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Newsletter of the Faculty of Natural and Agricultural Sciences

September 2022

www.up.ac.za/nas

Make today matter

NAS staff and students celebrate Women's Month

The Faculty of Natural and Agricultural Sciences (NAS) made inroads by having a very frank conversation on many topical issues, attended by both staff and students. The event was the Dean's Women's Month Lunch and Conversation on 19 August.

"Women must be part of the change and ensure that we don't only transform in terms of race and gender and the other known criteria. As the transformation initiative has broadened, we must work collectively to make a difference. Ask yourself: what can I do in my sphere of work and life to change things?" These were the welcoming words of Prof Barend Erasmus, Dean of the Faculty.

Prof Erasmus acknowledged that there are still substantial hurdles for women but said it is significant that women are stepping up to leadership positions.

Ms Nomsa Mboneli, a second-year BSc Human Physiology student and Dr Nerhene Davis, a senior lecturer from the Department of Geography, Geoinformatics and Meteorology, facilitated the conversation. Dr Davis set the scene and explained that this is the first initiative where students and staff have the opportunity to talk about transformation issues. As Dr Davis emphasised, "Your voice is important." Ms Mboneli confirmed this, saying that "the Faculty wants to be inclusive and unbiased."

One of the first issues raised by staff and students was if there were softer ways to deal with matters that did not necessarily require a formal investigation but still needed to be addressed.

Another issue that was high on staff and students' agenda was what support the Faculty and UP give to staff and students who are also mothers. It was noted that there is currently a committee looking at this issue as well as the matter of bringing children onto campus.

The matter of how to address people with different sexualities was also under the spotlight. As one student aptly put it, "Treat people as a person – regardless of whom they want to be addressed as. People needed all to be treated with respect and treated equally."

Safety on campus remains a concern for female students using public transport at night now that students have returned to campus. There were also questions on how to identify sexual harassment.

For more information on transformation in the Faculty, and also visit the UP Transformation Office.

Staff and students were given a light lunch, and everyone received a rose to celebrate Women's Month. The attendees also had the opportunity to take some photos in the NAS selfie frames.

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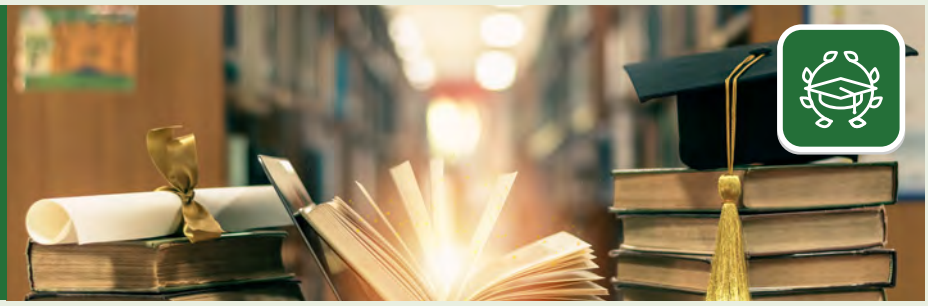

Transformed and Inclusive Community

Institutional Sustainability

Social Responsiveness and Societal Impact

Read more about our ground-breaking research

RE.SEARCH is a digital magazine where the University of Pretoria highlight some of its impactful research, knowledge and solutions. The Faculty of Natural and Agricultural Sciences (NAS) features prominently in this third edition.

Read NAS stories on pages 2, 12, 20, 22, and 24. Visit the Research Matters website for the first and second editions and more NAS research.

Message from the Dean

Prof Barend Erasmus

Spring has sprung, and our NAS newsletter's next edition is ready for your enjoyment. Welcome to all our new readers, staff, students and friends of the faculty.

Spring is undoubtedly the time for renewal, planning and projects in the Faculty. We have been diligently compiling the self-evaluation report for the quinquennial review of NAS. I am grateful for the hard work and dedication of the NAS staff and students in the past five years, whose performance has placed the faculty in good standing for the review. The faculty EXCO, central support departments, internal readers and writers have drafted a report we can all be proud of. In addition, we have completed the 2023 faculty plan, which is currently under review, and participated in the UP CHE audit. Many of our departments have also completed their yearly strategic planning sessions, contributing to the faculty and respective departments' activities in 2023.

This edition features research highlights in the faculty, our phenomenal women's month event, and so much more.

Prof Fourie Joubert, a stalwart in NAS, was awarded the gold award by SASBi for outstanding contributions to the field of bioinformatics in South Africa (page 18). I am sure you will all join me in wishing him and all the other recipients of awards featured in this edition a hearty congratulation. We continue our journey towards research with impact featuring research on sustainable agriculture (page 8), climate change perceptions of small-scale farmers in the region and pollution research (page 11). We also featured profiled Prof Thulani Makhalanyane (page 12), a trailblazer in his own right.

While I am enthused and energised by the season, more so seeing and feeling the buzz of the activities on campus, I am constantly reminded of the long road ahead to adjust to feeling safe in public spaces. More so now, kindness counts as some of us are still grappling with the anxiety of infection and being in public areas. It can be daunting, but returning to shared spaces can lead to hope and happiness. I am inspired by the imperfectly perfectly ways we have found to adapt once more to change and uncertainty, proving that "life does not have to be perfect to be wonderful".

As we embark on the last months of 2022, let's take the time to plan for success and end the year strong. I sincerely hope you enjoy reading the newsletter and look forward to seeing you at the heritage month celebrations and around campus.

> *"Life does not have to be perfect to be wonderful*
>
> *– Annette Funicello."*

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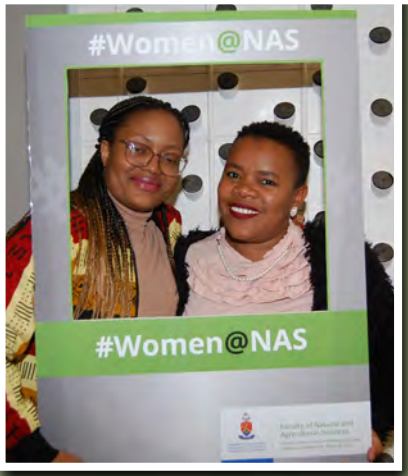
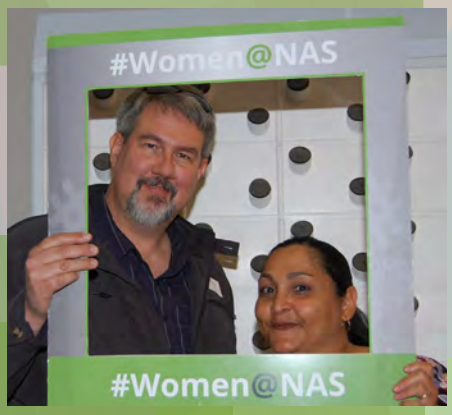
Please send your comments on the newsletter or suggestions/ideas for articles to martie.meyer@up.ac.za



WOMEN@NAS



"Women must be part of the change and ensure that we don't only transform in terms of race and gender and the other known criteria. As the transformation initiative has broadened, we must work collectively to make a difference. Ask yourself: what can I do in my sphere of work and life to change things?"

Research

UP chemists pave the way towards an ultra-sensitive analytical instrument that can detect water pollutants

A University of Pretoria (UP) master's student has built an all-optical system to trap and control particles that can detect water pollutants at extremely low concentrations, even in tiny volumes. This work signals a move from "test tubes" towards light-driven "chemistry-on-a-chip" approaches.

MSc Chemistry student Ané Kritzinger showing the pattern of a structured laser light beam used in her experiments.

Chemistry student Ané Kritzinger is part of UP's Environmental Monitoring and Sensing Research Group, which is led by Professor Patricia Forbes. This interdisciplinary research project aims to advance the emerging field of chemistry applications in optics, and was made possible through collaboration with partners at the Structured Light Laboratory at the University of the Witwatersrand.

By combining optical tweezing with fluorescence spectroscopy of quantum dots (fluorescent nanoparticles with optical properties that make them ideal analytical sensors), the researchers are paving the way towards an ultra-sensitive analytical instrument. Prof Forbes explained that the system could be used to test river water collected from an agricultural area where rainwater run-off has potentially transported pesticides into the water, which could be harmful to the environment and humans.

Kritzinger explained the process of optical trapping and tweezing: "When you shine light on your hand with a torch, for example, it doesn't make your hand move. This reason for this is that while light can exert a force, it is very small. In the microscopic world, however, we can use light to trap (hold) particles and even move them around in a controlled way – the very small forces are appreciable in this world. We can use a laser to 'hold' a specific particle of interest in order for us to analyse it, in this case, by observing the light given off by the particle. Essentially, light acts like a pair of tweezers: we can pick things up and move them around."

The UP researchers are co-authors of a recent research paper, published in *Nature* Photonics, along with their collaborators from Wits and other photonics research groups from international universities. Experiments conducted on the optical trapping and tweezing system built by Kritzinger were used as one of the applications to prove a breakthrough in optics.

What does the research show?
When light travels through media like water, turbulent air or imperfect and misaligned optical elements (like lenses), the laser beam is distorted.

However, in this paper, the researchers showed that the polarisation inhomogeneity of vectorial light is not affected by the perturbing media. Light has intensity and colour as well as other properties or dimensions, which includes polarisation relating to the direction of vibration of the light. In vectorial light beams, this polarisation varies across the beam, giving it interesting properties as explored in this paper. The findings will benefit the optical communication and imaging communities alike. According to Kritzinger, optical communication involves sending information faster and more securely using photons of light (through fibres or air), instead of electrons, through copper cables. In terms of imaging, an example would be clearer imaging of biological samples, such as cancer cells, by using light.

In the case of the optical trap, by using vectorial light, the team had better control of the trapped particles. The optical trap has many parts and is a complicated set-up where things could go wrong, like a lens not being in the correct position, causing the trap to malfunction. By using vectorial light, the team could correct for this without having to determine the exact cause of the problem.

The significance of this research is highlighted by several real-world examples where light travels through liquids, turbulent air and optical fibre. "This research project affirms the importance of collaborations across disciplines to advance science," Prof Forbes said. "By pushing the boundaries of analytical science, we aim to improve environmental and human health and thereby quality of life."

"Light being distorted when passing through distorting media seems self-evident," said Professor Andrew Forbes, Head of the Structured Light Laboratory at the School of Physics at Wits, who co-supervised Kritzinger. "Now we have discovered a hidden property in light that remains unchanged, a figurative 'beacon in the dark' that can be exploited for applications such as imaging, sensing and communication. It is exciting that both the team and the applications require skills from across disciplines, from chemistry to physics; the best science is always found at the interface of fields."

"This research has it all: from fundamental theory to practical real-world experiments," Kritzinger said. "It resolved a standing debate in the optics community about the robustness of vectorial light in complex media and opened a new avenue for applications of vectorial light. The most exciting part of my master's research and this project was to get to work with and learn from brilliant postgraduate students and world-class researchers."

Sustainable small fisheries can help the planet

Prof Sheryl Hendriks

More than three billion people, most of whom are in developing countries, rely on the ocean to make a living. Fisheries and aquaculture provide the main source of animal protein for some 17% of the world's population. In the least-developed countries, fish contributes about 29% of animal protein intake.

The demand for seafood is predicted to rise by around 15% by 2030. Fish production has already doubled in Africa and Asia over the past few decades.

This is according to a commentary article published in *Nature* by Professor Sheryl Hendriks, Head of the Department of Agricultural Economics, Extension and Rural Development at the University of Pretoria (UP).

Despite the challenges of climate change and overfishing, studies suggest that seafood production can be sustainably expanded to meet future food demands. Last year, international efforts promoting this approach included the Blue Food Assessment (a joint initiative of 25 research institutions) and the United Nations Food Systems Summit.

Prof Hendriks explains the invited commentary was published ahead of the United Nations Ocean Conference in Lisbon Portugal. "The conference comes at a critical time where climate change and the neglect of our ocean's resources threaten the future of oceans resources, food supply, food security and the potential for oceans to act as a buffer for climate change," she says. The Conference will discuss much-needed science-based innovative solutions to turn the tide of decline and destruction."

Fish form an essential part of solving world hunger and malnutrition. As one of the most efficient converters of feed to food, fish offer a good source of easily digestible, nutrient-dense food. Fisheries play a significant role among populations in the developing world, contributing directly to livelihoods and employment.

Preserving and protecting environments and stocks is not enough to ensure sustainable fisheries and livelihoods for the future when the total global loss and waste from fisheries is estimated at between 30% and 35% annually.

Losses (before landing) and waste (post-landing of a catch) from the fisheries sector threaten the sector's sustainability and affect environmental and human health. This waste could be generated from a number of factors related to fisheries practices, storage of the catch, market constraints and policy gaps and loopholes, Prof Hendriks explains.

"Fisheries can create environmental hazards due to direct land and water contamination from waste disposal and water runoff from cleaning facilities. Waste in abandoned fishing gear and nets at sea presents ecological challenges," said Prof Hendriks, adding that in production, processing and preserving can, themselves, pollute the air, land, and water, affecting the ocean if not managed.

"The inefficient management of waste from human settlements pollutes rivers that feed into the ocean, carrying litter (including plastics), sewerage and contaminants from landfill sites and waste disposal dumps. Agricultural and industrial runoff and waste also contaminate the ocean via rivers. Carbon emissions are causing ocean warming, acidification, and oxygen loss, affecting fish availability and the spatial distribution of fish. These pollutants threaten the sustainability of fisheries at all scales and the livelihoods and jobs of millions of people, she said.

Moreover, due to the sectorial organisation of most governments, very few take an integrated approach to policy development, implementation and enforcement. The inter-connectedness of agricultural and industrial pollution on fresh and marine systems may well not be deliberated in sectoral development policies. Urban sprawl, especially in fast-growing coastal cities, may not consider the implications of human settlements on the coast and marine systems.

"Due to the significance of the global commons nature of the ocean and the inter-connectedness of marine systems with a wide range of environmental factors, the governance of marine systems is complex," says Prof Hendriks.

She noted, however, that any change in consumption drives changes across the food system, not only for fisheries. "Change affects multiple other food system components such as the demand for more and distributed storage and processing capacity. This is especially true for highly perishable commodities such as fish, which have a very short shelf life unless processed or preserved. Extending the shelf life of foods requires greater energy for storage (refrigeration), rapid transportation, or processing plants."

What can consumers do to support small fisheries? Consumers could support small fisheries by supporting local enterprises, increasing income for small fisheries. By supporting artisanal fishing (traditional or subsistence fishing) they can also contribute to improving livelihoods, boosting nutrition, and strengthening food systems, but fishers' input is needed locally, nationally, and globally.

Click here to see examples of small-scale, sustainable fisheries from across the world.

Photography courtesy of FAO with individual credits

Hot Birds Project homes in on how extreme heat affects bird species

Rising temperatures as a result of climate change will affect bird species differently, and their abilities to withstand extremely hot conditions depend on the part of the world that they find themselves in and the climatic region to which their physiology has become adapted over the course of millennia.

This is according to a new study by ornithologists of the University of Pretoria (UP) who are involved in the Hot Birds Research Project. The findings of the study have been published in the scientific journal *Proceedings of the National Academy of Science (PNAS)* and is based on the PhD work of UP zoology student Marc Freeman.

The study shows that birds from hot, humid climates, for instance, can handle larger spikes in body temperature than those flying about in hot deserts or cool mountains.

"It is vital to know just how much heat birds and other animals can stand before their bodies start shutting down on an extremely hot day," says lead researcher Professor Andrew McKechnie of UP's Department of Zoology and Entomology and South African Research Chair in Conservation Physiology. "Knowing this will help us to make better predictions about how vulnerable they are to higher temperatures and more frequent and intense heatwaves; whether such extreme events might be lethal to them; and under which conditions and at which temperatures we might see them dying on a large scale in future."

Prof McKechnie is co-principal investigator of the international Hot Birds Research Project, a multidisciplinary research group that has involved ornithologists at UP, the University of Cape Town, Rhodes University and several institutions abroad, including the University of New Mexico, over the past decade. The project seeks to find out whether and to what degree desert birds in particular will be able to withstand rising temperatures in light of climate change and an expected 3° Celsius (C) temperature rise in some parts of the world.

In recent years, lethal heatwaves have become increasingly common worldwide. In Australia, for instance, such events have already caused the deaths of birds and fruit bats en masse. In 2018, a third of the country's population of spectacled flying foxes (a type of fruit bat) died over the course of two extremely hot and humid days.

"The first such event in South Africa was recorded around Pongola in northern KwaZulu-Natal in November 2020, on a humid day when temperatures quickly reached 45°C," Prof McKechnie says. "Twelve species of birds, including blue waxbills, fork-tailed drongos, magpie shrikes and yellow-fronted canaries, died, as well as 50 Wahlberg's epauletted fruit bats."

He explains that each bird species has a particular resting body temperature and a maximum threshold to which their internal body temperatures can increase before their activity levels and bodily function is affected. Once the threshold is reached, overheating as a result of hyperthermia and subsequent heat exhaustion can prove fatal.

For the PNAS study, members of the Hot Birds team collected data from 53 bird species across South Africa. The sites chosen experience different air temperatures and levels of humidity, and ranged from Richards Bay in KwaZulu-Natal and Harrismith in the Free State to desert areas in the Northern Cape.

The research team found that red-billed queleas (Quelea quelea) are able to withstand body temperatures up to 48°C, which was the highest temperature measured. At the other end of the scale, Burchell's starlings (*Lamprotornis australis*) can handle 43°C before showing signs of severe heat stress. In terms of the maximum air temperatures the various species could handle, heat tolerance limits ranged from 43.3°C to 56°C.

Unexpectedly, the team found that bird species living in humid lowland sites, and not desert birds, were able to withstand higher body temperature extremes and could tolerate hyperthermia better before experiencing difficulty moving and could no longer safely regulate their body temperatures.

"The ability of birds from lowland areas to better handle hyperthermia has to do with their internal body temperatures being able to rise higher, and them having a lower resting body temperature than birds from other regions," Prof McKechnie says. Humid conditions are typically very difficult to handle when combined with hot weather.

Prof McKechnie says these differences have evolved over millennia as birds have become adapted to the climates of the particular regions that they find themselves in.

"Climate change is relentless and ongoing, and the habitats in which birds live are heating up," he says. "In hot environments, many species already live life on the edge and can give us early warning of the impacts of change. We are studying the capacity of these birds to tolerate elevated body temperatures, and how this capacity varies among species."

Beetles use mimicry to fool bees into feeding them

A breakthrough study from the University of Pretoria (UP) has found that small hive beetles trapped inside a honeybee nest sneakily entice the very bees that keep them prisoner into providing them with the best of what there is to feed on in the hive – even some of the queen's portion. That is what researchers from the Social Insects Research Group in the Department of Zoology and Entomology at UP's Faculty of Natural and Agricultural Sciences discovered during a laboratory-based study, the findings of which were published in the* Journal of Experimental Biology*.

Small hive beetles (Aethina tumida) sometimes invade nests to feed on pollen and honey stores, and to lay eggs. Some honeybee colonies simply move away to start anew elsewhere. However, African honeybee subspecies have evolved a tactic to herd the tiny insects, often a third the size of a worker bee, into inaccessible cracks and corners of the nest where they can cause no harm. Within four days, the bees wall the beetles in with propolis, a type of tree resin that they collect.

"Then follows a sophisticated guarding strategy to further limit the movement of the beetles," explains Professor Christian Pirk, leader of the UP Social Insects Research Group.

Since 2000, he has been involved in the first research into the social interaction between these insects, and how bees keep the parasitic beetles in check. Prof Pirk says the strategy of actively feeding rather than fighting them probably evolved because the beetles are so hard to kill: they have a hard exoskeleton and are tenacious defenders.

Thanks to a side project during his PhD years, it became known that while being imprisoned by bees, small hive beetles use so-called behavioural mimicry to dupe their captors into feeding them.

"They behave in such a way that they are perceived by the honeybee workers as being a 'hungry fellow worker'," Prof Pirk explains of his earlier findings.

This induces trophallactic feeding (the exchange of liquid food, usually between nest mates) from their honeybee captors, with the bees feeding the beetles some of the carbohydrate-rich contents in their crops. The beetles can thus survive for months.

One of Prof Pirk's students, Zoë Langland, recently established that the beetles also fool their guards into serving them with the very best there is to eat in the hive – the high-value, protein-rich jelly that worker bees secrete from their glands and feed to the queen, larvae and other nest mates. Langland used radioisotopes in an experiment with bees from the UP apiary, based at the Innovation Africa @UP campus, to show this. Females have more success at it and can induce worker bees of all ages to feed protein to them. Male beetles, on the other hand, actively avoid efforts with older, aggressive bees.

"Protein is essential for the survival, growth and fecundity of insects," explains Langland. "Honeybees obtain protein from pollen. Nurse bees consume and digest it, then distribute the protein to the rest of the colony by secreting a jelly-like substance from their hypopharyngeal glands. Small hive beetles are the only species known to mimic honeybee trophallaxis and successfully coerce worker bees to share carbohydrates and a limiting resource such as protein, which is essential for the bee colony's own survival and reproduction."

Her findings were made in collaboration with fellow members of the Social Insects Research Group and a researcher from the University of Graz in Austria.

Prof Pirk's research group studies the ways in which social insects communicate. "Since 2000, our studies have shown that somehow, small hive beetles are able to tap into the communication between honeybees and benefit from it," he says. "These beetles are not problematic in their native sub-Saharan Africa, but some have found their way to the USA, Australia and Europe where they cause significant damage to honeybee colonies. The fascinating thing is that these countries have the same species of honeybees, just different subspecies, and these seem to react differently. Understanding the interaction between these beetles and honeybees is one of the most fascinating evolutionary questions."

Smallholder farmers are aware of climate change, but are still struggling to adapt

Smallholder farmers are the most in touch with the earth's changing climate patterns, and they are the most vulnerable to increased temperatures and reduced rainfall. Dr. Mary Funke Olabanji, from UP's Department of Geography Geo-Informatics and Meteorology, wanted to know what exactly smallholder farmers know about climate change, and how difficult they find it to adapt.

She specifically looked at smallholder farmers in the Olifants catchment area in the north-eastern part of South Africa, where she surveyed their climate change knowledge and how they're trying to adapt to it. She then compared this knowledge to meteorological data for the area over 30 years (1986 - 2015).

The study found that 98% of the farmers were aware of climate change, and that their perception of climate change over 30 years aligns with actual meteorological data on decreased rainfall and increased temperatures. They found that the farmers were adjusting their planting and harvesting times to accommodate these changes.

Some of the farmers are trying to use seed and crop varieties that are resilient against heat and water shortages, but these are in short supply. Some are losing their interest in farming due to the difficulties that climate change brings.

Those who cannot adapt to climate change have more pressing matters to worry about, such as decreased yields and water shortages.

"Constraints to adaptation include a lack of access to credit services, government support usually reserved for bigger, commercial farmers such as subsidised water rates, and access to climate resilient crops," says Dr Olabanji. Additionally, the farmers need access to loans in order to purchase irrigation and other equipment.

Dr Mary Olabanji

Dr Olabanji says government could better support these smallholder farmers by providing them with flexible and affordable credit facilities. She says they could also benefit from more information on how to effectively adapt to climate change.

She worked with Dr Thando Ndarana (supervisor) and Dr Nerhene Davis (co-supervisor) on the paper.

Why does the air in South African Highveld cities smell foul in the winter?

Professor Rebecca Garland from the Department of Geography, Geoinformatics and Meteorology recently published an article in *The Conversation* which explains why the air in South African Highveld cities smells foul in the winter. Gauteng Province, situated on the Highveld, is also South Africa's industrial heartland, where pollution levels are often unacceptably high.

In Gauteng, residents can sometimes smell the pollution when the air comes from the east or the southeast where most industries are located. In Johannesburg, this generally happens when winds are from the east to the south.

Read the original article in *The Conversation*

Prof Rebecca Garland

PhD Geology student's research reconstruct palaeoclimate conditions in West Africa

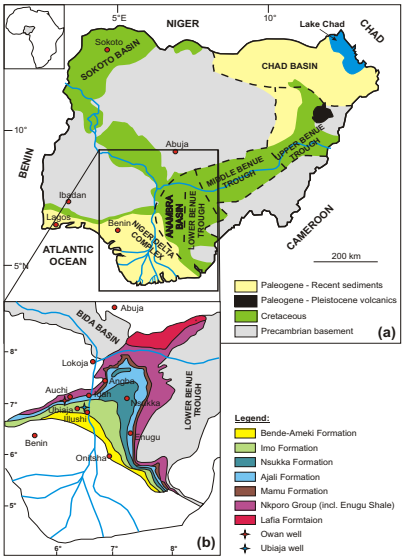
Mr Erepamo Omietimi

Research on sedimentary geochemistry has significantly advanced over the past 20 years. It is now used on a global scale to identify climatic changes and reconstruct environmental conditions such as salinity levels, redox conditions, water depths, and the hydrodynamic influence in both modern and ancient deposits. This can be done by using specific trace and rare earth elements or ratios thereof, which make it feasible to interpret climate and environmental changes over millions of years.

As part of his PhD project at the Department of Geology, Mr Erepamo Omietimi (under the supervision of Profs Nils Lenhardt and Adam Bumby) reconstructed the palaeoclimate conditions that existed during the Late Cretaceous (80 million years ago) to the early Paleocene (66 million years ago) in West Africa.

Major oxides, trace and rare earth elements, and mineralogical data reveal intense rainfall in a warm, humid tropical climate, supporting high global mean temperatures during this period in Earth's history. Additionally, brackish to shallow marine conditions, with high oxygen levels, in a shallow seaway with strong hydro-energy were detected for the deposits in the Anambra Basin of southwestern Nigeria.

The findings are published in the international, peer-reviewed journal Palaeogeography, Palaeoclimatology, Palaeoecology.



Map showing the study region

Hats off to Prof Thulani Makhalanyane!

Professor Thulani Makhalanyane of the Department of Biochemistry, Genetics and Microbiology has made inroads this past year. He has been awarded a co-funded Chair under the South African Research Chairs Initiative (SARChI) in Marine Microbiomics and appointed as the first African Senior Editor of *mSystems*®, a leading journal in the field of systems ecology.

To further add to all these outstanding achievements, he was also the Chief Scientist on the oceanographic cruise as Chief Scientist from 1 June to 10 July. The team boarded the ship for the voyage's 14th leg, travelled along the West Coast of Africa from Walvis Bay (Namibia) and disembarked in Pointe Noire (Congo Republic).

During this cruise, he and PhD student Ms Mancha Mabaso (as members of the Microbiome Research Group) joined the oceanographic cruise as part of a global effort to study the South Atlantic. This is the final phase of the current oceanographic cruise linked to Mission Microbiomes, a European Union-funded collaborative initiative that, in addition to the sampling in Africa, has had four legs in Chile, the Amazon and Antarctica respectively. The multidisciplinary project, carried out on board the schooner TARA Oceans, aims to provide new insights regarding the effects of environmental variables on microbiomes in the South Atlantic Ocean. The project has specifically characterised the impact of plumes from large rivers, including the Congo and Amazon, in the African and South American legs. The results are anticipated to reveal unprecedented levels of microbial biodiversity, including viruses, in these waters.

About the SARChI Chair, Prof Makhalanyane said, "It has been a long journey, but I am delighted that our group has been awarded this recognition. This national recognition allows our group to scale up our activities by training more students and producing high-quality, peer-reviewed outputs. We look forward to this exciting new phase!"

He said the SARChI Chair in Marine Microbiomics would focus on understanding microbiomes in geographically strategic oceans, including the Southern Ocean. "We will train students, produce research outputs and serve as a crucial engagement point with industry and government," Prof Makhalanyane explained.

Being appointed as the Senior Editor of *mSystems*®, Prof Makhalanyane admits, "It is indeed a great honour to be entrusted with guiding manuscripts in one of our field's leading journals. *mSystems*® has established itself as a primary international journal for multidisciplinary systems ecology."

The three honours will undoubtedly contribute to increasing the University of Pretoria's prestige and visibility.

Prof Thulani Makhalanyane

"It has been a long journey, but I am delighted that our group has been awarded this recognition. This national recognition allows our group to scale up our activities by training more students and producing high-quality, peer-reviewed outputs. We look forward to this exciting new phase!"

Global Engagement

Prof Mike Wingfield wins Harry Oppenheimer Fellowship Award

Professor Mike Wingfield, a professor at the Forestry and Agricultural Biotechnology Institute (FABI), is the recipient of the annual Harry Oppenheimer Fellowship Award for his research into disease-causing fungi.

The R2 million award recognises scholarship of the highest calibre across various academic and research disciplines, and is ranked as one of Africa's most prestigious research grants. The Oppenheimer Memorial Trust initiated the flagship award in 2000 to commemorate the trust's founder, Harry Oppenheimer, and his efforts to support human and intellectual development and advance scholarship. The trust dates back to 1958 and has become a significant funder of education, arts and culture, and civil society organisations. Over the past five years, disbursements have ranged from R100 million to R130 million annually, with about 60% allocated to higher education. This is part of a sustained effort to build the local academy.

Prof Wingfield's winning project – titled 'Quest to unravel the origin and ecology of two human pathogenic fungi and expand the base of medical mycology in South Africa' – focused on fungi that cause diseases in humans in South Africa and elsewhere in the world.

"This award has come to me in the latter part of my career," said Prof Wingfield in his acceptance speech. "Perhaps that is mostly the case for awards of this type that have huge prestige and likely would not go to early-career scientists. I see my role primarily as one of mentorship: to pass on my knowledge and experience to younger scientists, and to share my passion for fungi and for research with others that might build on what I have been privileged to do – not only via this award – but linked to my career as a scientist."

Through his project, Prof Wingfield hopes to learn more about where disease-causing fungi live naturally, to better understand and avoid the diseases they cause. "One fungus occurs in mines and infects the skin and lymphatic tissues; the other causes a serious pulmonary disease. With regard to mines, it is important to know whether the fungus is in the wood or whether injuries from wooden splinters provide entry points for the fungus, which is found naturally in the environment. "We know very little about them, other than from a medical perspective," he added.

From left: Jonathan Oppenheimer (Executive Chairman of the Oppenheimer Generations), Professor Mike Wingfield and Professor Tawana Kupe (UP Vice-Chancellor and Principal).

Another fungus that Prof Wingfield will track is sometimes known for its relationship to roses. "The question is whether this is a fungus found on rose thorns, in rose thorns or whether it is found somewhere else, such as in the soil, and if it is using injuries such as those caused by rose thorns to enter our bodies," he explained.

His project is expected to have a far-reaching impact on humanity. "We need to know a lot more about the world around us in terms of microbes – where they are in the natural environment and what threats they pose to us," Prof Wingfield said. "Take a plant disease – most diseases of plants are caused by fungi. They are a serious threat to food security. They pop up unexpectedly like SARS-CoV-2, many times from unknown sources. We need to know more about where they are and what the long-term threats are. Knowing such things prepares us for a more secure future."

The project will also enhance collaboration between plant pathologists and the health sciences. South Africa is well known for its strength in mycological research (the study of fungi). "This is mostly because we have a powerful plant pathology community, and most plant diseases are caused by fungi," Prof Wingfield said. "There is a much smaller community of scientists that consider fungi from the medical perspective and most work at the clinical level. We have a good opportunity to get to know one another better, and to build research bridges and opportunities. I hope to at least explore those opportunities and to get this process started."

He is one of a select number of academics in South Africa included on the Clarivate list of the world's most highly cited scientists. Prof Wingfield works closely with his wife, Prof Brenda Wingfield, a previous recipient of the Harry Oppenheimer Fellowship Award. They are the first family members to be recognised, which is an additional cause for celebration for this edition of the award.

"Prof Wingfield's project is a game-changer," said Jonathan Oppenheimer, Chair of the trust, upon presentation of the award. "Although some excellent work on the ecology of fungi such as *Sporothrix* has been conducted by members of the Southern African Society for Plant Pathology, very little connection has been made to those researchers working on the clinical relevance of these fungi. An important part of this project will be to fortify the field of medical mycology in South Africa, and the Oppenheimer Memorial Trust will give him the necessary support in line with its vision."

SASSP Persoon Medal awarded to Prof Bernard Slippers

Prof Bernard Slippers

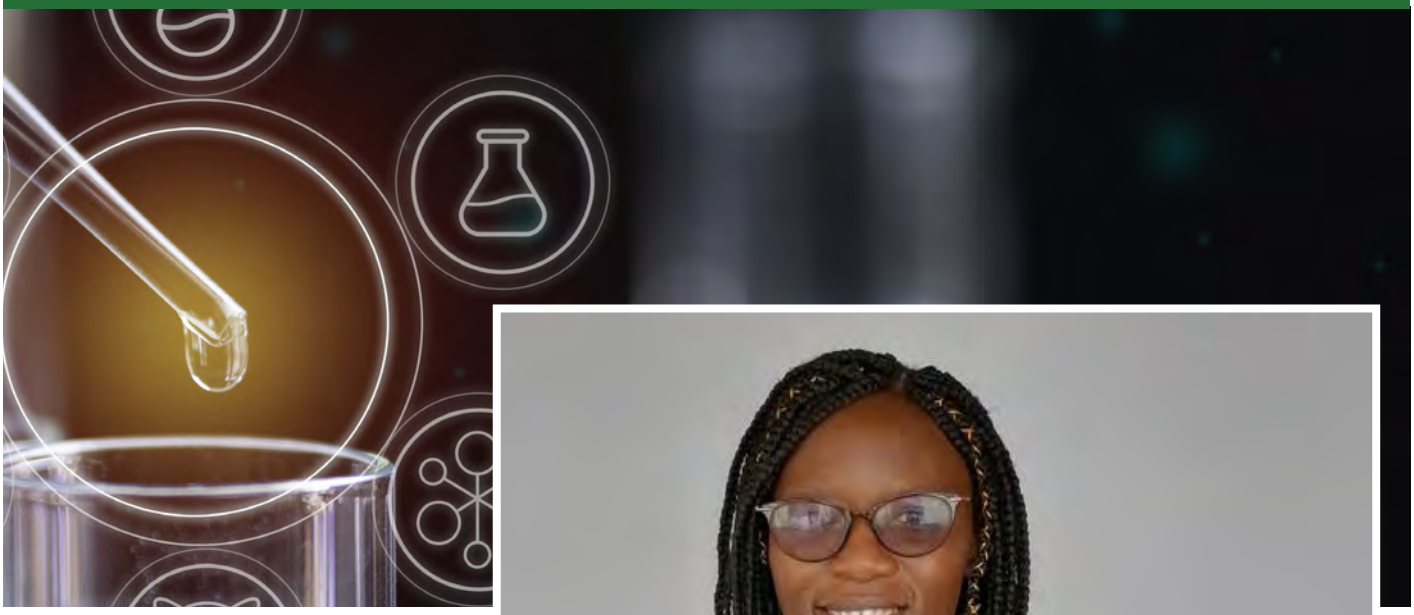
Prof Bernard Slippers, Director of the Forestry and Agricultural Biotechnology Institute (FABI) and a professor in the Department of Biochemistry, Genetics and Microbiology, received the prestigious Christiaan Hendrik Persoon Medal at an awards ceremony of the Southern African Society for Plant Pathologists (SASPP), which took place on the campus of the University of Pretoria in August.

This award is the highest honour that the SASPP can bestow on one of its members and must reflect the highest level of scientific achievement at an international level as well as service to the Society. The Persoon Medal (as it is commonly known) has been awarded only seven times in the 60-year history of the Society, reflecting the very high level of achievement that it represents. Previous recipients of the Persoon Medal include Prof. James E Vanderplank (1979), Prof WFO Marasas (1987), Prof Mike Wingfield (1999), Prof Pedro Crous (2005), Prof ZA Pretorius (2009) and Prof Brenda Wingfield (2015). Thus, there are now four recipients of the award that members are linked to FABI, with Prof Brenda Wingfield being the first female recipient. In presenting the award, SASPP President Prof Wijnand Swart outlined the vast contributions that Prof Slippers has made to plant pathology globally, not only based on exceptional scientific accomplishment but also in the many roles he has played and continues to play in science leadership.

Prof Slippers said that it was a highlight of his career and a tremendous honour to receive the Persoon Medal from the SASPP. He added, "the SASPP is the first scientific conference I ever attended, and it has been a key academic society in my academic career ever since. I am thankful to everyone in the society who has been instrumental in the opportunities the SASSP has created for me. It is a special occasion for me to share this award with all four of my PhD supervisors, including Profs Mike and Brenda Wingfield, Pedro Crous and Teresa Coutinho. I look forward to continuing to work with them and the incredible other colleagues and students with whom I have the privilege to share a passion for biology and plant health in particular."

> *"I am thankful to everyone in the society who has been instrumental in the opportunities the SASSP has created for me."*

Dr Gugu Kubheka selected to attend Nobel Laureate Meeting



Dr Gugu Kubheka, a postdoctoral fellow in the Department of Chemistry, was one of only 11 top young scientists from South Africa to attend the 71st Lindau Nobel Laureate Meeting dedicated to chemistry earlier this year in Lindau, Germany. The Academy of Science of South Africa (ASSAf) has successfully nominated these top young scientists from South Africa.

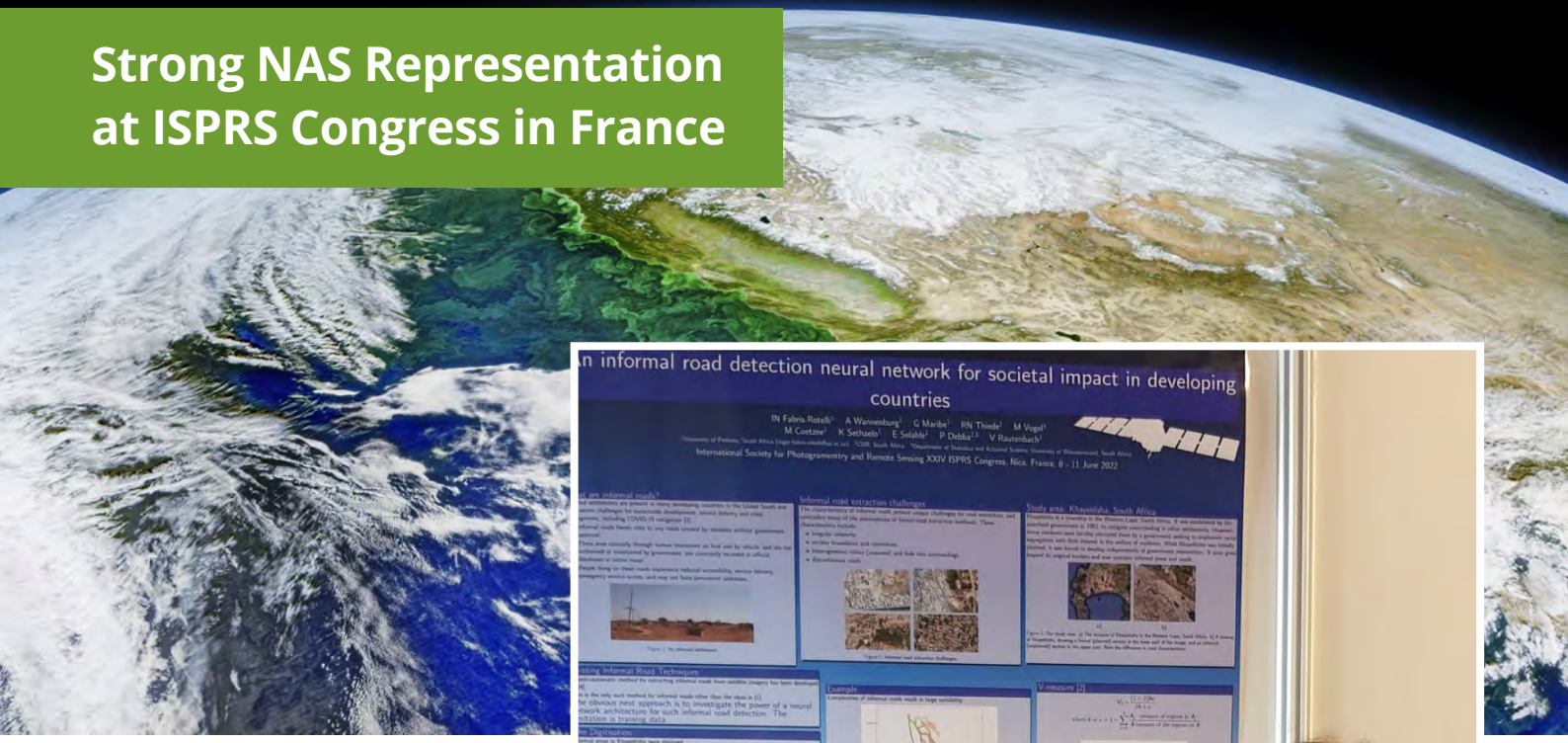
"Being selected to participate in the Lindau Nobel Laureate meeting meant an opportunity to learn and share knowledge with some brilliant young scientists and academics from different disciplines of science. On a professional level, attending this prestigious event will help expand my research network with renowned scientists, including the establishment of collaborations with both local and international scientists," Dr Kubheka said when asked what this opportunity meant to her.

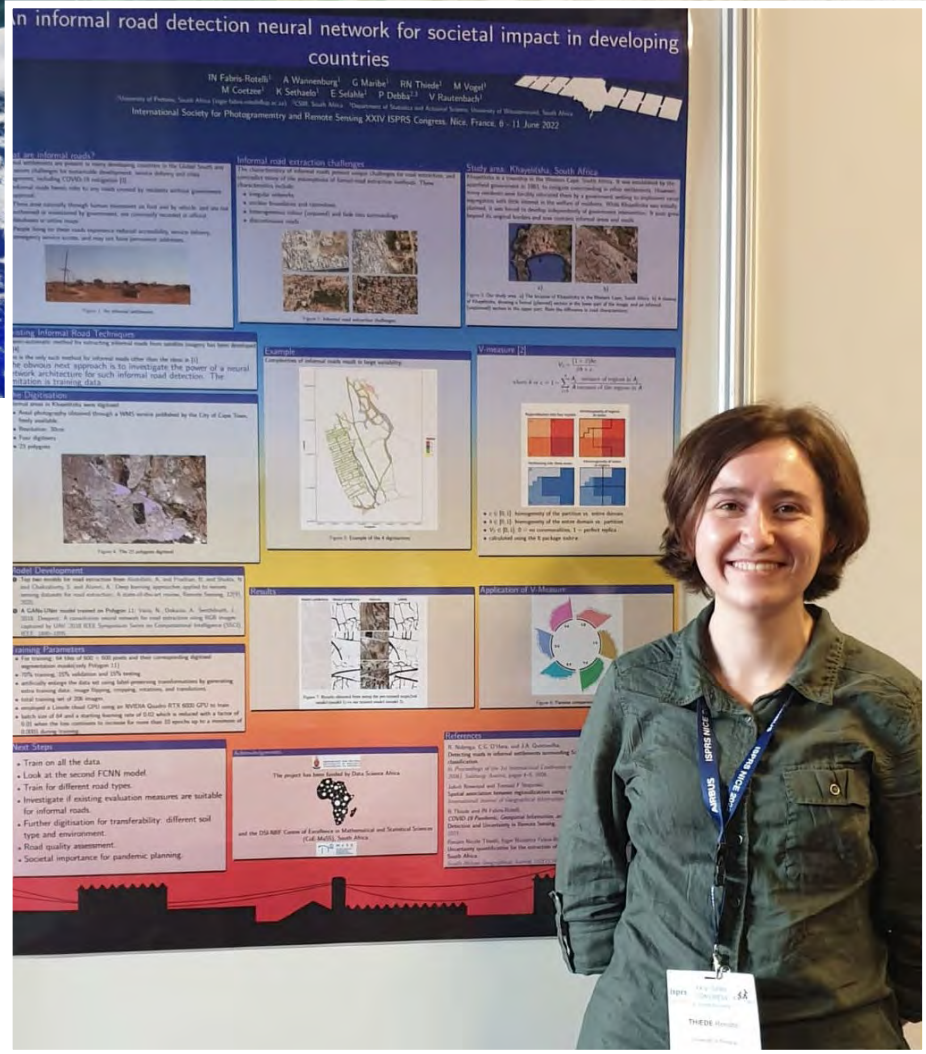
"The main goal of the Lindau Nobel Laureate meeting is to educate, inspire and connect. Personally, this meant an opportunity to expand my academic knowledge and be up-to-date with recent research developments in chemistry. The different talks given by the Nobel laureates, such as lecturers, Agora talks, open exchange and panel discussions, were part of the education programmes. Overall, the whole event was overwhelmed by educational programs on various chemistry and biochemistry topics. I was inspired, and I, in turn, wish to inspire other upcoming scientists through my work."

"As a researcher, I also got exposure through different interviews. I did interviews with the African Diaspora Magazine (LoNam), which is based in Berlin. The young scientist who also writes for this magazine was interested in interviewing me after she saw on UP's Twitter page that I was also attending the meeting. She was interested in chatting with young scientists about research in Africa. This interview which was written in German, allowed me to speak about my research, universities, infrastructure, and some of the best scientists we have in South Africa. I also had an opportunity to speak virtually with Koester Vera, who writes for *ChemistryViews*, about the Lindau meetings, research, and South Africa. This opportunity did not only shine a spotlight on my research but also on South Africa. With all the negative media surrounding the country, getting an opportunity to speak about all the brilliant research and other great things happening in South Africa presented an opportunity to express gratitude for the support the country has offered through sponsorship," Dr Kubheka concluded.

Dr Kubheka is a Rhodes University graduate with a PhD in nanotechnology. She has more than seven years of conducting research in a nanotechnology laboratory. Her research focused on synthesising organic molecules and nanomaterials for application in optical limiting, photodynamic therapy, and fluorescence sensing. She has also conducted research in the environmental monitoring and sensing group at the University of Pretoria. Her research was based on the design and development of novel carbon materials for the adsorption of environmental pollutants in water.

Strong NAS Representation at ISPRS Congress in France





Ms Renate Thiede with their poster on "An Informal Road Detection Neural Network for Societal Impact in Developing Countries".

In June, six Faculty of Natural and Agricultural Sciences (NAS) delegates participated in the XXIV ISPRS Congress in France.

The International Society for Photogrammetry and Remote Sensing (ISPRS) is a non-governmental organisation devoted to developing international cooperation for advancing photogrammetry and remote sensing and their applications. The ISPRS is a member of the International Science Council. Its scientific interests include photogrammetry, remote sensing, spatial information systems and related disciplines, and applications in cartography, geodesy, surveying, natural, earth and engineering sciences, and environmental monitoring and protection.

A daily keynote and more than 1 500 papers were presented. UP delegates contributed to the state-of-the-art current trends in science, technology and business. They had the opportunity to meet and network with experts and cross-fertilise with peers worldwide.

Dr Adedayo Adeleke, a lecturer in the Department of Geography, Geoinformatics and Meteorology (GGM), presented one of his honours students' research projects, titled "Developing Spatial Decision Support System to Assess Traffic Congestion in the City of Johannesburg". A poster by **Azile Mdleleni**, a PhD student in Geoinformatics, showed how one could visualise life in an informal settlement in South Africa using web maps and story maps.

Nicholas de Kock, also from GGM, presented a poster titled "Towards an Open Source Python Library for Automated Exploratory Spatial Data Analysis (ESDA)". This resulted from his honours project, which evolved into his current research for his MSc in Geoinformatics.

Ms Renate Thiede and **Prof Inger Fabris-Rotelli** from the Department of Statistics exhibited a poster. They co-presented their research titled "An Informal Road Detection Neural Network for Societal Impact in Developing Countries". This research created a training dataset of informal roads to train a neural network to extract informal roads in remote sensing imagery. The presentation and poster discussed the data collection and quality control process, as well as preliminary results from the neural network, which shows an improvement over existing neural networks trained on formal roads.

Prof Serena Coezee, Head of GGM represented South Africa at the ISPRS General Assembly. She co-organised the forum "Openness and Innovation in Geomatics and Earth Observation" with Prof Maria Brovelli from the Politecnico di Milano, Italy.

SASBi honours Prof Fourie Joubert with Gold Award

Prof Fourie Joubert, Director of the Bioinformatics and Computational Biology Unit, is the first recipient of a Gold Award for achievement in Bioinformatics. The South African Society for Bioinformatics (SASBi) made the Award.

The award exemplifies his outstanding contributions to the field of bioinformatics in SA. He vastly contributed to the education of both undergraduate and postgraduate teaching and learning and research activities. This award also gives recognition to his leadership role played.

"I am truly thankful and humbled for the remarkable acknowledgement from the South African bioinformatics community that appreciates my efforts. I am committed to further serve the discipline of bioinformatics in teaching and learning, as well as research," Prof Joubert said when asked how he felt about this honour. He added that "it was an acknowledgement of almost 30 years of dedication to establish and promote bioinformatics research, as well as services and training in South Africa."

Prof Joubert explained that his interest in bioinformatics started at a young age. "I was fascinated by computers. After completing my honours in Biochemistry, it quickly became apparent that there were many remarkable computer applications in biological sciences. I started experimenting with computers to apply the core knowledge I learned in biological research during my master's degree in 1992. My PhD project in 1995 addressed computer modelling of the binding of inhibitors to malaria proteins, followed by testing these in the laboratory."

He established the Bioinformatics and Computational Biology facility at UP in 2003 to enhance and coordinate bioinformatics-related activities and led the facility from 2003 to 2014. After considering the impact of the facility's involvement on undergraduate and postgraduate teaching and learning, as well as research, Prof Joubert upgraded the facility to the Centre for Bioinformatics and Computational Biology in 2014. Prof Joubert also provides extensive bioinformatics and high-performance computing support to staff and students and still arranges regular short courses.

Prof Fourie Joubert

Computer-related bioinformatics support and services led to his involvement in a range of research projects other than his own focus on breast cancer genomics. As the discipline of bioinformatics is a highly interdisciplinary, multidisciplinary collaborative field involving high throughput data analyses of biological samples, there is an excessive demand of requests for bioinformatics support and collaboration, especially in the field of genomics.

Prof Joubert has authored/co-authored 56 research papers in internationally accredited peer-reviewed journals. The highest impact factor (IF) includes his co-authorship in *Nature* (IF: 41.577).

ERL hosts third Summer School on non-invasive Monitoring of Hormones

A very successful third Summer School on non-invasive Monitoring of Hormones took place in May at the Endocrine Research Laboratory (ERL) of the Mammal Research Institute.

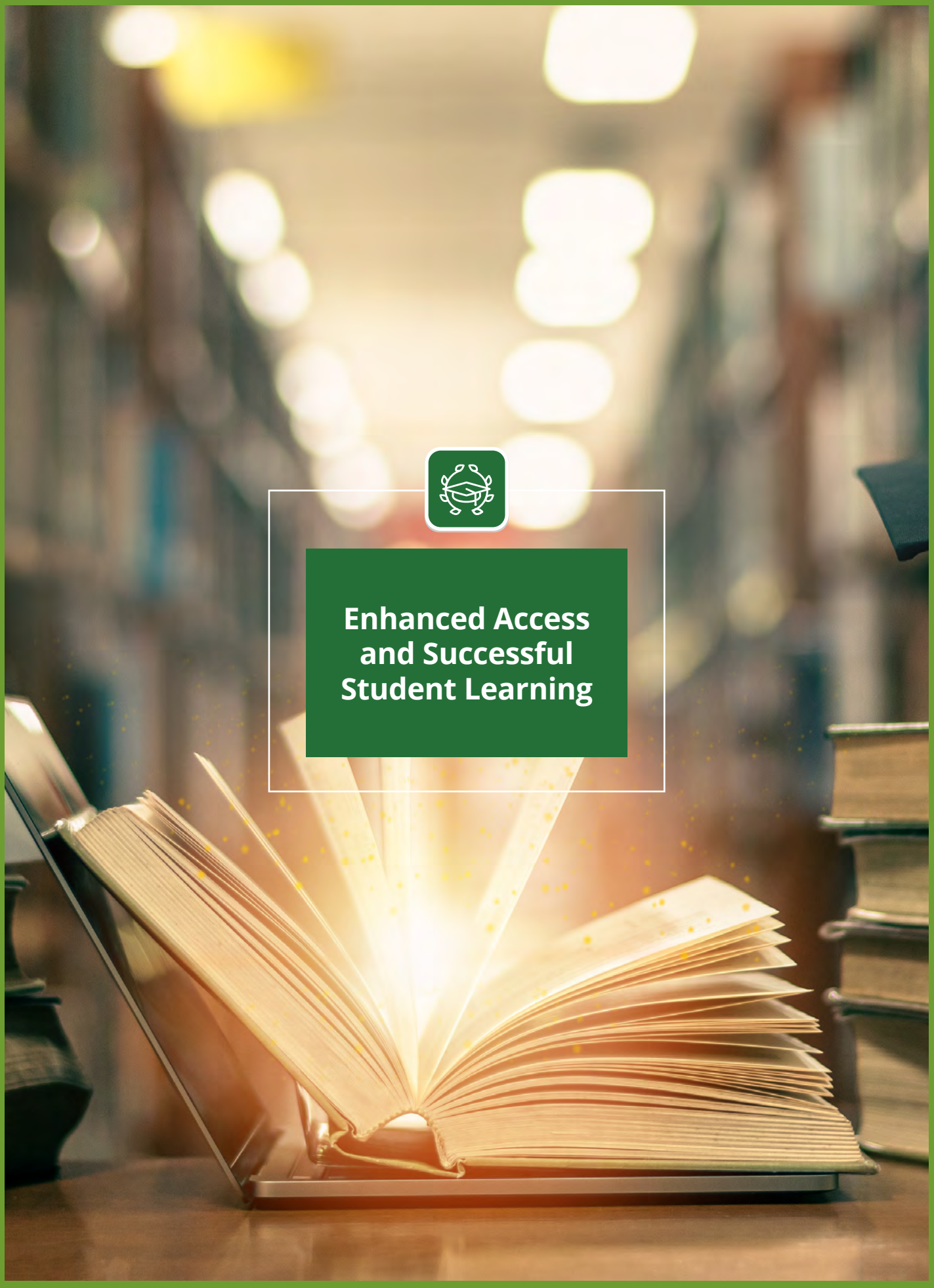
According to Dr Nicole Hagenah-Shrader, Manager of the ERL, "The Summer School focused on theoretical and practical aspects of non-invasive hormone monitoring for examining reproductive function and responses to stressors in wildlife. The workshop was structured as a beginner-level course that required little laboratory experience and was aimed at graduate/postgraduate students and established researchers. Over the five days, the participants received intense training on sample collection, storage and hormone extraction, as well as quantification of steroids and their metabolites for examining and interpreting male and female reproductive activity and success and the impact of intrinsic and extrinsic factors on animal homeostasis."

The Head of the ERL, Prof André Ganswindt, as well as collaborators from the Institute of Zoo and Wildlife Research (Germany), University of South Africa (UNISA) and some current UP postgraduate students and postdoctoral fellows provided the theoretical background on all aspects of non-invasive hormone analysis. The staff of the ERL facilitated the hands-on practical training. It included everything from sample collection and preparation to pipette training, enzyme immunoassay techniques, and finally, data analysis and interpretation. As a well-deserved treat after all the hard work, the course finished off with a half-day trip to Rietvlei Nature Reserve, where the delegates could enjoy South Africa's fantastic wildlife first-hand.

In total, nine (inter)national delegates from Germany, Belgium, the USA, Kenya, and South Africa participated in the Summer School. Just like in previous years, the Summer School received overwhelmingly positive feedback (e.g. 'I learned a lot, made new contacts. A great experience!', or 'So helpful to have time to ask questions about my specific project'). Finally, at least one new collaboration has resulted from this exercise.

"Despite the additional work required to make the Summer School a success, the ERL team felt it was an enriching experience. As a result, we are already looking forward to the next Summer School, which we hope to host in 2025," Dr Hagenah-Shrader concluded.

Delegates doing a dummy faecal sample collection, and hard at work in the Endocrine Research Laboratory



Enhanced Access and Successful Student Learning

Future scientists awarded as exceptional achievers

Nearly 70 prizes were awarded at the Annual Exceptional Achievers Function for Faculty of Natural and Agricultural Sciences students in May this year.

Dr Ntombi Gama from the Department of Biochemistry, Genetics and Microbiology was the programme director. Mr Luke Invernizzi, a postgraduate student from the Department of Chemistry, was the guest speaker.

Mr Invernizzi's research focus on natural product chemistry and biodiscovery, and the quality of his MSc was of such high quality that it has been upgraded to a PhD. Between all his studies and research activities, he made time to get his third dan and is a former provincial and South African champion.

Mr David Dodkins, who completed his BSc degree in Actuarial and Financial Mathematics, received the Vice-Chancellor and Principal's medal for maintaining a weighted average performance (94.8%) during his three years of undergraduate studies. He also won the OUTsurance Prize (For the best performance in third year BSc Actuarial and Financial Mathematics); Prudential Investment Managers Prize (Best performance in Contingencies); FNB Prize (Best performance in Survival Models), and the STATOMET Prize (Best overall performance in Mathematical Statistics at 300-level. He also obtained the second position on the Dean's Merit list for third-year students.

Prof Barend Erasmus, Dean of the Faculty and Mr David Dodkins, Vice-Chancellor and Principal's medal winner.

Ms L Kwinda (BSc Biological and Agricultural Sciences) was first on the Dean's List in the BSc Extended Programmes with 86,9%. Mr N Retief (BSc Actuarial and Financial Mathematics) obtained first place in the first-year category with 93,4%. For the second-year student category, Mr M Steynberg (BSc Physics) earned the top spot with 94,67%. Mr J Lakhani (BSc Actuarial and Financial Mathematics) was first on the third-year list with 94,86%, while Mr J Venter (BScAgric Applied and Plant and Soil Sciences) was the best student in the category for fourth-year students with 86,7%.

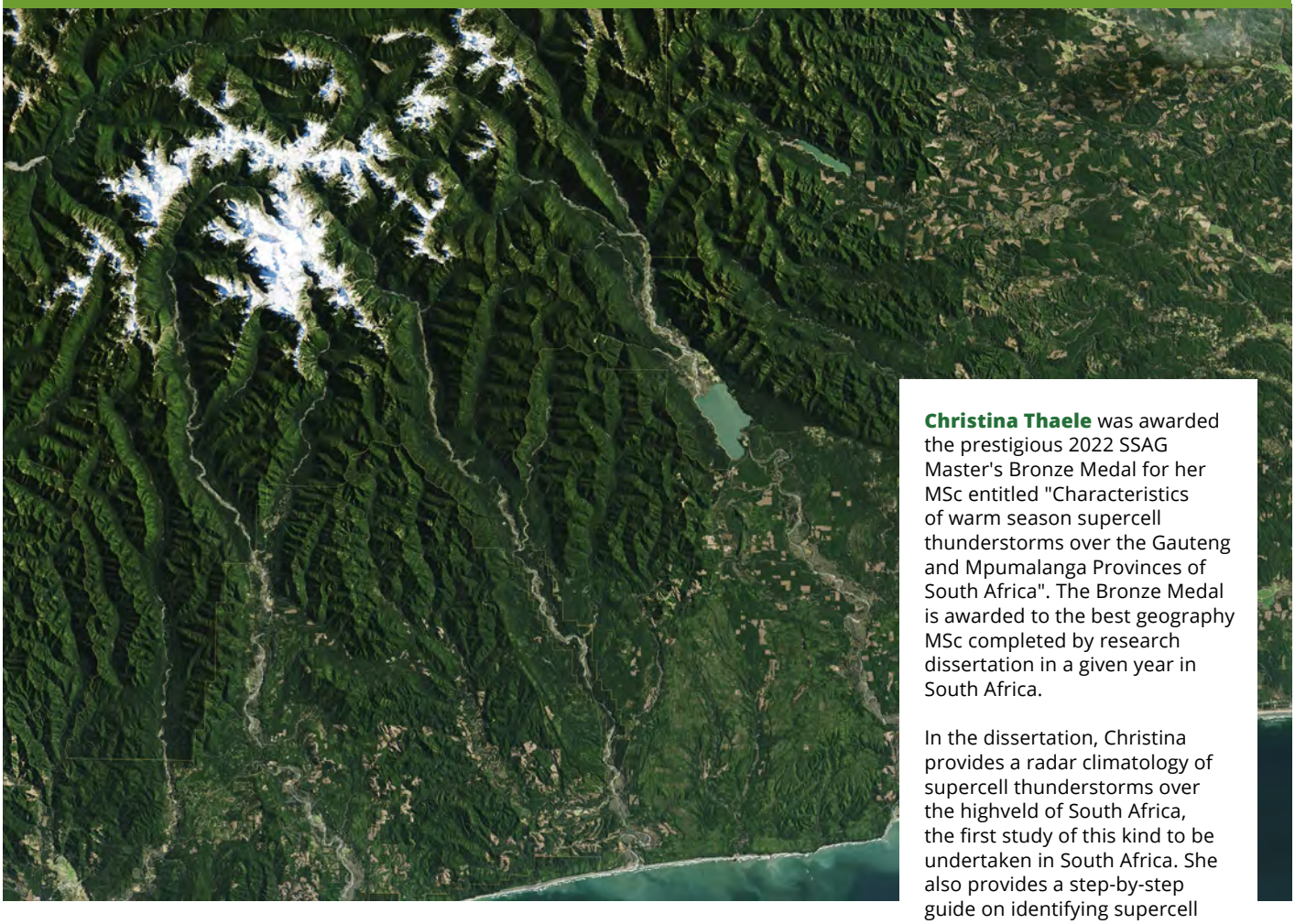
Mr N Retief (Actuarial and Financial Mathematics)

Mr M Steynberg (Physics)

Mr J Venter (Applied and Plant and Soil Sciences)

Watch the virtual event here.

Society of South African Geographers awards two NAS students



Two postgraduate students from the Department of Meteorology, Geoinformatics and Meteorology recently received awards from the Society of South African Geographers (SSAG).

Ms Christina Thaele

Ms Kayla Theron

Christina Thaele was awarded the prestigious 2022 SSAG Master's Bronze Medal for her MSc entitled "Characteristics of warm season supercell thunderstorms over the Gauteng and Mpumalanga Provinces of South Africa". The Bronze Medal is awarded to the best geography MSc completed by research dissertation in a given year in South Africa.

In the dissertation, Christina provides a radar climatology of supercell thunderstorms over the highveld of South Africa, the first study of this kind to be undertaken in South Africa. She also provides a step-by-step guide on identifying supercell thunderstorms on radar. She has already disseminated this information to South African weather forecasters in a workshop at the University of Pretoria. Listing the dates on which supercell thundershowers occurred now opens the door for numerous further research opportunities.

She conducted this research under the guidance of Prof Liesl Dyson and Mr Erik Becker from the Centre for Climate Research Singapore.

Kayla Theron, who graduated with an honours degree in Geoinformatics this year, was awarded the SSAG Outstanding Honours Research Award for 2022. She received the award for her honours project, completed in 2021, “A street segment analysis of crime in Khayelitsha, South Africa”. Her project was conducted under the supervision of Professor Greg Breetzke and Mr Lourens Snyman.

Cognitive geomatics project kicks off between UP and two international universities

Cognitive geomatics refers to digital teaching that creates awareness of intercultural differences in sense of place

Germany, South Africa and Kenya have been used in case studies undertaken for a project of the Baden-Württemberg-STIPENDIUM for students. BWS plus is a programme of the Baden-Württemberg Stiftung. This project, financed at a cost of €140 000, started in March 2022 and will continue until February 2025.

There is a standing, long-term cooperation between the Karlsruhe University of Applied Sciences (HKA) in Germany and the University of Pretoria (UP) in South Africa, and for this new cognitive geomatics project, the two institutions have included the University of Nairobi (UoN) in Kenya. The project will widen the thematic discourse to be more interdisciplinary and will, in addition to geo(infor)matics students, also include students from the social sciences and cultural media management.

According to Professor Serena Coetzee, Head of the UP Department of Geography, Geoinformatics and Meteorology and one of the three principal investigators in the project, '[R]apid advances in information and communication technologies, together with the increasing availability of processing options in the cloud, are leading to significant increases in data. Future use and analysis of the location-based aspect of such big data is expected to lead to a boom in geomatics, which implies that increasingly not only geomatics specialists will work with such data. At the same time it is becoming evident that the mere positioning of objects based on geographic coordinates does not do justice to the subjective experiences of space and the world around us. Sense of place, however, differs from one culture to another and is closely linked to locality and authenticity. This raises questions about the nature of the interplay between the way we think about and perceive physical space (our mental maps) and the use of high-tech methods for measuring, analysing and visualising our environment (in the virtual world), which can be described as cognitive geomatics. The individual cultural differences are also of interest in teaching and learning.'

The project officially started with a workshop on 'Sense of place: Web mapping' held at the HKA in April, which brought together six lecturers from the three collaborating universities and 13 HKA students. During the winter semester of 2021/22, as part of their coursework, HKA students used web mapping technologies to design and develop digital teaching materials aimed at teaching different aspects of spatial awareness. During the workshop, they presented their material, which was critically reviewed by the project partners from Africa and a larger group of students from different fields of study. Participants in the workshop came from eight countries.

Mental mapping as an introduction to 'sense of place', the theme of the workshop

The three principal investigators, from left: Prof Serena Coetzee (UP, South Africa), Prof Dr-Ing Gertrud Schaab (HKA, Germany) and Prof Dr-Ing Faith Karanja (UoN, Kenya)

The meaning of 'sense of place' was traced and web mapping possibilities for interactive, dynamic spatial visualisation of statistical data, or for sharing one's ideas, were shown. The two days were a successful start to the new project as student participants had the opportunity to experience cooperation and exchange with South Africa and Kenya, and the project partners were inspired to undertake further project work, which will primarily take place virtually.

NAS Student Administration first to participate in Enterprise Service Management system (online helpdesk project)

The Faculty of Natural and Agricultural Sciences (NAS) is improving service delivery by being the first faculty at UP to participate in the student administration call centre and service portal project.

As the NAS student administration office handles large volumes of enquiries from students and parents, this system significantly reduced the turnaround time for resolving queries.

According to Information Technology Services, Service Management Automation (SMAX) is becoming a key enabler of digital transformation and modernisation efforts.

Some of the benefits of SMAX include a customised service portal to the NAS environment, with service and support offerings designed to help students and staff alike. Knowledge articles are used extensively to assist staff and students with self-help information that is always available. The system also can recognise recurring enquiries and then attempts to provide a context-relevant solution.

"With the return to campus, the NAS Student Administration Department had to deal with the usual walk-in enquiries and an increased number of online enquiries. SMAX dramatically improves our ability to provide good service and timely feedback to our students", says the Dean of the Faculty, Prof Barend Erasmus.

A chatbot functionality is also available with access to all the information across the system to guide students to up-to-date information and help.

The system also provides staff and students with the functionality to track enquiries and interact with agents.

Since March 2022, over 5 000 enquiries have been received and resolved through the online system.

To access this NAS online enquiry system, go to www.nas.up.ac.za/ and log in with your UP Portal credentials.

Transformed and Inclusive Community

Meet co-chairs of the NAS Anti-discrimination and GBV subcommittee

RETHINK@NAS, the Faculty of Natural and Agricultural Sciences (NAS)' transformation initiative, comprises six subcommittees. In this issue, we focus on the subcommittee's co-chairs on Anti-discrimination and Gender-based Violence (GBV).

Dr Thando Ndarana

Dr Thando Ndarana is a Senior Lecturer in the Department of Geography, Geoinformatics and Meteorology and has been employed at UP for nearly six years.

Q ***Why do you believe it is important that the Faculty has such an initiative as RETHINK@NAS?***

A Before RETHINK@NAS, issues of transformation were talked about. These were crucial discussions to have, of course, but that is where things ended; discussions and debates. RETHINK@NAS aims to take things further and implement activities that will transform the Faculty. It operationalises transformation. Furthermore, transformation is broad and not only apply to the all-so-important employment equity issue. Whilst this is a priority at NAS, I believe that RETHINK@NAS also highlights other issues that will help transform the culture at UP so that we all feel that we belong here. It promotes inclusivity and fights against discrimination, whether based on race or gender.

Q ***Why is it important to act against Anti-discrimination and GBV at the University and the Faculty?***

A We live in a country with a harrowing past, and many of the problems we fought against persist. These issues have to be addressed urgently. Furthermore, South Africa is leading in GBV; one sees this in the news daily. I think that part of the solution to this ugly and disturbing problem would benefit from education, focusing mainly on men, the perpetrators of GBV, because these are the people who commit these crimes. Universities are certainly not immune to the problem; many cases of rape and femicide have been reported at universities around the country. It is therefore critically important that the UP takes an active role in preventing these things from happening.

More about Dr Ndarana:

Who/what inspires you?
I am inspired by historical jazz figures and personalities who overcame some of the worst conditions that a person can grow up to become world-acclaimed artists.

Hobbies: Visual art exhibitions and attending live music shows in jazz clubs in Gauteng.

Favourite sports team: Boxing, as I grew up in Mdantsane.

Favourite song: This changes from time to time, but I really love "Song for Biko", a recording by Johnny Dyani.

Dr Nolwazi Nombana

Dr Nolwazi Nombana has been a Senior Lecturer in the Department of Chemistry for the past five years.

Q ***Why do you believe it is important that the Faculty has such an initiative as RETHINK@NAS?***

A It is not often that ordinary staff members at the bottom of the 'food chain' are asked for input, so this initiative gives us a voice, and we get to be part of the solution. Also, this initiative shows that NAS is committed to transformation for growth.

Q ***Why is it important to act against Anti-discrimination and GBV at the University and the Faculty?***

A Discrimination is a compromise on human dignity; the constitution requires all of us to promote antidiscrimination given our history, so we need to make an effort as a faculty to guarantee we respect human dignity. This forms part of protecting human rights, especially regarding GBV. Having initiatives is crucial as preventative measures against GBV will prevent trauma, create awareness, and change behaviours. It is essential to realise that UP is an entity within society that has to drive positive cultural change and stand for the public good, and we believe that through this platform, NAS can make a meaningful impact

More about Dr Nombana:

Who/what inspires you?
Happy people

Hobbies: I like walking my dog.

Favourite sports team: Banyana Banyana

Favourite song: Anything by Toni Braxton

Some of the planned activities include:

- Develop a plan of support for postgraduate students who have suffered discrimination and gender-based harm (GBH)
- Understand Anti-discrimination and GBH at the faculty level and produce a document that summarises processes that deal with this, and make the contact details available of the relevant people to connect to when issues arise
- Creating awareness of RETHINK@NAS and the committee – creating a NAS- wide footprint
- Connect to student house leadership to address issues related to students
- Use social media to reach out to students

NAS students' view of Women's Month

Women come in all sizes, shapes and colours – just like their different opinions and world views. That is just one of the reasons why the Faculty of Natural and Agricultural Sciences (NAS) chose to celebrate Women's Month by doing short interviews with a few undergraduate and postgraduate students.

Ayla Malan
(PhD student in Microbiology)

Q *How much do you think the role of women has changed over the years?*

A Women are featuring and making a success in more prominent roles, e.g. company directors and global leaders.

Q *What difference can we as women make?*

A Mentor younger generations of women on the possibilities and opportunities that exist, both in academia and in society.

Q *What challenges have you experienced as a woman in your student life?*

A Writing semester tests in the evening and walking through dark streets and alleyways to get to my car.

Q *Female role model?*

A My mother.

Q *What inspires you?*

A The successes of people around me, especially those that show kindness and compassion towards their fellow citizens.

Prisca Atieno (PhD student in Agricultural Economics)

Q *How much do you think the role of women has changed over the years?*

A Women are more empowered and contribute to economic development. The United Nation's Sustainable Development Goal five, which emphasises the need for women's empowerment, has greatly shifted the role of women in many countries. Moreover, global advocacy and gender empowerment and equality programmes have enabled women to contribute to and stimulate economic growth, productivity, and development. It is also important to note that, as much as progress has been made, a lot needs to be done.

Q *What difference can we as women make?*

A Women can take up more leadership roles and engage in policy formulation. For instance, women are the critical source of labour in agriculture, yet they are the lowest paid compared to the amount of work and hours they contribute to agriculture. Moreover, other responsibilities such as childcare and family care and household chores are still their responsibilities.

Q *What challenges have you experienced as a woman in your student life?*

A Having to balance my student life and family life is a great challenge. I am a mother who must give attention to my child and still be able to achieve in my academic studies.

Q *Female role model?*

A I look up to so many female role models, to mention a few. My mentor, Prof Sheryl Hendriks, has guided and continues to support me through this academic journey. I also look up to my mother, a powerful woman who gave life to me and is supportive in everything I do.

Q *What inspires you?*

A The ability to make a difference in someone's life inspires me and motivates me in all areas of my life. My research in food security policy is a way for me to contribute to the evidence-based policy that will improve food security and ensure zero hunger, especially among the women and children most vulnerable.

Martha Muruya
(MSc student in Biochemistry)

Q *How much do you think the role of women has changed over the years?*

A The confines of traditional gender stereotypes have loosened. Women are taking up space in male-dominated fields and are pushing for their voices to be heard, but not without struggle. Although greater efforts have been made to bridge the gender gap between men and women, the fight for gender equality is far from over.

Q *What difference can we as women make?*

A Women can provide unique perspectives required to sufficiently understand and tackle global challenges. As women's representation in our Faculty continues increasing, this could inspire more young women to pursue careers in STEM which could have ripple effects in our country.

Q *What challenges have you experienced as a woman in your student life?*

A One of the most significant challenges I've faced as a woman in my student life is sadly one shared by most, if not all, women in South Africa, is fearing for my safety owing to the ongoing violence against women.

Q *Female role model?*

A It sounds cliché that my mother is my female role model, but I don't say this lightly. She is the embodiment of what it means to "take up space" and "push to be heard", and she empowers so many women around her to do the same. She is a force to be reckoned with. If I could be even half the woman my mother is, I'd count it as one of the greatest accomplishments of my life.

Q *What inspires you?*

A I firmly believe that our lives are a part of something much bigger than ourselves. Striving to live my life from this conviction is what inspires me.

Emre Holz-Leite
(BSc Biological Sciences)

Q *How much do you think the role of women has changed over the years?*

A The role of women has changed drastically. Women have become more prominent in the "workplace" and, most importantly, moved away from the stereotype of women needing to stay in the kitchen.

Q *What difference can we as women make?*

A We can start by changing the social construct of women being weak. – e.g. when asked to run like a girl, most usually start running weird or slow. Women don't run like that; it is a social construct.

Q *What challenges have you experienced as a woman in your student life?*

A I have been very blessed not experiencing any prejudice because of my gender. I am surrounded by a lovely group of people who do not make assumptions based on gender.

Q *Female role model?*

A Most certainly, my mom. Without her guidance, I would not be the self-assured, confident woman I am today.

Q *What inspires you?*

A Poetry, music, family, sport, friends, kindness, the rain and someone who loves their work.

Catha Holz-Leite
(BSc Biological Sciences)

Q *How much do you think the role of women has changed over the years?*

A The role of women has changed significantly, as they were seen as typical housewives whose sole responsibility was to raise children and run the household, whereas now they are trailblazers.

Q *What difference can we as women make?*

A As women can stand together and raise awareness of the violence, abuse and harassment women come across every day. We can create a safe space for women where they can be able to talk about their abuse without feeling judged and undermined.

Q *What challenges have you experienced as a woman in your student life?*

A I've had times when I'm afraid to walk around alone on campus at night after a test because so many women are being harassed and hurt when they're alone at night.

Q *Female role model?*

A My mom. She taught me to stand up for myself and never back down from what I want in life. She taught me that even though I can't always be strong, I can always be brave.

Q *What inspires you?*

A I get inspiration from countless places. Some of these things include the passion of others for things they love. Seeing someone being passionate about a particular thing gives me a thrill and motivates me to jump into action and do something I love. I also find my inspiration in music and poetry. The rainy and windy days bring me peace and inspire me to be an easy-going person who goes where I want to and enjoy the ride there.

Lu-Nita Berrange
(MSc in Chemistry)

Q *How much do you think the role of women has changed over the years?*

A Coming from a culture where women used to stay home and raise their children, pursuing education was different from taking care of the home. I think dreams should be followed no matter what the idealised view of women is; when talent doesn't work hard, passion, in my opinion, triumphs over talent. Women have developed over the years as we discover new interests, mature, and take on new challenges like any human should. More women over the years have been pursuing their passions that lead them to much higher grounds than previously.

Q *What difference can we as women make?*

A I'm not sure about you, but I naturally have a nurturing temperament. I take a softer approach while working with students while establishing boundaries. Women in science may foster a sense of community and belong in their circles, which will help others around them thrive.

Q *What challenges have you experienced as a woman in your student life?*

A Being a woman who cannot pick up some items and working long hours has presented issues for me. Women sometimes have to learn to say, "Yes, I can do it, but it's better to watch someone else do it." Still, in my opinion, each individual should be able to recognise when they can and cannot perform a task and be sensible enough to seek assistance when necessary.

Q *Female role model?*

A For a woman in science, I think that Rosalind Franklin can be idolised for her DNA discovery even though she never got the recognition she deserved; similarly, even if women's hard work isn't always seen so easily doesn't mean we should not keep on pursuing our dreams. But I can't think of a finer mother as a role model. I believe that after seeing how hard she worked to achieve her goals, I was inspired to strive even more challenging to realise my aspirations.

Q *What inspires you?*

A In the morning, I have two primary sources of inspiration. First and foremost, I can teach because I participate in the first-year Chemistry practicals. The eagerness of the students to learn motivates me to get dressed and attend class no matter how difficult it might get. Learning is the second inspiration each day. As a graduate student studying chemistry, I aim to learn more daily.

Zeenat Patel (BScHons Environmental Science and Geography)

Q *How much do you think the role of women has changed over the years?*

A Women's role has become more acceptable for them to individually take up whatever role in society they best fit into.

Q *What difference can we as women make?*

A Women can make a difference in any way they wish, but one aspect that I think is particularly important is making previously male-dominated spaces more inviting to women. As women, we shouldn't get caught up in trying to fit the status quo and be 'the' woman in the room but rather work towards making the room friendly to other women.

Q *What challenges have you experienced as a woman in your student life?*

A I have been fortunate enough not to experience direct, explicit challenges, but I have found that, as a woman, there are many situations that I don't necessarily feel safe in. I have also found that sometimes it is more difficult to be taken seriously in student leadership spaces as a woman.

Q *Female role model?*

A I would have to say, my mom and my late grandmothers! They have been resilient through many challenging times.

Q *What inspires you?*

A Seeing others who are passionate about what they do and knowing that I can make a difference somewhere. Knowing and feeling like you can make a positive contribution makes all the difference.

Institutional Sustainability

Prof Beyers appointed as new HoD for Actuarial Science

Prof Conrad Beyers has been appointed the Head of the Department of Actuarial Science from 1 August 2022.

"The Department of Actuarial Science will strive to maintain and strengthen its reputation as a leading destination for students who plan to enter the workforce as risk managers and actuaries. Over the past ten years, interdisciplinary collaboration, both locally and internationally, proved to greatly assist in accelerating actuarial research growth and development. This is essential to a successful research vision," Prof Beyers explained his vision for the Department."

He elaborated, "It is envisioned that the Department could assist in attracting a broader range of postgraduate quantitative risk research students to UP through inter-departmental and inter-faculty collaboration. Research and teaching innovation are embedded within a broad and rapidly changing environment, where transformation processes and community engagement are essential to the Department's continued relevance and ability to make a meaningful contribution," Prof Beyers concluded.

He started his teaching and academic career in the Department of Mathematics and Applied Mathematics in 2001. He holds a PhD in Mathematics and is a qualified actuary with the Chartered Enterprise Risk Actuary (CERA) designation. In 2010, he moved to the Department of Actuarial Science. As a teaching-intensive department, there was no research contingent at that stage, and he started to work towards developing research capacity in the Department. This culminated in establishing the Absa Chair in Actuarial Science in 2013, facilitating significant growth in the Department's research activities, including postgraduate students, postdoctoral fellowships and research output.

Prof Conrad Beyers

Prof Beyers is a C2-rated researcher. Actuarial Science is fundamentally interdisciplinary, combining a range of practical and theoretical areas relevant to risk and uncertainty in the financial and business world. An interdisciplinary research network with researchers from areas including mathematics, statistics, machine learning, economics, computer science and banking law has developed, especially since the establishment of the Absa Chair in Actuarial Science. He was appointed as Editor of the *South African Actuarial Journal* in 2018.

His research focuses on risks pertaining to the banking and related industries. Risk contagion in financial systems (systemic risk) forms the core of research questions. However, related areas such as stress testing, early warning systems, credit risk and fraud modelling are increasingly prominent. With collaborators, advanced methodologies such as machine learning and network theory applications were incorporated into these financial fields, where more conventional approaches dominated.

UP Giving Day helps alleviate funding challenges

The University's Giving Day campaign, launched in July, raised an additional R100 million for several significant projects over the next three years. The campaign is championed by the Vice-Chancellor and Principal, Professor Tawana Kupe.

He explained some of the reasons for the campaign: "Many students and families have been adversely affected by the ongoing pandemic. We can see how our collective efforts can help to alleviate the funding challenges and to raise the much-needed funds for our students to provide them with the quality education that we are known for and to support the projects we have that make us one of the leading tertiary institutions in the world," says Prof Kupe.

Funds donated specifically to the Faculty of Natural and Agricultural Sciences (NAS) will go towards the projects below:

NAS UNDERGRADUATE HISTORICAL DEBT FUND

Every year numerous students face difficulties registering because of the financial strain of paying off historical debt.

MIERTJIE LE ROUX EXPERIMENTAL FARM DEVELOPMENT PROJECT

The Miertjie Le Roux Experimental farm will be developed into an agricultural research and teaching site in an agricultural hub. Building towards a sustainable living lab concept, this site will allow students and other stakeholders to collaborate on experiential projects.

NAS FOOD CAMPAIGN

The higher costs of living resulting from global fluctuations have placed many NAS students at risk. Food and other basic commodities are essential components to happy and healthy lifestyles.

NAS POSTGRADUATE CONFERENCE TRAVEL FUND

An essential experience of postgraduate studies is to be able to present your research at international or national scientific conferences. This experience not only develops presentation skills but also shapes research ideas, research networks and exposure to the latest research trends.

NAS INDIGENOUS CROPS PROJECTS

Indigenous fruits and vegetables are well-adapted to harsh climates and disease infestation, yet they are underutilised in urban settings in South Africa. This project aims to bring together students, researchers, communities and other stakeholders to develop sustainable circular agricultural practices for growing indigenous crops. Crops will be grown onsite by staff and students, using indigenous and scientific knowledge.

Make Today Matter and Donate

See the UP Leaderboard on which faculty or department raised the most money on Giving Day and who had the most donors.

Social Responsiveness and Societal Impact

Prof Johan Ferreira on jury for international music competition held in SA

Prof Johan Ferreira

Like the rest of our society, the world of classical music has been profoundly impacted by the COVID-19 pandemic. As a result, physical distancing, travel restrictions and quarantines have become part of our daily life.

This has particularly affected classical music performance as physical contact and exchanges are indispensable in making music. A group of South African professionals has organised an International Woodwind Competition (IWC) to be held this year to reinvigorate the South African classical music fraternity for advanced woodwind players (university and young professionals).

The group includes the University of Pretoria (UP)'s **Prof Johan Ferreira**. It is chaired by Dr Danre Strydom from the Odeion School of Music at the University of the Free State in Bloemfontein.

How is Prof Ferreira involved? Prof Ferreira is a full-time associate professor in UP's Department of Statistics. He obtained an LRSM in oboe performance from the Associated Board of the Royal Schools of Music in the UK in 2016 and a PhD in Mathematical Statistics from the University of Pretoria (UP) in 2017. In addition to his role at UP, he currently performs as a freelance oboist around South Africa, regularly appearing as an ad-hoc member of the oboe sections of the KZN Philharmonic, Johannesburg Philharmonic, Eastern Cape Philharmonic and the Free State Symphony Orchestra. Prof Ferreira also performed at the Cape Town Concert Series and presented solo recitals at the Wakkerstroom Music Festival, the GauFestival, the Arts Association of Pretoria and Brooklyn Theatre TV, and participated in the concert series of the North West University in Potchefstroom.

The role of music in his life? 'If strings give warmth to an orchestra, surely the wind instruments are its breath and beating heart. So it is a great privilege for me to be joining Dr Strydom and the other acclaimed board members and jury to establish this competition as a showcase of excellent South African and international wind artistry. The advancement and sustainability of wind playing and training in South Africa form a core focus in music education for the exclusive benefit of society. Music, after all, is meant to be heard and enjoyed,' said Prof Ferreira.

For this competition, international entries are also welcomed to benchmark South African woodwind musicking to global standards. The board of the IWC envisions the sustained legacy of this project beyond 2022. Since there are currently no competitions for advanced woodwind players in our country, an overarching aim of this competition is to contribute to the vibrancy of the national/ international piano, strings and vocal competitions that South Africa hosts. 'Our country has a rich history of performance excellence. We believe this competition can once again provide a platform for our woodwind players to perform, grow and help launch their performance careers. The primary purpose of the competition is to promote the inheritance and preservation of excellent woodwind players and to encourage high standards, set goals and reward young performers for continuing the tradition,' Prof Ferreira explained.

To date, the board has secured support (in kind) from the judges and significant national and international funding agencies and partners. In addition, it has teamed up with the Free State Symphony Orchestra (FSSO) to present a concert showcasing the excellent finalists at a formal symphony concert during which they will perform concertos - a valuable platform in itself for the wind family in a symphonic setting.

Conversations@NAS

From Paradox to Powerhouse: Book on future of agriculture and food security in Africa

Author: Paseka Elcort Gaola

The second Conversations@NAS in June was slightly different than previous occasions with a panel discussion and launch of a book on the future of agriculture and food security in Africa.

The book *Africa's Agricultural Renaissance: From Paradox to Powerhouse* was authored by Dr Ayodele Odusola, a resident representative for the United Nations Development Programme (UNDP).

"This book was motivated by the kind of paradox that Africa finds itself in," Dr Odusola said. "A continent with a comparative advantage in terms of access and assets that could be used to turn agriculture in Africa to become the epicentre of food security globally... Based on the comparative advantages, as% of the world's uncultivated arable land is in Africa. The continent also has the highest number of youths, and we have the highest yield gap in productivity across all crops. As a result, how can such a continent be riddled with poverty, hunger, and malnutrition?"

UP Vice-Chancellor and Principal Prof Tawana Kupe also said, "Africa needs to create sustainable agricultural and food security systems. We have all the natural and human resources needed to produce a robust agricultural food system. Wars and pandemics beyond our control will take place. However, we need a holistic system change to address food security issues in the continent."

From left: Prof Gyebi Duodu (moderator), Dr Ayodele Odusola (author) and UP Vice-Chancellor Prof Tawana Kupe (host).

Dr Odusola's book addresses the contrast of the high levels of hunger in a continent that is well endowed with fertile agricultural land, plenty of fresh water, and a vibrant labour force.

The panel discussion was moderated by Prof Gyebi Duodu, Head of the Consumer and Food Sciences Department, and analysed some critical issues that arise from the book.

"Dietary transitions will be driven by the youth, as they constitute such an enormous proportion of the population," said another panel member, Prof Sheryl Hendriks, Head of the Agricultural Economics, Extension and Rural Development Department, who was attending the event virtually. "So those aspirations of young people need to be taken into consideration when we think about policies, as many young people aspire to a Western diet that would have disastrous effects on our health and future. Therefore, the youth is the food system's driver and actor."

Dr Odusola added that subsistence and small-scale farming also play an essential role in many households and communities, with small-scale farming contributing 80% of total agricultural production on the continent. "As a result, we need to change agriculture from a way of life to a profitable business enterprise."

Zoology professor and students undertake climate change campaign with spekboom

Prof Adrian Shrader from the Department of Zoology and Entomology and his third-year conservation ecology students have embarked on a novel campaign to contribute to carbon dioxide reduction in the atmosphere and raise awareness about climate change – by growing spekboom in non-recyclable coffee cups.

Characterised by its small bright green leaves and reddish stems, spekboom is an indigenous plant with surprisingly powerful properties. "Increasing carbon dioxide levels in the atmosphere is resulting in climate change," says Prof Shrader, Deputy Head of Teaching and Learning in the Department of Zoology and Entomology and an Associate Professor of Mammalian Behaviour Ecology, who is leading the project. "Spekboom has enormous carbon-storing capabilities, so growing it is one way to try to reduce carbon dioxide."

The project is also acting as an awareness campaign. "The hope is to raise awareness of climate change and the opportunities to help reduce carbon, and highlight the issue of single-use containers," Prof Shrader says. "For example, a thicket of spekboom is ten times more effective per hectare at carbon fixing than the same area in a tropical rainforest. Moreover, each hectare of spekboom could capture 4.2 tons of carbon yearly. Thus, the more there is, the larger amount of carbon stored."

Prof Shrader and his students plant spekboom in coffee cups that are usually used only once. "Coffee cups might seem recyclable because they are made of paper, but they contain a thin layer of polyethylene, which allow the cups to hold liquid," he says. "But that makes them non-recyclable. I saw so many coffee cups being used and thrown away on campus, so I thought that using these cups would be a good way to generate awareness."

Speaking to who is driving this project, he said: "The students are the ones that have been bringing in cups and spekboom clippings. A couple of staff members are also collecting cups and growing clippings."

To date, Prof Shrader and the students have about 90 spekbooms growing. Once planted, they will be given away to staff and students. "I hope that they will take care of them and eventually plant them in pots or their gardens," Prof Shrader. "Every little bit helps. Also, I hope this will encourage people to move away from single-use coffee cups and buy reusable cups instead."

He encourages staff and students to view the coffee cups and social media projects such as blogs, podcasts and videos created by the third-year students that will be displayed in Merensky 2 Library during September. "Go check it out – you can learn something about conservation issues and get a free spekboom," Prof Shrader said.

Prof Adrian Shrader

Biochemistry, Genetics and Microbiology donate stationary for Mandela Day

The Mandela Day Campaign encourages people to use 67 minutes of their time to support a chosen charity or serve in their local community on 18 July annually. The 67 minutes symbolise the number of years the former President fought for human rights and the abolition of apartheid.

The Department of Biochemistry, Genetics and Microbiology (BGM) hosted a stationary drive and collected stationery items (pens, pencils, erasers etc.) to make packs for less privileged school children. They spent their 67 minutes packing the stationery donations.

PSANA's community outreach project help save Bouvier dogs

"As part of our community outreach and engagement initiative, we hope to help those in need – be they plant, animal or human."

These are the Postgraduate Student Association for the Natural and Agricultural Sciences (PSANA) sentiments.

Ms Ayla Malan, Vice-Chairperson of PSANA, explained, "We have been placed in the wonderful position where we can act as the integral support structure for postgraduate students on an academic level, but at the same time allows us to help those in need through our connections in the Faculty. We aim to approach this in a multi-faceted manner.

"One of our first community outreach initiatives was a breed-specific donation drive. We recently learned that small, breed-specific organisations struggle to survive in our current economic climate. Unfortunately, many of these small organisations have had to close down during the last few months, where they were looking for forever homes for the last animals in their charge. We hope to contact the remaining small organisations and offer them whichever aid they are in dire need of, be it monetary or through volunteering. The Bouvier Rescue SA is but the first of many breed-specific rescue organisations we hope to help with the assistance of our faculty."

We would appreciate any comments, ideas, and suggestions members: psanaup@gmail.com or find us on our social media platforms.

Ms Malan was personally involved in the rescue of Eberhard. "He went from his owner passing away and being left alone in the house with her body for ten days to being one of the happiest dogs after his adoption. He now travels as a companion dog with his new owner, visits hospitals and patients (his new mom is a doctor), and gets to run on the beach. He is now living a dog's best life ever, and it would not have been possible without people's generous donations."

Click here to read more.

Join the IYBSSD to promote basic sciences

The International Year of Basic Sciences for Sustainable Development (IYBSSD) is developed based on themes identified as priorities by UNESCO and the United Nations. It kicked off in July 2022 and will conclude in June 2023.

It encourages exchanges between scientists and all stakeholders, whether from grassroots communities or political decision-makers and international leaders, as well as associations, students and local authorities.

Prof Patricia Forbes, Professor in the Department of Chemistry and Rand Water Research Chair, echoes this. "I think the International Year of Basic Sciences for Sustainable Development gives NAS a great opportunity to popularise our research in this regard."

The Faculty of Natural and Agricultural Sciences (NAS) supports this international initiative and request the staff to participate by organising activities during this period to promote and showcase our research in the basic sciences.

Over the next year, the IYBSSD initiative will seek to normalise the adoption of open access publishing throughout all basic sciences, data, and software; to promote diversity, equity, and inclusivity throughout basic sciences; to promote basic education and training in sciences in developing countries; while seeking ways to actively decrease the footprint of basic sciences on the environment.

Click here for more information on IYBSSD 2022 and updates.

Back to Basics: Sci-Enza celebrates National Science Week

After a two-year absence, Sci-Enza, the University's science centre, had the opportunity to host National Science Week from 1 to 6 August 2022.

National Science Week is an initiative of the Department of Science and Innovation implemented by the South Africa Agency for Science and Technology Advancement.

This year's theme was 'Celebrating the role of the basic sciences in the modern world' with objectives to (a) Illustrate the role of science in tackling problems and challenges encountered in creating and sustaining a prosperous society; (b) Demystify the myths surrounding some of the innovations that are important to the advancement of society; (c) Display that South Africa is a home of some discoveries and innovations that influence the world; and (d) Raise Science, Technology, and Engineering and Mathematics (STEM) career awareness.

"For this year's National Science Week, Sci-Enza took to the streets and went on a roadshow to visit schools in Tshwane and Ekurhuleni municipalities. Using the concept of edutainment, the Sci-Enza team offered science shows and hands-on workshops to help different learner groups understand the practical application of science in our daily lives," Ms Puleng Tsie, Manager of Sci-Enza, explained.

"The in-person public engagement took a hit during the pandemic and even ceased for some of the communities we serve. Going out to schools again continues to highlight the need for face-to-face engagement which gives science a face and makes it relatable. This reaffirmed the critical roles played by programmes like National Science Week and centres like Sci-Enza," she concluded.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