotechnology were reflected through awards from the European Union programme of the Department of Science and Technology and the Gauteng Department of Agricultural and Rural Development.

He added, "Work will continue to enhance cooperation between the wide range of disciplines in the Department, namely Botany, Plant Ecology and Diversity, Medicinal Plant Science, Soil Science, Agronomy, Horticulture, Plant Pathology, Pasture Science and Plant Biotechnology.

This offers exciting opportunities to explore plant biodiversity and food systems with multi-disciplinary teams. For example, focusing on climate-smart agriculture and soil health could attract substantial funding locally and internationally for research and postdoctoral/ postgraduate training."

Prof Berger emphasised that "The Department has several unique resources. It hosts the HGWJ Schweickerdt Herbarium, a national and international resource. Recently, we heard from visiting world-leading botanists how they use herbarium data in a global project on one of the holy grails in Agriculture, namely, to develop cereals that can fix atmospheric nitrogen like legumes. The Manie van der Schijff Botanical *Garden* works closely with the Future Africa indigenous food gardens, and this will be an important platform for community engagement, in addition to the ongoing initiatives in urban biodiversity in the Department."

"Finally, I look forward to working with colleagues in other departments in NAS and other University structures, building on the strong connections that are already established and making new ones. For example, the Department has extensive field and glasshouse activities at Innovation Africa @ UP, and several staff are members of FABI," Prof Berger concluded.

UP part of International Food Systems Research Week at Leeds University

The University of Pretoria (UP) is proud to have been part of the International Food Systems Research Week hosted at the University of Leeds, England. The event sought to enable research and innovation collaboration opportunities across strategic research, industry and priority policy themes. The Global Food and Environment Institute (GFEI) hosted partners from eastern and southern Africa.

The week, which was organised in collaboration with the Food Systems Transformation in Southern Africa for One Health (FoSTA-Health) programme, focused on changing food systems supply chains and regulation; and human, animal, environmental and plant health. Leeds University hosted associates from academia, industry and government, from South Africa, Zambia, Malawi and Tanzania.

"International Food Systems Research Week is where our community of world-leading research and innovation colleagues can collaborate with partners to foster opportunities across research, industry and policy, to create life-changing impact in our global communities," said Professor Nick Plant, Deputy Vice-Chancellor for Research and Innovation at Leeds University. "The global challenges facing our world, such as food security, can be solved only by viewing the system as a whole. Such a holistic approach requires strong interdisciplinary collaboration. We are delighted to continue to develop our partnerships with these leading experts and establish new interdisciplinary partnerships that can tackle global issues and drive change."

Representing UP was Prof Esté van Marle Köster, Head of the Animal Science Department in the Faculty of Natural and Agricultural Sciences, and Dr Danie Jordaan, a lecturer in UP's Department of Agricultural Economics, Extension and Rural Development. Their involvement indicated UP's commitment to advancing research in food security and African food systems.

During the week, a variety of systems research from Leeds University was shared, including that of FoSTA-Health and the Food Systems Research Network for Africa (<u>FSNet-Africa</u>). These two programmes

focus on food security and African food systems, and are carried out in partnership with UP and the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN).

Among the delegates was Cheney fellow Cecilia Onyango, Associate Professor of Horticulture at the University of Nairobi in Kenya, who was introduced to Leeds University's Cheney Fellowships Scheme through FSNet-Africa. The fellowship is designed to enable world-leading researchers to spend time at Leeds exploring new research ideas and building new collaborations.

"The Cheney fellowship will offer an excellent opportunity for me to work with colleagues from across multiple disciplines at the University of Leeds, starting now during International Food Systems Research Week," Onyango said. "Furthermore, my work will connect to the Knowledge Equity Network to enhance collaboration opportunities with higher education institutions in Kenya beginning with the University of Nairobi – with the aim of reducing inequalities and tackling global challenges together."

Academics were able to plan FoSTA-Health research on supply chain regulation, trade, and One Health in southern Africa, as well as progress work on food systems mapping and modelling. A tour of the University's research facilities included the research farm and the Centre for Innovation Excellence in Livestock's (CIEL) National Pig Centre.

"In a context of varied social and environmental challenges, there are competing priorities for food system change in eastern and southern Africa," Prof Plant said. "Bringing together different disciplines and sectors is crucial for building evidence-based understandings of the implications of food system changes in the region. Food Systems Research Week is part of our ongoing efforts within the GFEI to build interdisciplinary partnerships for global challenge-led research."

In light of the recent commitment from the UK government to strengthen science collaboration partnerships with South Africa, the week helped to identify opportunities for ongoing collaboration and a co-developed research agenda.

German academic exchange delegation visit UP

A delegation from the German Ministry of Education and Research and the German Embassy in Pretoria recently paid a visit to the University of Pretoria (UP). The delegation included Professor Sabine Döring, Deputy Minister of Research and Education, and spent time touring UP's Department of Zoology and Entomology.

The visit aimed to bolster existing research collaborations with German academic institutions, focusing on sustainable development in developing countries through enhanced global knowledge exchange. This initiative involves partnering with institutions of higher education to foster academic networks and sponsor programmes, strengthening learning structures and promoting high-quality, up-to-date study programmes.

"It is vital to strengthen the collaborations between excellent South African universities such as UP and German universities and institutions," Prof Doring said. "Joint research projects play a significant role in addressing global challenges by developing innovative solutions and approaches that can be utilized worldwide. The partnership promotes excellence and mutual learning, which helps improve competitiveness on a global scale. A strong bilateral collaboration allows researchers from both countries to expand their international network, the building up of research capacities and the best use of research infrastructure." Delegates arrived to a warm welcome at UP, greeted by Prof Flavia Senkubuge, Acting Vice-Principal of Student Life.

"We're thrilled to have you here," she said. "We want you to experience the vibrant environment where our students thrive and explore the spaces we're passionately working in, such as the Department of Zoology and Entomology. In our language we say, 'namukelekile', meaning, 'You are warmly welcomed."" She also presented gifts to each guest.

"This moment serves as a vivid reflection of the robust connections we aim to cultivate as partners," Prof Senkubuge added. "With these esteemed German institutions and our pinnacle of research excellence, the German Academic Exchange Service, we eagerly anticipate delving into the rich tapestry of insights awaiting us. Prof Dr Sabine Döring articulates our collective anticipation, eagerly awaiting the enlightening discourse on student research. Why insects? Why hone in on the intricate world of bees? And crucially, how does this scholarly pursuit weave its threads into the fabric of our community, enriching it in profound ways?"

The students engaged in extensive research to illuminate the intricate relationship between honeybees and humanity. This endeavour delved into the symbolic parallels between the hierarchical structures observed in bee societies and those prevalent in human civilisations, as exemplified by the concept of a ruling monarch. However, the connection between bees and humans extends far beyond mere governance, finding its essence in the sweetness of honey itself, a ubiquitous elixir that enriches the human experience. Additionally, the utilisation of beeswax holds significance in various cultural practices, such as its use in providing illumination within religious settings like churches.

It is noteworthy that a considerable portion of the students involved in this exploration hail from the Department of Zoology and Entomology, many of whom benefit from the support extended by the German Academic Exchange Service, a prominent contributor to fostering academic pursuits. The main aim of their investigation was to explore avenues for bolstering existing partnerships, particularly between students in their respective home countries and educational institutions in developing nations. Integral to this endeavour is the aspiration to offer counsel to policymakers. Ş

Enhanced Access and Successful Student Learning

Dr Charissa Button becomes UP's first PhD graduate in Astrophysics

Dr Charissa Button has made history by becoming the University of Pretoria's (UP) first PhD graduate in Astrophysics. She was capped during the University's autumn graduation ceremonies.

"I am excited to see UP growing in astronomy, especially as the Square Kilometre Array (SKA) and MeerKAT are such important, high-profile international projects," said Dr Button of the two projects in which UP is involved. "I am honoured that my PhD constitutes a milestone in developing UP's astronomy programme. I look forward to continuing to contribute to its development as an early-career researcher."

Dr Button completed her degree under the supervision of Professor Roger Deane, who established UP's Radio Astronomy Research Group in 2018. Prof Deane now serves as an Extraordinary Professor in the Department of Physics in the Faculty of Natural and Agricultural Sciences, and is the Department of Science and Innovation/National Research Foundation SARChI SKA Chair in Radio Astronomy at the University of the Witwatersrand.

"Dr Button's PhD is an excellent example of how a bright young mind can use the power of smart algorithms and big data to make new important cosmic discoveries with next-generation telescopes like the Square Kilometre Array," Prof Deane says. "I'm excited that we'll soon be able to test her predictions with the SKA, building on a strong foundation of experience with MeerKAT."

Dr Button first became interested in pursuing postgraduate studies in radio astronomy because of its unique perspective in exploring several fundamental questions in physics, such as the nature and effects of dark matter, and the expansion of the universe.

"During my studies in radio astronomy, I became interested in the vast array of physical processes that contribute to galaxy formation and evolution," she explains. "This has included the neutral atomic hydrogen gas (HI) found in the outer discs of spiral galaxies, as well as hydroxyl megamasers (OHMs), typically found in the inner regions of merging galaxies, which both provide valuable information on the star formation taking place in these galaxies. Due to the intrinsic faintness of these emission lines, studies of them have historically been limited to the nearby universe.

"In my PhD, I explore gravitational lensing as an approach to probe the more distant universe. Gravitational lensing, which Einstein predicted in his general theory of relativity, arises when a massive object, like a galaxy, lying in the foreground of a more distant galaxy, bends the light rays from the distant galaxy (like a raindrop on a window), thereby amplifying the signal of the distant galaxy that would otherwise be too faint to detect with current instruments. My thesis explored methods for finding gravitationally lensed HI sources and OHMs in upcoming SKA surveys, which will significantly increase their scientific yield."

Dr Button adds that she had been pursuing postgraduate studies in astronomy when the Event Horizon Telescope collaboration published the first image of a black hole.

"However, Prof Deane's involvement in the collaboration and his standing in the South African astronomical community ultimately influenced my decision to undertake my PhD studies under his supervision," she says. "The wide range of discoveries that telescopes like MeerKAT has produced is inspiring; it is an exciting time for postgraduate and postdoctoral research opportunities in South African radio astronomy."

Dr Button would like to continue her research in exploring galaxies in the distant universe with gravitational lensing.

"My position as a postdoctoral fellow at UP will enable me to do so," she says. "I aim to build on international collaborations developed during my PhD with the Universities of Oxford and Western Australia as I pursue a broader research portfolio. UP's membership of the Inter-university Institute for Data-Intensive Astronomy has facilitated such partnerships, in addition to the highperformance computing and expert software support that made my computationally intensive PhD results feasible on a three-year timescale."

Dr Button did her PhD full-time thanks to funding from the South African Radio Astronomy Observatory (SARAO); she is now a SARAO postdoctoral fellow at UP.

"It's been a fantastic return to my alma mater, as I started my undergraduate studies in Physics at UP in 2014 and completed my honours in the subject in 2017. I then pursued a master's in Radio Astronomy at Wits University and returned to UP in 2020 to start my PhD studies under the supervision of Prof Deane.

During her studies, she recalls presenting her research at the annual SARAO bursary conference.

"This allowed me to see the diverse range of topics that other research groups around the country are interested in and to hear from international speakers," Dr Button says. "Also, last year, I attended a conference in Bristol in the UK, and also visited one of the research groups at the University of Oxford. This was an excellent opportunity to engage with the broader international radio astronomy community and start developing collaborations that I plan to continue building as I begin my postdoctoral fellowship."

"It is exciting for a new research group like the Radio Astronomy group to reach this milestone, having been built from the ground up and now seeing the fruits of that investment after many years of work," said Prof Chris Theron, Head of the Department of Physics. "Dr Button joining the Department of Physics as a SARAO postdoctoral research fellow, after having done her undergraduate degree here, is a proud moment for the Department and a significant step for radio astronomy's continued growth and success."

Dr Bertus van Heerden selected to attend prestigious Lindau Nobel Laureate Meeting in Germany

Dr Bertus van Heerden, who graduated with his PhD in Physics during the University of Pretoria (UP)'s University's autumn graduation ceremonies, was selected to attend the prestigious Lindau Nobel Laureate Meeting in Germany.

He is one of just eight young scientists from South Africa who were selected by the Lindau Nobel Laureate Meetings to participate in the 73rd Lindau Nobel Laureate Meeting dedicated to Physics, which will take place from 30 June to 5 July 2024.

Dr Bertus van Heerden is a postdoctoral researcher in the biophysics research group at UP. He graduated in April with his PhD, *Studying single plant light-harvesting complexes in near-native environments*, under the supervision of Prof Tjaart Krüger from the Department of Physics.

"I am very grateful and excited to be selected to attend this event. I know this is a once-in-a-lifetime opportunity that very few in my position get to experience. I am passionate about science; therefore, this is a dream come true," Dr Van Heerden said.

"This means a lot to me as a young scientist, as I will get the opportunity to interact with scientific leaders and other passionate young scientists. I believe this will be a wonderful learning experience for me and an opportunity to make new connections."

Dr Van Heerden is no stranger to awards. He received a Research Excellence Award for Next Generation Researchers, recognising his extraordinary contributions to the field of data analysis in physics during the esteemed 2023 National Research Foundation (NRF) Awards

Ceremony. During the same year, he also won a prize for the best PhD talk in laser spectroscopy at the 67th Annual Conference of the Institute of Physics (SAIP).

He was also awarded a prize for the Best first-author publication from a PhD student at UP's Forestry and Agricultural Biotechnology Institute (FABI) for a 2022 paper in Small. A Fulbright Visiting Student Researcher scholarship (September 2022 to May 2023) allowed him to spend nine months of his PhD in the USA.

The Academy of Science of South Africa (ASSAf), as the official partner of the Lindau Foundation and with funding from the Department of Science and Innovation (DSI), nominates young scientists from South Africa annually to attend the Lindau Nobel Laureate Meetings. The meetings are a forum for young scientists from around the world to engage in-depth with Nobel Laureates on research and overall career management aspects.

80-year-old graduates with PhD in Soil Science

The pursuit of knowledge truly is a lifelong endeavour – as demonstrated by 80-year-old Meiring du Plessis, who recently graduated with a PhD in Soil Science during the University of Pretoria's (UP) autumn graduation season.

"Receiving a PhD in the month I turn 80 is a special gift from my heavenly Father," he says. "I am blessed with good health and I am still compos mentis."

Next to the guidance, advice and encouragement provided by his supervisor, Prof John Annandale, Du Plessis credits his wife, Miemie, for being his main source of support.

"She was the first person I told about each examiner report that came in," he says. "She encouraged me from the start, and never wavered in her support. She also took responsibility for so many chores that were my responsibility. Our children were next to learn about my pass, who were always supportive and encouraging, while being discreet in their enquiries about the (slow) progress their dad was making." His thesis is about risk-based, site-specific irrigation water quality guidelines. Du Plessis envisages his research will find universal acceptance and application among irrigation users.

"It describes the development and main features of a newly developed software-based decision support system with which to assess the fitness for use of water containing several non-traditional water constituents for irrigation," he explains. "The support system uses mainly internationally accepted cause-and-effect relationships to assess the effect of water quality constituents."

Du Plessis admits that he was anxious about the nature of his research and how it would be received.

"I'm sure all students experience a stressful period while waiting for the results of their reports," he says. "It was especially stressful for me because my thesis did not represent a typical PhD thesis that presents a collection of research regarding a particular topic and related hypotheses. Rather, mine presented a decision-support tool. So you can understand how ecstatic I was when the examiner reports returned with a positive verdict and were quite complimentary. In fact, one examiner remarked: 'To my knowledge, the decision support system is a first in the world and therefore novel."

Du Plessis was born in Gqeberha, and at the age of nine, his family moved to Tshwane. He began his career in 1965 as an assistant professional officer at the Soil and Irrigation Research Institute of the then Department of Agricultural Technical Services, before becoming the deputy director responsible for soil surveys and irrigation planning. In 1987, he joined the Water Research Commission as a research manager, a position he retired from in 2009.

"When we think about education, our first thought is about acquiring knowledge that will equip us for a successful career in our favoured field of interest," he says. "But education is more than that – attending a university helps you to grow into a well-balanced person who is inquisitive and open to new ideas, yet able to evaluate them critically. You also learn to be more tolerant of others who do not think similarly to you."

He adds that university is where you meet people you would not otherwise meet, and make friends with like-minded people.

"It is where you start to develop your network of people on whom you can call for the rest of your life," Du Plessis says. "I am reminded of something a professor once shared with me –education is that which you remember once you have forgotten everything you have been taught in class at varsity."

He fondly notes how eager the next generation at UP is to acquire knowledge and make a success of their studies.

"It gives me great satisfaction when some of them tell me that my example inspired them to do the same."

Postgraduate Chemistry students scoop awards

Postgraduate students from the Department of Chemistry at UP won the first, second and third place awards presented by the South African Association for Mass Spectrometry (SAAMS) for their excellent oral presentations, as judged by international and local experts at the Analitka 2024 Conference.

Ross McAdam won the first place prize for his presentation on using comprehensive chromatographic and mass spectrometric techniques to identify adulterants in origanum sold commercially. This was based on his honours research project and he is now continuing with his MSc under the supervision of Dr Madelien Wooding and Dr Yvette Naudé. Ross commented, "The Analitika 2024 Conference was an excellent experience, which I would recommend to any developing chemist. Every moment was a combination of learning and delight, connecting with analytical chemistry's brightest minds and the latest research in a beautiful setting".

Second and third place went to MSc students Serena Joubert and Boitumelo Nokeri, respectively, who are conducting research in the Environmental Monitoring and Sensing research group led by Prof Patricia Forbes.

Serena's research, funded by Sasol, focuses on comprehensive indoor air quality monitoring in households employing different combustion devices to assess improvements in air quality and, thereby, human health as a result of air quality offset interventions. Serena said, "I am so grateful that I had the privilege to share research I am passionate about in a setting where I could experience academia in a new light. If I could describe my Analitika 2024 experience in one word, it would be inspiring".

Boitumelo Nokeri is conducting research to advance the analytical characterisation of natural organic matter (NOM) in water in partnership with Rand Water. This is important in optimising the water treatment process, as NOM can cause discolouration and odour in treated water, and it can react with disinfectants such as chlorine to produce potentially carcinogenic disinfection byproducts. Boitumelo noted, "Being selected to present at the 2024 Analitika Conference was already an honour, but receiving a prize was an unexpected confidence boost. It serves as a reminder that hard work, a good supervisor and effective communication can truly make a difference in the academic community."

This year's conference was held in Drakensberg in March. This premier analytical chemistry conference has been organised by the South African Chemical Institute every four years since 1990.

UP academics publish short story collection based on statistics: stranger than fiction!

In December 2023, ESI Press published Fiction and Fable: Tales of Time-Series, edited by Prof Johan Ferreria and Dr Seite Makgai from the Department of Statistics.

Fiction and Fable: Tales of Time-Series is a collection of short stories written by undergraduate students from the Department of Statistics, inspired by concepts taught in time-series analyses. This book was formally launched in April this year.

According to the book's editors, "This volume serves as an educational tool, bringing together fictional narratives written by students, for students, within the scientific framework of time-series at tertiary level. A common thread visible in this volume is a sheer human desire for victory, overcoming obstacles and transformation."

Prof Delia North, erstwhile Dean of Science from UKZN and stalwart within the statistics education sphere in South Africa, delivered opening remarks. In her words: "This book comes at the precise moment in time when academic statisticians are challenged to think of new and novel ways to advocate for their discipline. I have no knowledge of any other similar statistics storybook being written – the editors should be considered true visionaries in statistics education."

What started as an optional assignment to see if students would be willing to blend creative ideas in the time series context, evolved into a unique book of stories. Prof Ferreira, who presented the idea of the assignment, highlighted, "What stands out for me is how something conventionally analytical can be broken down into consumable pieces of creativity. Most of us started off learning mathematics in this way! 'If Seite has five pumpkins and gives Johan three, how many pumpkins does she have left?' Word sums are the start of anyone's first exposure to mathematics. Why not stick with it even longer? Viewing fundamental time series concepts through students' different creative lenses is immensely interesting."

Stories such as *The Shepherd and the Wolf* or *The Tale of the ARMA Warriors* take us back to the moments of comfort and delight that fables and fairytales hold for all. The exceptional illustrations by Michelle Pinto further contribute to the magic of these stories, transporting the reader on a journey to meet the characters.

Dylan Cuyler, who authored *The ARIMA*, says, "I've always loved the fantasy genre. When I thought about the different processes: AR, MA and ARIMA, I was inspired to write a fight scene using these concepts as personified fictional characters." He also added that integrating maths into creative writing allowed him to learn more about time-series mathematical concepts because he researched them.

Tiffany Harzon, who wrote The Wolf and the Three Kids in the book, was inspired by one of her favourite childhood stories, the Brothers Grimm's, 'The Wolf and the Seven Young Goats'. She rewrote the story to incorporate the concepts from time-series analyses. In integrating her love for writing with her studies, she says, "In the process of writing the story, I had to revise and improve my understanding of the work, which helped me form a more in-depth understanding of the coursework in an enjoyable way." She pointed out that "everyone learns differently, and creative writing allows learners to understand difficult work in a completely different way."

From left: Prof Johan Ferreira, Prof Delia North and Dr Seite Makgai

According to Prof Ferreira, "There is comparatively little literature in the analytical sciences at tertiary level that focuses on this type of storytelling in an 'advanced' undergraduate field. The uniqueness and merit of this text is invaluable for the pedagogy in statistics and the personal lived experiences of students in the discipline."

Student contributions in advanced undergraduate statistics courses, explored through fictional narratives, can further promote storytelling as a pedagogical tool within analytical sciences, offering an alternative, less stressful approach to teaching and learning. Contextualising storytelling as a framework for mathematical discussions facilitates the homogeneous and heterogeneous sharing of informal knowledge among teachers and students and effectively stimulates peer learning.

Fiction and Fable: Tales of Time-Series is available for free download here for those seeking enchanting stories steeped in mystery and magic.

Visit the ESI Press website at www. esipress.up.ac.za for more information.

Consumer Science graduate 'want to be part of conserving the aesthetic of Xhosa culture in modern society'

"Clothing is a complete language that has internal and external influences on all of us," says Zandile Zamela (33), who graduated from the University of Pretoria (UP) with a master's degree in Consumer Science, specialising in Clothing Management.

Zandile Zamela

Zamela has taken her passion for fashion to a new level with her master's research, through which she sought to determine the impact of Westernisation on Xhosa women's beauty standards and clothing habits.

"The goal was to determine if Xhosa women preferred popular Westernised beauty criteria – in relation to body size, body shape, skin tone and hair texture – or their own features," she explains. "I also wanted to know if Xhosa women's continual exposure to mainstream Westernised society had made them disinterested in their indigenous dress traditions, or if they were interested in Xhosa clothes. My research revealed that most of them showed a significant preference for Xhosa beauty criteria, with the exception of physical size. Even though Xhosa culture praises and supports larger forms, they preferred smaller body shapes."

Through her studies at UP, Zamela came to appreciate the science behind textiles and know how to utilise different materials for diverse clothing. Interestingly, she began her studies in geoinformatics and subsequently moved on to consumer science, mainly because map programming and land surveying no longer inspired her.

"Two years into it, I realised I was not passionate about anything I was doing and it was my amazing mother, Beauty, who pointed out that I had always been a creative child, and that perhaps I needed to pursue a career that had some creative aspect to it," Zamela says.

She adds that she enjoyed every aspect of her studies in consumer sciences, which features a good balance of creativity and analytical subjects to keep her motivated. She learnt about visual merchandising and trend forecasting in the third- and fourth years. She developed an appreciation for both the psychological and technical components of the degree, which include studies in textiles, pattern drafting and garment production.

"It takes expertise to transform a two-dimensional piece of fabric into a three-dimensional garment," she says. One person who made a significant impact on Zamela during her studies was Dr Bertha Jacobs, a senior lecturer in the Department of Consumer and Food Sciences. Dr Jacobs's participatory seminars on the various social elements of clothes were among her favourites.

"Dr Jacobs was supportive and enthusiastic about cultural and social aspects of clothing, which made her an appropriate supervisor for my studies," Zamela says.

She enrolled in a master's programme with Dr Jacobs as her supervisor, and recalls things going well at first."However, as many research students will tell you, things got challenging, especially when I had to balance a job and my studies – but my supervisor's support never wavered," she says. Zamela hopes to be in academia and, through her research, influence clothing retail and fashion design spaces towards cultural inclusivity, beginning with her PhD, which will be solution-based for the gaps in her master's study.

She predicts that the future of Xhosa fashion will be a blend of Western designs and Xhosa aesthetic features, allowing for cultural representation in everyday life while still preserving the distinctiveness of Xhosa traditional dress.

"I see a modern version of maintaining Xhosa culture's significance through the use of Xhosa stripes and geometric shapes as well as glass beading – I want to be part of conserving my culture's aesthetic in modern society."

A bacterial isolate from the soils

Cultivating inquiry-based learning: A microbiological approach to soil health

GKD 420

Experimental setup - the students had to grow and maintain the plants themselves over the semester

In an era where interdisciplinary knowledge is increasingly valued, the Department of Plant and Soil Sciences took a significant step forward in 2023 by revamping the curriculum for the module Soil Fertility, Soil Microbiology, and Plant Nutrition (GKD 420/773).

At the heart of this transformation were novel microbiology-based practical sessions that epitomised inquiry-based learning. *The aim?* To familiarise students with the influence of organic versus inorganic fertilisation on crop growth and the dynamics of soil microbial communities under varying soil pH environments.

Led by early career researcher Dr Jarishma Gokul and supported by Prof Teresa Coutinho, Prof Quenton Kritzinger, Mr Charl Hertzog and Prof Eyob Tesfamariam, the team introduced microbiology-focussed practical training in this module for the first time. The sessions on soil microbiology provided students with valuable skills in isolating bacteria from various soil types using advanced technology such as MALDI TOF for bacterial identification. These skills were applied in the context of comparing organic and inorganic fertilisation, before and after planting. The Department of Plant and Soil Sciences, under the guidance of Prof Nigel Barker, provided exceptional support to enhance the students' learning experience.

The outcomes of our inquiry-based approach yielded fascinating insights into the dynamic nature of soil bacterial communities. This hands-on experience allowed students to actively engage in scientific inquiry, from designing experiments to analysing results, which complemented theoretical lectures and provided a deeper understanding of the biological dynamics within Agronomy. From observing distinct shifts in bacterial composition to unravelling the intricate interplay between soil pH and microbial preferences under organic versus inorganic fertilisation, students were enthused to explore new practical avenues. Through these innovative approaches and interdisciplinary collaboration, the Department continues cultivating future scientists equipped to address the complex challenges of sustainable agriculture.

Newly renovated Industrial Sewing Laboratory officially opened

"Innovation and excellence come to mind when thinking of the Department of Consumer and Food Sciences at the University of Pretoria". This sentiment was expressed by Prof Barend Erasmus, Dean of the Faculty of Natural and Agricultural Sciences, during the recent opening of the newly renovated Industrial Sewing Lab on 30 April 2024.

Prof Erasmus officially opened the facility with 36 industrial sewing machines and 18 industrial overlockers purchased from Bernina. He emphasised how the Department of Consumer and Food Sciences excels in teaching, learning, and research activities. "This Department has strong industry and community links and responds to challenges with their excellent qualifications and research."

Prof Erasmus added that he is very impressed with the spirit with which the Department operates. "For example, the Department has consistently submitted the most contributions from NAS (all eight editions) to the University's Re.Search magazine – since the publication's inception". He also underlined the importance of sustainability and keeping in mind where the raw materials come from and who we are dealing with. "How do we approach the sustainability challenge?" he reminded all present.

From left: Dr Lizette Diedericks, Prof Gyebi Duodu, Prof Barend Erasmus and Prof Suné Donoghue.

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The Department's internationally benchmarked Clothing Retail Management degree combines design, clothing construction, fashion, textiles, consumer behaviour, retail and merchandising modules with various marketing and business modules to prepare students for the exciting and ever-changing clothing industry. This vocational programme balances theory, practical application, and experiential training. As the program exposes students to the entire clothing supply chain, they can specialise in a particular area of interest once they graduate.

The function was attended by industry and community engagement partners of the Clothing Division of the department, including Bernina, Woolworths, Mr Price, Truworths, Clothes to Good and Falke. Bernina very kindly assisted the department by keeping the equipment in storage throughout the lab renovation period.

Prof Gyebi Duodu, Head of the Department of Consumer and Food Sciences, shared his insights on how this R4.1 million project evolved after the Faculty Executive Committee visited the department two years ago. "They took note of our equipment needs and our vision to upgrade facilities to ensure stateof-the-art teaching and learning for our students." Prof Duodu thanked everybody involved in getting this project off the ground and finishing it timeously.

Prof Suné Donoghue, a professor in Consumer Science, extended a word of thanks to all parties involved with the project upgrade. She shared that the Department donated tables and chairs from the previous clothing construction lab to the Magalies School for Secondary Pre-Vocational Training to use in their newly built upholstery workshop – yet another example of sustainability.

The guests had the opportunity to tour the newly renovated Industrial Sewing Lab and the existing Textile Lab, Pattern Drafting Lab, and Small-Scale Production Lab.

Autumn Graduation 2024

1353 TOTAL AUTUMN GRADUATES

897 UNDERGRADUATE DEGREES *97 WITH DISTINCTION

456 POSTGRADUATE DEGREES

280 HONOURS DEGREES *60 WITH DISTINCTION

GRADUATION @ NAS

| Programmes | UG | Hons | MSc | PhD |
|---|-----|------|-----|-----|
| Chemistry, Geology, Geography, Geoinformatics and Meteorology, Physics | 101 | 72 | 26 | 16 |
| TOTAL: 215 | | | | |
| Zoology and Entomology (including BSc: Ecology) As well as all the BSc: Human Physiology programmes | 274 | 20 | 14 | 5 |
| TOTAL: 313 | | | | |
| Animal Science, Agricultural Economics, Extension and Rural Development, Consumer and Food Science, Plant and Soil Sciences | 135 | 47 | 37 | 16 |
| TOTAL: 235 | | | | |
| Biochemistry, Genetics and Microbiology, including Medical Science (exclude all the BSc: Human Physiology programmes) | 189 | 56 | 33 | 9 |
| TOTAL: 287 | | | | |
| Actuarial Science, Statistics, Mathematics and Applied Mathematics | 198 | 85 | 13 | 7 |
| TOTAL: 303 | | | | |

Department of Statistics doctoral students clean sweep at SASA

UP doctoral students in the Department of Statistics showed their strengths by winning all four prizes in the South African Statistical Association's (SASA) 2023 Postgraduate Paper Competition. All four students are under the supervision of Prof Inger Fabris–Rotelli.

The winning paper in the unpublished paper category was Renate Thiede (lecturer in the Department of Statistics), with co-authors Prof Inger Fabris-Rotelli, Prof Pravesh Debba (CSIR) and Dr Chris Cleghorn (AWS). The title of her paper was *Measuring homogeneity of spatial line patterns*.

In second place was René Stander (also a lecturer in the Department of Statistics), with Prof Inger Fabris-Rotelli and Prof Din Chen, with a paper titled *Variogram estimation on spatial lattice data*.

Third place went to Jean-Pierre Stander, also with Prof Inger Fabris-Rotelli and Dr Theo Loots, with his paper titled *The use of level sets for representing images as spatial models*.

The winner in the reviewed/published paper section was **Kabelo Mahloromela** (a lecturer in the Department of Statistics), with Prof Inger Fabris-Rotelli and Christine Kraamwinkel. The paper's title was *Covariate construction of nonconvex windows for spatial point patterns*.

Lifts give more access to everybody

One of the lifts in the Agricultural Sciences Building has recently been replaced to offer more accessible access to staff, students and visitors. The other lift will be replaced in the next few months. The new lift not only assists the visually and hearing impaired with braille signs on the buttons but also has a voice function indicating whether the lift is going up or down and on which floor it is. Art Hlatshwayo (right) and Shado Mahlangu from the Human Resources division checked out the lift's functionalities.

Soup it Forward campaign

The University's Student Governance Unit has partnered with Pure Café on its Hatfield Campus to launch the Soup it Forward campaign, which will provide students in need with nourishing cups of soup during the cold winter months from May to August. The meals will be available to students on UP's Student Nutrition and Progress Programme (SNAPP). Students who wish to be considered for the SNAPP should contact snap-programme@up.ac.za

HOW IT WORKS

Soup purchase: Every time a customer purchases a bowl of soup at Pure Café UP, a portion of the proceeds will go directly towards sponsoring a free cup of soup for an underprivileged student. So, when you buy a cup of your favourite soup, you're also helping someone in need to stay warm and nourished.

Direct donations: Pure Café has made it even easier for its customers to make a difference. Scan the QR code available at the café, and for every R10 donated, another cup of soup will be sponsored for students facing food insecurity.

Distribution: Pure Café will then donate soup vouchers to the Department of Student Affairs, which will be distributed to students enrolled in SNAPP. Students can then redeem the vouchers at Pure Café for a cup or bowl of soup.

SPREADING THE WORD

The Student Governance Unit and Pure Café invite the entire University community – students, staff, and Faculty – to support the campaign. Here's how you can help:

Purchase soup at Pure Café: Every bowl of soup you enjoy contributes to this heartwarming initiative.

Donate: Scan the QR code available at the café to make a direct donation.

Spread the word: Share the Soup it Forward campaign on your social media platforms to help create a buzz and raise awareness about the campaign.

Enquiries about this initiative must be sent to snap-programme@up.ac.za

RETHINK@NAS

CONTACT PERSON: Ms Nokwazi Mtsweni is the coordinator of the Faculty of Natural and Agricultural Sciences transformation initiative, RETHINK@NAS.

Contact her at nokwazi.mtsweni@up.ac.za

KONTAKPERSOON: Me Nokwazi Mtsweni is die koördineerder van die Fakulteit Natuur- en Landbouwetenskappe se transformasie-inisiatief, RETHINK@NAS.

Kontak haar by nokwazi.mtsweni@up.ac.za

MOTHO YO O KA IKGOKAGANYAGO LE YENA:

Mmarena: Nokwazi Mtsweni ke mokgokaganyi wa lenaneo la phetogo la Lefapha la Disaense tša Tlhago le Temo, RETHINK@NAS. Ikgokganye le yena go nokwazi.mtsweni@up.ac.za

FLY @ UP Clothing Drive

Nokwazi Mtsweni encourages NAS staff to donate clothes for the FLY @ UP Clothing Drive. The box is situated in the Foyer of the Agricultural Sciences Building.

The Clothing Drive is an ongoing project – please donate your pre-loved clothes.

Prof Reyers highlights progress linking environment and development issues despite enormous challenges

Prof Belinda Reyers, Professor of Sustainability Science in the Faculty of Natural and Agricultural Sciences, has spent the past five years working with the team behind the <u>UN</u> <u>Human Development Report</u> as a member of their Advisory Group.

The recently released Human Development Report (HDR 2023-24) titled: "Breaking the gridlock: Reimagining cooperation in a polarized world" is an eye-opening call to action.

Prof Reyers explained, "With all the progress we have made, all the technologies invented, all the knowledge and other riches that have been created, why are we not doing better than this? Why can't we fix poverty, end climate change, ensure peace and keep people and the planet safe? In essence – as the report states – *"why are we so stuck?"* Why does making progress on things like the SDGs and the Paris Agreement feel like a *"half-hearted slog through quicksand"*?

Therefore, it is no surprise that although the Human Development Index, an annual measure of a nation's health, education, and standard of living, has rebounded after its slump since the pandemic, the global HDI value is still below trend. This is further evidenced by the recently published Global Sustainable Development Report 2023, which highlights that the world is far off track to meet the Sustainable Development Goals by 2030 - placing the "Leave no one behind" Principle at serious risk. Without concerted action, crisis and uncertainty - triggered by and

reinforcing poverty, inequality, hunger, disease, conflict and disaster – will become the norm.

As a South African researcher working on understanding and engaging with the complex interdependencies and relationships connecting people and the planet, Prof Reyers has been excited to see the innovative strides made in this HDR to highlight the global interdependencies between people, and between people and planet and how the mismanagement of these has led us to the predicament we are in. "These interdependencies are vital as we have seen for pandemic preparedness, peace building, climate action and digital governance. We cannot shy away from these behind porous sectoral and national boundaries. Instead, as the report sets out, we need to work hard at the required shifts in mindsets, policies and institutions to better manage our social and ecological connectedness and get unstuck."

Prof Reyers has been able to support more integrative and systemic perspectives in the report to find a way forward that brings everyone along. This is vital as at the heart of human development is that people can determine for themselves what it means to live a good life, including defining and reassessing their responsibilities to other people and the planet. This collaborative journey is essential, but it is being crowded out in many ways by polarisation and distrust, driven by crisis and uncertainty.

The Reports explore hopeful avenues forward to build a new global public goods architecture to better manage our interdependences, to push back on polarisation and act on climate change, and to narrow the gaps in agency and better manage our interdependences with one another and with the planet.

Prof Reyers has been grateful to be included in the process of developing these reports, finding a fruitful conversation in which science and policy can overcome problematic divisions between environment and development to focus instead on the quality of relationships connecting people and the planet and the reconfigurations of relationships needed to enhance capacities to navigate uncertain futures.

Promoting excellence through collecting, preserving, and popularising plant biodiversity

Many people ask: What exactly is a Botanical Garden, and why is it relevant to us as a University and, in a greater context, science and society?

"We can answer using our own experiences as an illustration," explained Jason Sampson, Senior Curator of the Manie van der Schijff Botanical Garden in the Department of Plant and Soil Sciences.

"A Botanical Garden is not just a garden, while aesthetic issues are important as in a traditional garden, it is primarily a living scientific reference collection and, as part of a thriving educational community, an educational resource too."

"Diversity is the key; most gardens rely on only a few species planted for looks and design considerations alone. A Botanical Garden sets out to collect and maintain as many plant species as possible; in our case, these collections have been targeted towards our educational needs and our indigenous flora. As a Botanical Garden filling the needs of a community of researchers, we collect and curate as much living material as is practical since having material on hand for investigation and teaching often negates the need for field work and related requirements such as permits for collection of plant material in the field, not to mention the associated time and cost of these!"

Educationally speaking, plant material for undergraduate and postgraduate practicals is cultivated mainly in the

Botanical Garden. This material is used annually by roughly 700 BSc undergraduate students from ten different departments and as an integral part of the teaching and learning offering of the Department of Plant and Soil Sciences. Honours, MSc and PhD students regularly use the plant material cultivated with the Botanical Gardens for their projects, while approximately 40 researchers from the Institution benefit from plants specifically grown and housed for these purposes. The material provided is not restricted to use by the Faculty of Natural and Agricultural Sciences but is available to researchers in other fields, such as Veterinary Science, other universities (nationally and internationally) and institutions such as the CSIR.

According to Mr Sampson, "Great Botanical Gardens are often closely associated with a particular Herbarium; in our case, we are privileged to be associated with the H.G.W.J. Schweickerdt Herbarium (PRU) as both form part of collection-based scientific endeavours and in a very real sense can be seen as complementary parts of a larger whole, the Herbarium dealing with preserved and recorded plant material, the Botanical Garden being concerned with living and likewise recorded plant material."

A Botanical Garden (and its curators) should be a focus of botanical and horticultural expertise. They are closely involved in the environmental management and landscaping of the larger campus communities, as our curators are part of the process of new development and new garden designs on all of the University's campuses through a close relationship with the Department of Facilities Management. "Conservation is critical in a botanical garden. We maintain one of the only scientifically managed *ex situ* plant propagation programmes for endangered species of *Encephalartos* sp. in South Africa, and this comprehensive collection has its own Curator, Mr Arnold Frisby. Many of the estimated three thousand indigenous and exotic plants in our more extensive collections are rare, endangered or even extinct in the wild."

As part of their collection and conservation efforts, they maintain a seed and pollen bank and close association with other botanical gardens worldwide through visits, electronic communication, and plant material exchanges, often with much knowledge transfer.

Many Botanical Gardens also carry out plant breeding and introduction programmes for horticultural promising species - historically, the Manie van der Schijff Garden was instrumental in introducing Syzigium pondoense, a very rare Pondoland endemic, into comprehensive cultivation as a garden ornamental. Also, a previous Curator of this Garden, Mr At Koeleman, was instrumental in pioneering Aloe hybridising and forming the South African Aloe Breeders Association, a significant and long-lasting contribution towards popularising South African indigenous plants in horticulture.

"We also horticulturally test new commercial varieties and species of indigenous and exotic plants for institutional planting and novel horticultural scenarios. The Aloe cultivar testing beds scattered on Hatfield Campus have been invaluable in the "water wise" gardening programme of the University, and tests of cremnophytic and succulent species for green walls and green roofs are ongoing on the Plant Science building walls and balcony gardens," added Mr Sampson.

New developments and the introduction of new methods are vital for the educational, maintenance, and aesthetic purposes of the University of Pretoria. New developments and displays must always be in the pipeline, and new collections must be planned to keep it a vital and living educational resource. In our case, while we are an old and established Garden, changing conditions in each area of the Garden opens up new display and collection opportunities that need to be utilised. Prime examples of this are the ground-breaking Rainwater Harvesting Garden and the massive interest it has attracted since its installation in 2013, as well as the food plant collections (also boasting their own Curator, Mr Richard Hay) housed at Future Africa and recently expanded into the Giving Garden on Hatfield Campus.

Community outreach programmes can and should also be planned and carried out; we have provided plants for community upliftment projects many times and have made *Moringa oeifera* trees available to the staff and contractors of the University in the past. The Giving Garden initiative, formally started in 2023, specifically focussed on testing and introducing promising orphan crop species into feeding schemes and small-scale agriculture across South Africa.

Educationally, too, the Curators of the Garden can be expected to fulfil the role of a lecturer /public speaker and demonstrator to students and researchers; our curators have not only been of use to the Plant and Soil Sciences Department but also to the Landscape Architecture students and students of the Department of Consumer and Food Sciences.

"With challenges such as global climate change and urbanisation threatening biodiversity, Botanical Gardens are fast becoming more relevant than ever. Botanical Gardens provide the perfect vehicles for relevant research, especially with regard to conservation and climate change, and promoting green consciousness to the public and within universities," Mr Sampson concluded.

UP-hosted THE Pan-African Universities Summit: 'The weight of expectation is growing on academics to become changemakers'

The need for a new type of graduate, shaped by a new type of university leader and academic was a recurring theme on the first day of the inaugural <u>Times Higher Education</u> (THE) Pan-African Universities Summit, hosted at the University of Pretoria's (UP) Future Africa Institute on 17 and 18 April.

About 300 university leaders from 32 countries attended the summit, which is a partnership between THE, UP and Stellenbosch University. The theme for the summit was 'The Future of African Higher Education'.

As many as 45 speakers shared insights into the future of higher education in Africa through plenary sessions, panel discussions and masterclasses. Topics ranged from the role of industry and university partnerships in promoting sustainable development to digital transformation at African universities, and defining ethical leadership and its real-world impact. Many delegates felt that African university leaders and academics should serve as changemakers in society by developing graduates who think critically, and are ethical, entrepreneurial, empathetic, creative, compassionate, citizen-centred and job-creating, among many other things.

The question for them was: do today's academics and leaders have the skills to be changemakers, especially considering that they might not have been taught the skills that they're now expected to teach students?

Speaker after speaker made the point that if Africa is to succeed in addressing grand challenges such as rampant poverty and unemployment, then university leaders and academics will have to do things differently – and this should go beyond curriculum transformation.

TRAINED IN A DIFFERENT CONTEXT

Imparting the range of skills students need today could be a tall order for academics who honed their skills at a time when technical academic and disciplinary proficiency were all-important. Professor Margaret Chitiga-Mabugu, Dean of UP's Faculty of Economic and Management Sciences, moderated a panel discussion titled 'Education, entrepreneurship and equity: Creating a sustainable knowledge economy in African higher education'. She commented on the changing role that academics are being expected to fulfil.

"When I listen to all the things we need to impart to our students, I think, that's a lot, and yet it's very exciting. When I was trained, we were not taught to do all these things. Entrepreneurship was never mentioned; critical-thinking skills were not mentioned. We were taught to do the technical work, and we are the ones at universities teaching. So the questions keep coming to us as deans: how do you expect us to do this?"

She quipped that "perhaps with the bosses here, we might get some insights" into that. This was a reference to the many high-level university leaders present, including vice-chancellors from universities in Malawi, Nigeria, Senegal, South Africa, Uganda and Zimbabwe, among others.

Asked what African university leaders should be doing to make visible contributions to societal transformation, Prof Barnabas Nawangwe, Vice-Chancellor of Makerere University in Uganda, said: "If we are to transform society, we must put in place measures to spur innovation and entrepreneurship at universities and with people in the communities."

Makerere University, for example, had established an innovation hub where students come up with about 100 student businesses a year, while in Zimbabwe, every public university now has an innovation hub.

MAKING A MINDSET SHIFT

A mindset shift is also critical, said Prof Nawangwe, noting that these shifts "must begin with the professors".

Sylvia Kunkyebe of the Mastercard Foundation, which invests heavily in higher education across Africa, commented on the notion of student success as going beyond graduating and finding a job. Universities, she said, should also be focusing on character-building and ethical qualities.

"If we want to transform this continent, graduates need to be ethical; they need to be citizencentric – not just thinking about themselves but what their education can do for society."

For Kunkyebe, tertiary education should "produce a human being who is not just knowledgeable but who has a heart and thinks of themselves, not just for their own good and that of their families, but as changemakers and transformative leaders for their communities".

"Universities should also think of themselves as transformative institutions and changemakers in the communities they find themselves," she added. "As leaders, of course, we are also changemakers."

Social Responsiveness and Societal Impact

Maths mania hits UP on International Day of Mathematics

The University of Pretoria's (UP) Department of Mathematics and Applied Mathematics recently enjoyed a two-day event to celebrate the International Day of Mathematics observed worldwide on 14 March. Collaborating with the UP Maths Club and Blue Crane Space – a STEM-based student society – the Department held an exhibition of various mathematical puzzles, arts and games on the Hatfield campus.

The Tower of Hanoi puzzle was presented by Zerwick de Lange (BSc Physics) and Luan Naude (PhD Mathematics). The solution to this puzzle is typically offered in discrete mathematics and computational courses, as an example of the principle of mathematical induction and recursion.

The art gallery puzzle sought to determine the number of guards needed in an art gallery to observe the whole gallery. Gerlo Theron (BSc Mathematics) illustrated a simple yet elegant solution to the problem, known as the Art Gallery Theorem, which was proven by mathematician Steve Fisk. Theron showed two key ideas of Fisk's proof: triangulation and the three-colouring argument from Graph Theory.

Eduard Plint (BSc Applied Mathematics) and Brendan Coetzee – BSc Physics (Hons) – demonstrated how mathematics can be used to model a physical problem, by presenting a mathematical model for a trebuchet. Instances of

mathematics found in art forms were presented through the work of MC Escher, and the art of paper folding (origami). The mathematical aspects of origami have received a considerable amount of study with exciting applications, such as fitting the mirrors of the James Webb telescope into a rocket. Various optical illusions such as the Ames Room, the missing square and the infinite chocolate puzzles were presented as means to reason with (or not to reason with) geometrical figures.

Nicola Engelbrecht (BSc Applied Mathematics) shared exciting facts on the Möbius band, a classic example of non-orientable surfaces in mathematics, with her classmate Lourie Bosman (BSc Physics). The band can be easily formed by joining the ends of a strip of paper together with a half twist. Bosman and Engelbrecht showed variations of joining and cutting the band to get interesting shapes. "What an amazing experience it was for us to come together and share our love and passion for mathematics," Engelbrecht said.

The UP Maths Club, which was also involved in celebrating the

International Day of Mathematics in 2023, consists of students from various programmes, including mathematics/applied mathematics, statistics, physics and chemistry. Joining the celebration this year was the Blue Crane Space, which hosted the Pi recitation competition and the integration contest.

The celebration on 14 March took place at the Sci-Enza auditorium, with Ben Victor (MSc Mathematics) leading the first activity.

"I presented a mini-lecture on the Buffon Needle Problem and how its solution can be used to approximate the number π which we also did with the help of our enthusiastic audience members," he said. "I think the celebration of the International Day of Mathematics was an outstanding success."

Closing the event, Bosman presented a mini-lecture on the Bèzier curves. Named after French engineer Pierre Bèzier, the curves were used by him to design the bodywork of Renault cars. Bosman demonstrated how to obtain a simple Bèzier curve using pen and paper, and more sophisticated ones using graphing software.

Fueling Young Minds at Sci-Enza's Holiday Programme

Sci-Enza Science Centre proudly kicked off the first holiday programme of the year with an energy-fuelled programme'. Welcoming young science enthusiasts from diverse educational backgrounds, this initiative showcased the immense potential of our future problem-solvers.

Designed for learners from grades R to 6, the theme, "Energy: Fuelling the Universe," ignited curiosity and exploration through various captivating activities. Our workshops formed the programme's backbone, offering participants a blend of hands-on experiences and cognitive challenges. From flashy science experiments to constructing Rube Goldberg machines, learners delved into energy transfer, conversions, and conservation intricacies. The realworld applications showcased during these sessions resonated deeply, highlighting the relevance of scientific principles across diverse contexts.

Moremi Melato, a dynamic science communicator from Sci-Enza, captivated audiences with a lively science show. His dazzling array of experiments transformed complex concepts into engaging spectacles, leaving learners both entertained and enlightened. Dr Thabsile Thabethe, hailing from the Physics Department, further elevated the programme with her insightful presentation on Nuclear Energy. Through handson demonstrations, Dr Thabethe provided invaluable practical insights, remarkably enriching participants' understanding.

The unanimous sentiment among attendees was one of engagement,

enlightenment, and professionalism. Learners expressed their enthusiasm for future participation, a testament to the programme's impact in fostering a love for science. Beyond mere entertainment, the programme's overarching goal is to cultivate and enhance the skills of young science enthusiasts, nurturing their growth and development.

Engaging with these budding minds is a pleasure and a privilege,

recognising their pivotal role in shaping tomorrow's challenges, said Moremi.

Looking ahead, Sci-Enza eagerly anticipates future collaborations with diverse organisations, both within and beyond the university. These partnerships promise to enrich upcoming holiday programmes, offering even more opportunities for young minds to explore, learn, and thrive.

PhysX – Making physics fun and accessible

PhysX is a new and exciting subhouse of the Department of Physics at the University of Pretoria. It welcomes all students studying physics and physicsadjacent degrees to create a vibrant community of young scientists.

PhysX aims to showcase the fun aspects of physics and science and give students opportunities to participate in leadership and outreach activities.

One of their first successful events was a career day in March, where different career paths related to physics were presented. The presentation also included information about the Department of Physics' structure to guide students in planning their degree paths. The interactive session allowed students to voice questions and discuss their insights.

Another event was a cocktail evening in April - "PhysX and Phunk". This social event allowed students to spend time together and doubles as an opportunity to make new connections. It enthralled the students with three esteemed speakers in the field of Physics - Prof Tjaart Kruger, Dr Gourab Giri and Dr Paolo Concha Obando. The casual evening event hopes to promote conversation between novice and experienced scientists. Other exciting activities included a board games night and a braai day.

Future events such as outreaches, meet and greets, and demonstrations will occur throughout the year.

TO RECEIVE UPDATES, FOLLOW PHYSX ON THESE SOCIAL MEDIA PLATFORMS:

@physxatup
PhysX At UP
PhysX Subhouse

THE PHYSX COMMITTEE WITH THEIR PORTFOLIOS IS AS FOLLOWS:

Chairperson: Michael Lovemore (PhD student) Vice-chairperson/Academic Liaison: Jarryd Bath (PhD student) Treasurer: Patrick Kinsey (honours student) Secretary: Emma Gelderblom (master's student) Social events planner: Liandré Robberts (master's student) Outreach and field trip coordinator: Keamogetswe Mabando (final-year student) Social media and marketing: Jonathan Raghoo (second-year student) Transformation Officer: Albert Roux (master's student) Branding: Jayde Bhana (master's student)

For more information, contact Physx@tuks.co.za

IN MEMORIAM Tribute to Mrs Matilde Beresford

Mrs Matilde Elza Beresford (71), former Head of the Faculty of Natural and Agricultural Sciences (NAS) Student Administration has sadly passed away on 7 April 2024.

According to Prof Anton Ströh, former Vice-Principal and Dean (NAS), Mrs Beresford was a remarkable colleague and friend. "Her passion for making a meaningful difference to thousands of university students started in 1972 when she joined UNISA as an administrative assistant supporting students through the entire process from application to registration. She joined UP in 1988 as an Administrative Officer in the Faculty of Engineering and, in 1994, joined the Faculty of Biological and Agricultural Sciences, where she was promoted in 1996 to Administrative Control Officer. In 1999, the faculties of Natural Sciences and Biological and Agricultural Sciences merged to become NAS.

Her vast management experience and the exceptional leadership skills she demonstrated to the benefit of her staff made her the obvious candidate to take up the newly created position of Head of Student Administration of NAS. "Since 2002, in my role as Chair of the School of Mathematical Sciences, we established a close working relationship. Matilde played a major role in setting up the necessary new structures to effectively deal with the student application and administration processes of one of SA's most diverse science faculties at the time. Her wealth of experience, knowledge and innovative ideas were particularly evident at the strategic sessions of the Faculty Management Committee."

This working relationship became stronger when Prof Ströh was Dean from 2004 to 2014. Mrs Beresford played a crucial role in enabling her department to support all students and academic staff on student administrative matters. Matilde was part of the Senior Management of the Faculty, a member of the heads of academic departments' meetings and the Secretariat of the Faculty Board.

"I can confidently say that Matilde has had a significant impact on a large cohort of UP's students and staff both as a colleague and for many as a friend." Prof Ströh concluded.

According to Prof Marietjie Potgieter, former Deputy Dean for Teaching and Learning at NAS, "she worked closely with Mrs Beresford from 2012 until Mrs Beresford's early retirement. We had (almost) daily discussions on student matters - admissions, student records, difficult cases with students and their parents, appeals, readmissions and regulation changes. In this partnership, I greatly benefitted from her vast knowledge of regulations and processes, her commitment to rigour and fairness, and her openness to deal with exceptional situations that require innovative thinking. We had to decide early on whether the Faculty could admit the blind student, Zak de Beer, for a BSc degree in biological sciences. The decision to do so was risky (no other university in South Africa has ever done that). Still, the outcome was gratifying, becoming a sterling example of studentcentred governance. Matilde became a very dear friend of mine during this time, and our friendship stretched much further than a professional association.

Matilde excelled as a leader and manager. Some of her staff members share their memories:

Liana Sturgeon: "One of the most admirable aspects of Matilde was her ability to bring out the best in others. Matilde believed in teamwork, the power of collaboration, and the strength of unity. Matilde was the glue that held NAS together, the one who could turn challenges into opportunities and differences into synergies. She made an

immeasurable impact on my life. She was an extraordinary person who was much more than a colleague; she was a true friend, a mentor, and an inspiration to me even after she retired from the University."

Mrs Henda van Vuuren: Our journey began at UNISA in 2001 and continued as colleagues at UP until Matilde's retirement. Matilde stood out as an exceptional leader, displaying unwavering loyalty to her staff and the university she served diligently. She encouraged and mentored everyone under her, nurturing their potential, and empathised with their personal challenges without compromising her professionalism. Her in-depth knowledge of Faculty regulations made her an outstanding manager, setting a high bar for dedication and inspiring us to follow suit. Our close friendship grew from our lengthy conversations on politics, the country's trajectory, and global issues. Matilde, always open-minded and a champion of justice, sustained this connection even after retirement."

Jacob Mphse (on Facebook): "Matilda Beresford paved my career path at NAS. She believed in me and my capabilities, mentored me and watched me become the best version of myself. I am forever grateful to have crossed paths with such a great mentor."

Rest in peace, Matilde.

University of Pretoria

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