Science Matters

SCIENCE FACULTY NEWSLETTER

University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad

FACULTY OF SCIENCE

AUGUST 2025

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Message from the Dean

WELCOME TO THE FIRST EDITION OF SCIENCE MATTERS FOR 2025.

It is clear from these pages that a lot happens in the UCT Faculty of Science. Congratulations to all the newly NRF-rated staff and the numerous staff and students who have won local and international awards. The collective recognition of what we do demonstrates that Science at UCT is a crucial part of the organization and a key contributor to our society.

Congratulations to the 2 new SARChI research chairs: Babatunde Abiodun in Ocean and Atmosphere Modelling; and Tommie Meyer in Artificial Intelligence. We are privileged to benefit from their leadership at a time when climate change and AI influence so much of the research being done in our faculty.

Our faculty started the teaching year with a bumper crop of students, confirming the relevance of our qualifications. The new majors in AI and Statistics and Data Science have attracted a lot of attention. Ongoing discussions in the faculty are investigating how to meet the needs of students in those areas, while also expanding our enrolments in other disciplines.

The Dean's Office expanded this year to include a 4th Deputy Dean. Collectively, the Deputy Deans have been very busy leading projects such as Academic Misconduct training, an undergraduate Orientation programme revival, revising our Ad Hom promotion criteria, Orientation for postgraduates, a new Faculty Strategy and a new Faculty Research Strategy.

These accomplishments and innovations are only possible through the efforts of the entire faculty. Thanks to everyone for their contributions to the faculty!

Regards,
Hussein Suleman

WELKOM BY DIE EERSTE UITGAWE VAN SCIENCE MATTERS VIR 2025.

Uit hierdie bladsye blyk duidelik hoe baie daar in die Universiteit van Kaapstad (UK) se Fakulteit Wetenskappe gebeur. Geluk aan al die personeellede wat nuwe NRF-graderings ontvang het en aan die talle personeellede en studente wat plaaslike en internasionale toekennings gewen het. Die gesamentlike erkenning vir wat ons doen wys dat Natuurwetenskappe by die UK 'n onontbeerlike deel is van die universiteit en 'n belangrike bydrae lewers tot ons samelewing.

Ons dra ons gelukwensings oor aan die 2 nuwe SARChI-navorsingsvoorsitters: Babatunde Abiodun in Oseaan- en Atmosfeermodellering en Tommie Meyer in Kunsmatige Intelligensie. Ons is bevoorreg om voordeel te trek uit hul leierskap in 'n tyd waarin klimaatsverandering en KI soveel van die navorsing wat in ons fakulteit gedoen word, beïnvloed.

Ons fakulteit het die onderrigjaar met 'n buitengewoon groot groep studente begin, wat die relevansie van ons kwalifikasies bevestig. Die nuwe hoofvakke in KI en Statistiek en Datawetenskap het baie aandag getrek. Gesprekke duur voort oor hoe om te voldoen aan die behoeftes van studente in hierdie spesialisgebiede terwyl registrasie in ander dissiplines ook uitgebrei word.

Die Dekaan se kantoor is vanjaar vergroot om ook 'n 4de Visedekaan in te sluit. Die visedekaans was gesamentlik druk besig met die lei van projekte wat wentel om Akademiese Wangedrag-opleiding, die herlewing van die voorgraadse Oriënteringsprogram, hersiening van ons fakulteit se Ad Hom-bevorderingskriteria, beplanning rondom oriëntering vir nagraadse studente en die nuwe Fakulteit Navorsingstrategie.

Hierdie prestasies en innovering is slegs moontlik danksy die pogings van die hele fakulteit. Baie dankie aan almal vir hul bydraes tot die fakulteit!

Groete,
Hussein Suleman

UCT senior leadership were among the packed audience who attended Prof Res Altwegg's inaugural lecture.

WAMKELEKILE KUHLELO LOKUQALA LU KA2025 LWEMIBA YENZULULWAZI.

Kucacile kula maphepha ukuba kuninzi okwenzekayo iFakalthi yoboNzululwazi yase-UCT. Sivuyisana nabo bonke abasebenzi abasanda kufakwa kwinqanaba le-NRF kunye nabasebenzi abaninzi nabafundi abaphumelele iimbasa zasekhaya nezamazwe ngamazwe. Ukubalulwa okudibeneyo kwento esiyenzayo kubonisa ukuba iNzululwazi e-UCT yinxalenye ebalulekileyo yombutho kwaye inegalelo eliphambili kuluntu lwethu.

Sivuyisana nezihlalo ezi2 zophando ze-SARChI: Babatunde Abiodun e-Ocean and Atmosphere Modelling; noTommie Meyer e-Artificial Intelligence. Siyazingca ngokuxhamla kubunkokeli babo ngexesha apho utshintsho lwemozulu kunye ne-AI inefuthe kuphando oluninzi olwenziwayo kwifakhalthi yethu.

Ifakhalthi yethu iqale unyaka wokufundisa ngesixa esikhulu sabafundi, siqinisekisa ukufaneleka kweziqinisekiso zethu. Izifundo ezibalaseleyo ukutsho-iimeyija ezintsha kwi-AI kunye ne-Statistics kunye neNZululwazi yeDatha ziye zatsala ingqalelo enkulu.Iingxoxo eziqhubekayo kwifakalthi ziphanda indlela yokuhlangabezana neemfuno zabafundi kwezo ndawo, ngelixa sisandisa ukubhaliswa kwethu kwezinye iinkalo zezifundo.

IOfisi yeNtloko yeSebe yandisiwe kulo nyaka ukuze iquke iSekela leNtloko yesi4.Ngokudibeneyo, amaSekela eeNtloko axakeke kakhulu ekhokela iiprojekthi ezifana noqeqesho olufana ne-Academic Misconduct, ukuvuselelwa kwenkqubo yoQhelaniso yesidanga sokuqala, ukuhlaziya iindlela zethu zokunyusa i-Ad Hom, ukuQeqesha abafundi abasele benezidanga, iSicwangciso nkquboqhinga seFakhalthi esitsha kunye neSicwangciso esitsha senkquboqhinga soPhando seFakhalthi.

Ezi mpumelelo kunye nezinto ezintsha zinokwenzeka kuphela ngeenzame zefakhalthi yonke. Enkosi kuye wonke umntu ngegalelo labo kwifakhalthi!

Ozithobileyo,
Hussein Suleman

Prof Jeff Murugan (left), Assoc Prof Katye Altieri (centre) and Rebecca Oppenheimer at the Oppenheimer Memorial Trust's New Frontiers Research Award.

Featured Article

UCT-LED STUDY FINDS DEHORNING RHINOS REDUCES POACHING

A LANDMARK INTERNATIONAL STUDY PUBLISHED IN SCIENCE REVEALS THAT DEHORNING RHINOS SIGNIFICANTLY REDUCES THE RISK OF POACHING – ONE OF THESE ICONIC SPECIES' MOST IMMEDIATE THREATS.

The research, co-led by the University of Cape Town (UCT), focused on 11 reserves in South Africa's Greater Kruger region from 2017 to 2023 – a critical conservation area that is home to approximately 25% of Africa's remaining rhino population.

The study was the result of a powerful collaboration between reserve managers, represented by the Greater Kruger Environmental Protection Foundation (GKEPF), and scientists from UCT's Centre for Statistics in Ecology, Environment and Conservation, Nelson Mandela University, Stellenbosch University, and the University of Oxford. Key partners supported it, including the South African National Parks, the World Wildlife Fund South Africa, and the Rhino Recovery Fund.

"We documented the poaching of 1 985 rhinos (about 6.5% of the population annually) across 11 Greater Kruger reserves over seven years. This landscape is a critical global stronghold that conserves around 25% of all Africa's rhinos," said Dr Tim Kuiper, lead author, who conducted the work as a postdoctoral researcher at UCT and is now a senior lecturer at Nelson Mandela University.

"Dehorning rhinos to reduce incentives for poaching (2 284 rhinos were dehorned across eight reserves) was found to achieve a 78% reduction in poaching using just 1.2% of the overall rhino protection budget," added Dr Kuiper.

Dehorning of rhinos has been found to reduce poaching by 78%.

Using a comparative approach between dehorned and horned rhino populations and tracking changes over time, the study shows that dehorning is a highly cost-effective intervention – though not without challenges. Some poaching for horn stumps and regrowth continued, and evidence from 2024–2025 indicates this remains a growing concern. The potential displacement of poaching to horned populations elsewhere also remains a critical consideration.

Between 2017 and 2021, the reserves invested approximately US$74 million (approximately R1 billion) in anti-poaching strategies, including ranger patrols, tracking dogs, helicopters and surveillance technology. Despite this massive investment, the study

found no statistically significant evidence that these traditional law enforcement measures alone reduced poaching.

"Finally, ineffective criminal justice systems mean that arrested offenders often escape punishment, with evidence from our study area of multiple repeat offenders," said Kuiper.

Black rhino in the Greater Kruger region. All dehorned and showing some horn regrowth.

Collaboration

This study stands out not only for its findings but also for its model of science–policy collaboration. The research was sparked by GKEPF reserve managers themselves, who sought to evaluate the effectiveness of their anti-poaching investments.

"The true value of this innovative study, conceived by GKEPF operational managers, lies in its collective critical thinking. Ensuring not only that operations are guided by science, but also that science is grounded in real experience from the frontline," said Sharon Hausmann, CEO of GKEPF.

Dr Markus Hofmeyr of the Rhino Recovery Fund said: "From a donor perspective this study has given excellent insight where conservation donor funding can be spent and where to avoid funding."

Professor Dame EJ Milner-Gulland of the University of Oxford added: *"This collaboration is a brilliant example of how the effectiveness of conservation interventions can be assessed quantitatively, even in challenging and complex situations, and how important the participation of on-the-ground practitioners is in initiating, and interpreting, such research."*

UCT's Professor Res Altwegg, who supervised the statistical analysis, said: *"It's important to check that our conservation interventions work as intended and keep working that way. For me, this project has again highlighted the value of collecting detailed data, both on the interventions that were applied and the outcome. It's such data that makes robust quantitative analyses possible."*

The findings open a timely window for governments, funders, conservation NGOs, and the private sector to rethink and recalibrate strategies in addressing wildlife crime, particularly rhino poaching, with a renewed focus on data-driven and cost-effective interventions.

Horned white rhino mother and calf - Undisclosed South African reserve.

Achievements

THE NRF RATING SYSTEM IS A KEY DRIVER IN THE NRF'S AIM TO BUILD A GLOBALLY COMPETITIVE SCIENCE SYSTEM IN SOUTH AFRICA.

NRF ratings are allocated based on a researcher's recent research outputs and impact as perceived by international peer reviewers.

The Faculty of Science managed to achieve 27 Rated Researchers during 2025 cycle.

These awards falls within the following categories:

A – Leading international researchers
B – Internationally acclaimed researchers
C – Established researchers
P – Prestigious Awards
Y – Promising young researchers

A1 Prof Igor Barashenkov
A1 Emer Prof Doug Butterworth
B1 Prof James Gain
B1 Prof Paul Groot
B1 Prof Muthama Muasya
B1 Prof Maano Ramutsindela
B1 Prof Judith Sealy
B2 Prof Rebecca Ackermann
B2 Prof Res Altwegg
B2 Emer Prof Linda Haines
B2 Prof Chris Harris
B2 Prof Timm Hoffman
B2 Dr Ivan Varzinczak
B3 Prof Phil Janney
B3 Assoc Prof Robert Thomson
C1 Dr Petrus Le Roux
C1 Dr Paul Meyers
C1 Assoc Prof Deshendran Moodley
C1 Assoc Prof Geoff Nitschke
C2 Assoc Prof Samson Chimphango
C2 Dr Shajid Haque
C2 Assoc Prof Alastair Sloan
C3 Dr Roger Diamond
P Dr Jesse Heyninck
Y1 Dr Vincent Hare
Y2 Dr Miengah Abrahams
Y2 Dr Rosephine Georgina Rakotonirainy

AD HOMINEM PROMOTIONS

CONGRATULATIONS TO THE FOLLOWING STAFF ON THEIR AD HOMINEM PROMOTIONS - EFFECTIVE JANUARY 2025.

NAME	DEPARTMENT	PROMOTED TO
Professor Phil Janney	Geological Sciences	Professor
Professor Gina Ziervogel	ACDI	Professor
A/Professor Jacqui Bishop	Biological Sciences	Associate Professor
A/Professor Greg Distiller	Statistical Sciences	Associate Professor
A/Professor Colleen O'Ryan	Molecular & Cell Biology	Associate Professor
A/Professor Robyn Pickering	Geological Sciences	Associate Professor
A/Professor Alastair Sloan	Geological Sciences	Associate Professor
Dr Miengah Abrahams	Geological Sciences	Senior Lecturer
Dr Natasha Karenyi	Biological Sciences	Senior Lecturer
Dr Peter Johnston	Environmental & Geographical Science	Senior Research Officer
Dr Julie Luyt	Archaeology	Senior Research Officer
Dr Carryn de Moor	Mathematics & Applied Mathematics	Chief Research Officer
Dr Vinayak Singh	H3D	Chief Research Officer
Ms Marilyn Krige	Molecular and Cell Biology	Principal Scientific Officer
Ms Pei-Yin Liebrich	Molecular and Cell Biology	Principal Scientific Officer
Ms Lisa van Aardenne	Environmental & Geographical Science	Principal Scientific Officer

Congratulations on receiving your ad hominem promotions! This achievement is a testament to your dedication, hard work, and valuable contributions to the Faculty of Science. Thank you for your commitment to excellence in teaching, research, and service. We are proud to have you as part of our team.

HOW ECOLOGY, STATISTICS AND INTERDISCIPLINARY COLLABORATION CAN SAVE SPECIES

IN AN ERA WHERE ENVIRONMENTAL RISKS INCREASINGLY THREATEN ECONOMIC STABILITY AND HUMAN LIVELIHOODS, STATISTICAL ECOLOGY PLAYS A VITAL ROLE IN SHAPING EFFECTIVE CONSERVATION STRATEGIES. THIS WAS THE KEY MESSAGE BY PROFESSOR RES ALTWEGG, FOUNDING DIRECTOR OF THE CENTRE FOR STATISTICS IN ECOLOGY, ENVIRONMENT AND CONSERVATION AT THE UNIVERSITY OF CAPE TOWN'S DEPARTMENT OF STATISTICAL SCIENCES, DURING HIS INAUGURAL LECTURE.

Prof Res Altwegg

In a lecture, titled "Adventures in Statistical Ecology", and delivered in a packed Lecture Theatre 2 in the Hoerikwaggo Building, Professor Altwegg explored the intersection of ecology, data science, and practical conservation.

With research interests ranging from amphibians in the Cape mountains to rhinos in the Kruger National Park, Altwegg offered insights into how scientific evidence and statistical modelling inform conservation decision-making. This raises the urgency of protecting biodiversity in an era of climate instability.

Why ecology and conservation matter

Referring to the World Economic Forum's Global Risks Report 2025, Altwegg pointed out that six of the top 10 global threats over the next decade relate directly to environmental degradation, including biodiversity loss, extreme weather events, natural resource shortages, and ecosystem collapse.

"These are not people who are necessarily worried about nature per se. They worry about the global economy, but they understand that the economy and our livelihoods depend on the environment," he explained.

Drawing from the Intergovernmental Panel on Climate Change (IPCC) 2023 synthesis report, Altwegg warned that we are headed toward a dangerous trajectory if mitigation and adaptation are not urgently scaled up. *"We're not currently on a sustainable pathway. We're headed for high levels of global warming, weak international cooperation, and growing inequalities"*.

Central to Altwegg's research is the study of population ecology – the science of how populations change over time and space. Conservation science, he explained, focuses on four key drivers of population change: births, deaths, immigration, and emigration. *"If we know these four quantities, we know how the population changes. So, a lot of my work is about estimating either some or all of these quantities."* This framework is the base of his work, from frogs in mountain pools to endangered megafauna like rhinos. With a background in evolutionary biology and statistical modelling, Altwegg uses a range of tools to estimate these parameters in complex, often fragmented ecosystems.

From house sparrows to frogs

Altwegg's academic journey has taken him across the world, from Norway and

Switzerland to Canada and, most recently, South Africa. He began his MSc research with house sparrows in Norway, examining metapopulations or populations spread across fragmented habitats connected by occasional movement of individuals.

For his PhD, he turned to frogs, whose lifecycle from aquatic tadpoles to terrestrial adults offers a unique model for studying life-history evolution and environmental effects. Frogs, he explained, provide a useful system for understanding how climate variability affects reproductive strategies, survival, and dispersal.

His research also extends to the microscopic level. During his time in Canada, he studied protists – single-celled eukaryotes – to explore predator–prey dynamics at the microscopic scale. These experiments helped uncover fundamental rules about interaction strength and feedback mechanisms in ecological networks.

Throughout the lecture, Altwegg stressed that conservation science is not just about observing nature – it's also about overcoming biases in the data and how we perceive information in them. ***"What looks like a pattern may just be noise. That's why we use statistical models to help us distinguish real trends from random variation."***

Altwegg now leads research projects focused on local biodiversity, including Rose's mountain toad (Capensibufo rosei), a critically endangered amphibian found only in a few montane wetlands in the Western Cape.

These toads breed in short, intense windows during the rainy season. Using capture-mark-recapture (CMR) methods, he and his team track individuals across breeding seasons to estimate survival rates and population trends – with interesting results.

Their research showed that adult survival decreases during wetter years. ***"It's counterintuitive. You'd think more rain would be better, but it turns out the energy costs of breeding, especially in wet, cold conditions, lead to higher adult mortality."***

Such findings have important conservation implications, he concluded. ***"If you want to manage these populations, you need to understand not just how many tadpoles are being produced, but how many adults are surviving from year to year,"*** he said.

Rhinos and conservation finance

Another example of Altwegg's work is the Rhino Impact Investment Project, a multi-country initiative aimed at financing conservation through performance-based mechanisms. The idea is to attract funding from impact investors, who will receive returns based on the success of conservation outcomes, such as reduced poaching or increased birth rates.

He worked with teams who implemented a monitoring system that tracks individual rhinos using CMR methods. By identifying known individuals and recording births, deaths, and movements, the project can produce robust, time-sensitive data on population dynamics. This data feeds into multi-state models, a statistical framework that allows researchers to estimate key parameters like survival and fecundity, even when animals go undetected for long periods.

"It's about quantifying what's actually happening on the ground so that funders, park managers, and policy makers can make informed decisions," he said.

He also evaluated the effectiveness of various anti-poaching interventions in the Kruger National Park, such as dehorning, increased patrols, and fences. With the decline of rhinos around the African continent, the Kruger National Park is home to a large proportion of the global rhino population. So, if we lose them there, we might lose them for good."

The results were revealing. *"Dehorning had the strongest negative effect on poaching rate. Other interventions had some impact, but it was less consistent."*

Climate change reshaping bird body size and habitats

Birds are shrinking in size in response to rising temperatures, offering compelling evidence that climate change is driving evolutionary changes in wildlife, according to Altwegg.

More than 150 years ago, German biologist Carl Bergmann observed that larger animals tend to occur in colder climates, while smaller ones are more common in hotter regions. Known as Bergmann's Rule, this idea has long been linked to how animals regulate heat. Smaller animals, with proportionally larger surface areas, dissipate heat more effectively – an advantage in warm environments.

But with global temperatures rising, a key question has emerged: Is climate change now selecting for smaller body sizes in birds?

Initially sceptical, Altwegg revisited this idea through an analysis of long-term bird monitoring data. Drawing on 25 years of meticulous CMR data from the work of late ornithologist Professor Steven Piper, researchers found that birds' body mass had declined over time alongside a measurable rise in average temperatures.

Further analysis revealed that this change was not random. Larger birds had higher survival rates in colder years, while smaller birds thrived in hotter years – strong evidence of temperature-dependent natural selection.

"This was quite surprising. But the pattern matched exactly what we would expect if body size change were an evolutionary response to warming."

The research also explored bird populations in South Africa's high-altitude grasslands, particularly the Ingula Nature Reserve, home to the Ingula Pumped Storage Scheme. This area provided a unique opportunity to study how land management practices, like controlled burning and grazing, affect bird habitats.

Through extensive fieldwork led by one of his PhD students, the research measured bird population density and habitat preferences. Different species showed clear preferences: some thrived in taller grass, while others preferred grazed or burned areas. The findings led to a management guide aimed at maintaining a mosaic of habitats to support biodiversity.

Beyond individual sites, Alwegg and his team used occupancy modelling to assess changes in bird populations across southern Africa. Drawing on citizen science data from the Southern African Bird Atlas Project, which collects nearly two million records annually, they tracked long-term trends in species distributions.

Analysis of 130 species revealed significant changes: species favouring wooded habitats were increasing, particularly in areas undergoing bush encroachment. Conversely, grassland species were in decline in these areas but increased in their prime habitat.

The research, rooted in collaboration between departments at UCT, highlights the value of long-term data and interdisciplinary approaches to conservation.

"This work was really a lot of collaboration between departments, and I think we should also strengthen our collaboration with other departments like Maths, Computer Science, Environmental and Geographical Sciences and Oceanography. There is still a lot to do in our field. It's not just about understanding the past but supporting smart, data-driven decisions for the future. And it's about training the next generation of scientists to do this work."

HUMANITY EXHIBITION HONOURED BY UNIVERSITY OF CAPE TOWN

HUMANITY, the museum exhibition produced in partnership by the Human Evolution Research Institute (HERI) and the Iziko Museums of South Africa, has been honoured with the 2024 Creative Works Award by the University of Cape Town.

"This exhibition was made possible thanks to an extraordinary team I have been privileged to be a part of, and we're very excited that it has been recognised with this award from UCT," says Ackermann.

Benchmark for museum practice
HUMANITY is a permanent exhibition that reimagines the story of human evolution. It explores the creative work of humankind through its content and design and presents the science of human evolution with the purpose of social justice.

HUMANITY aims to frame the story of human origins in a decolonial manner that centres and celebrates the diversity of humans today, and uses this diversity as a way to understand the past and the complex origins of our species. In this telling, the exhibit tackles sensitive topics including race and racism, and the colonial legacy of science.

Launched at the Iziko South African Museum in 2023, it was the culmination of over five years of inclusive co-creation that involved academics, curators, designers, artists, educators and community leaders.

"We are taking visitors on a new kind of journey, one that explores our diversity and how we became who we are today." says Dr Wendy Black, Chief Curator of Art and Social History at Iziko Museums of South Africa and member of HERI.

"Our approach involved engaged and socially responsive scholarship that we hope sets a benchmark for museum practice going forward."

Financial support for HUMANITY was provided by Iziko Museums of South Africa and UCT, as well as the national Department of Sport, Arts and Culture, the National Research Foundation (NRF), GENUS the NRF Centre for Excellence in Palaeosciences, the Palaeontological Scientific Trust (PAST), the European Society for Evolutionary Biology (ESEB), and the University of Copenhagen.

Acknowledging leadership

The HUMANITY award was given as part of the UCT Staff Annual Awards 2024 ceremony by UCT, which celebrates the outstanding achievements of academic and professional merit among its staff.

And it was not the only honour received by HERI. Co-Director Dr Robyn Pickering received an ad hominem promotion to Associate Professor, acknowledging her achievements and exemplary leadership in teaching and learning, research, social responsiveness and university service.

Pickering is an isotope geochemist with research focused on understanding where, when and in what environments early human ancestors evolved.

"UCT does a good party! The awards event was a really fun evening. This promotion is recognition from my peers of my commitment to both excellence and transformation at UCT, and it means a lot to me. I am also delighted that HUMANITY and the exhibition team are receiving the recognition they so richly deserve," says Pickering.

SHAPING THE FUTURE OF EXPLAINABLE AI EARNS RESEARCHER NRF P-RATING

FOR ARTIFICIAL INTELLIGENCE (AI) TO BECOME MORE RELIABLE AND ADAPTABLE, IT MUST DEVELOP A FORM OF "UNDERSTANDING" OF THE WORLD THAT ALLOWS IT TO MAKE SOUND DECISIONS. DR JESSE HEYNINCK, AN HONORARY RESEARCH ASSOCIATE IN THE DEPARTMENT OF COMPUTER SCIENCE AT THE UNIVERSITY OF CAPE TOWN (UCT), HAS HIS SIGHTS ON DEVELOPING A FRAMEWORK THAT INTEGRATES SYMBOLIC AND SUB-SYMBOLIC AI, THUS CREATING A HYBRID AI MODEL THAT AIMS TO IMPROVE TRUST IN AI SYSTEMS.

Dr Jesse Heyninck's work is focused on the reliability, safety and transparency of AI.

Dr Heyninck was recently awarded a prestigious P-rating by the National Research Foundation (NRF), a recognition reserved for promising young researchers who have held a doctorate or equivalent qualification for less than five years. The rating identifies those whose published work demonstrates exceptional potential to become future international leaders in their field. UCT is home to eight of the 13 P-rated researchers nationwide.

Since earning his PhD in Philosophy from Ruhr-Universität Bochum, Heyninck has held positions in computer science departments and worked with leading AI research groups across the world, including his current role in the Department of Computer Science.

As his PhD was on philosophical logic and formal argumentation, the shift to AI, in which formal logic can play an important role as well, was both timely and natural. Furthermore, his philosophical background brings a refreshing perspective to the field of AI.

His research expertise lies in Knowledge Representation and Reasoning (KRR), a branch of AI focused on enabling machines to reason logically and transparently. This branch uses rule-based systems that give AI a structured framework from which to draw its reasoning and decision-making.

According to Heyninck, many popular AI systems (like ChatGPT and BERT) do not genuinely "understand" the world. Instead, they rely on identifying patterns in astronomical datasets without "knowing" the meaning behind the information. This can lead to errors and unpredictable patterns in the AI. *"Furthermore, in many fields of applications it is important to understand why an AI-system came to a certain conclusion. Using KRR in AI-systems is thus crucial to ensure these systems are reliable, safe and transparent,"* Heyninck added.

Hybrid methodology improves AI accessibility

To address this, the researcher aims to develop a hybrid AI methodology that combines the strengths of both symbolic AI and sub-symbolic AI. Symbolic AI is more rule-based, uses clear, logical rules and is transparent and reliable, but often regarded as rigid. Sub-symbolic AI, on the other hand, is flexible and learns from large datasets. Its internal workings are invisible to the user, making it hard to interpret and verify.

"Combining these approaches will improve the state-of-the-art algorithms and techniques as it allows for a plug- and play application of high-quality hybrid AI, opening these techniques to researchers and AI-developers without a need for deep theoretical expertise," Heyninck said.

Some of his key contributions include developing methods to prioritise rules in argument-based AI while keeping reasoning reliable. He has also developed novel ways to rank arguments by strength to help the AI decide on the most reliable reasoning path. Ultimately, his work has improved the explainability of AI, making it easier to trace why a system came to a particular decision, and more flexible to working with a wider pool of reasoning styles.

His influence in the field is backed by the multiple citations of his work in key texts, including the 2018 and 2021 Handbooks of Formal Argumentation, and in the empirical validation of his work on defeasible conditionals by researchers in China. He holds an H-index of 13 according to Google scholar.

UCT ACADEMICS AMONG TOP SCHOLARS IN SOUTH AFRICA HONOURED BY ASSAF

PROFESSOR EMESE BORDY FROM UCT'S DEPARTMENT OF GEOLOGICAL SCIENCES HAS MADE HISTORY AS ONE OF THE TWO FIRST FEMALE GEOLOGIST PROFESSORS IN THE ACADEMY.

Prof Emese Bordy

As the official academy of South Africa, ASSAf has as a core function to honour the country's most outstanding scholars by electing them to membership of the academy. ASSAf members are drawn from the full spectrum of disciplines.

Professor Bordy said: *"This accolade comes as I step into my new role as deputy dean in the Faculty of Science at UCT, thus firmly opening a chapter of my life in which I serve even more my immediate scientific community of students and colleagues and the broader community of both extant and extinct organisms in my orbit."*

"As a geologist working at the intersection of sedimentology and palaeontology in Africa, I hope to serve all, using the perspective I gained from studying the Earth and its stories. I also thank all the colleagues who participated in my ASSAf acceptance process for their vote of confidence."

New members are elected each year by the full existing membership. Membership in the academy is a great honour and is in recognition of scholarly achievement.

UCT SCHOLARS AWARDED SARCHI CHAIRS IN OCEAN MODELLING AND SYMBOLIC AI

IN A WORLD WHERE CLIMATE SYSTEMS ARE BECOMING INCREASINGLY VOLATILE AND ARTIFICIAL INTELLIGENCE (AI) SHAPES MORE ASPECTS OF DAILY LIFE, THE APPOINTMENT OF TWO UNIVERSITY OF CAPE TOWN (UCT) SCHOLARS – PROFESSORS BABATUNDE ABIODUN AND TOMMIE MEYER – AS SOUTH AFRICAN RESEARCH CHAIRS INITIATIVE (SARCHI) CHAIRS, REFLECTS THE UNIVERSITY'S LEADERSHIP IN TACKLING RELEVANT SCIENTIFIC AND SOCIETAL CHALLENGES.

Prof Babatunde Aboidun

Advancing climate science for Africa's future

Professor Babatunde Abiodun, an internationally acclaimed climate scientist and director of the Nasen-Tutu Research Centre at UCT, has been appointed to the DSTI/NRF SARChI chair in Ocean and Atmospheric Modelling. His pioneering work includes developing a groundbreaking global climate model with adaptive resolution capabilities, enabling detailed regional climate simulations.

His research has shed light on tropical rainfall patterns, West African weather systems, tropical cyclones in the Indian Ocean and the influence of global oceans on southern African rainfall.

Through the SARChI chair, he aims to refine ocean-atmosphere models to improve understanding of the interactions that drive extreme weather events in Africa and its surrounding oceans. His research will also support multidisciplinary studies on the impacts of climate change, examining how and when climate activity affects biophysical systems and socio-economic activities. Additionally, he plans to explore climate intervention strategies that position the continent in global discussions on climate resilience.

"We will leverage advances in computer science and machine learning to enhance the accuracy and efficiency of ultra-high-resolution modelling over Africa," he said.

"Ocean and climate modelling research will be tailored toward addressing societal needs in Africa." He noted that UCT is already playing a leading role in investigating the potential impacts of Solar Radiation Management (SRM) in the African context. *"The SARChI [chair] is a unique opportunity to enhance this leadership through the application of coupled ocean-atmospheric models."*

Beyond research, Professor Abiodun is passionate about nurturing the next generation of climate scientists. *"Developing future leaders in climate modelling has always been my passion and it is at the core of the SARChI chair,"* he said.

Pioneering transparent and ethical AI

In UCT's Department of Computer Science, Professor Tommie Meyer has been appointed to the DSTI/NRF SARChI Chair in Symbolic AI, co-funded by the university's Artificial Intelligence Research Unit (AIRU). Symbolic AI focuses on developing systems that represent problems using high-level,

human-readable logic – allowing machines to reason in ways that are interpretable by people.

An internationally recognised expert in Knowledge Representation and Reasoning (KRR), Professor Meyer advocates for AI that supports, rather than replaces, human decision-making. His research stands in contrast to the "black box" nature of many modern AI models, emphasising transparency, logic and explainability.

"It's important not to lose sight of the human aspects of AI," Professor Meyer said. "Some of us in the AI research community are of the view that the field should be renamed to 'Augmented Intelligence'.

Prof Tommie Meyer

"Intelligence should not be conflated with consciousness. It is possible to exhibit intelligent behaviour without being conscious. It is also possible to be conscious without exhibiting intelligent behaviour," he added.

Meyer's research has applications in healthcare, legal systems and other fields where explainability is crucial. He is also the co-director of the national Centre for Artificial Intelligence Research (CAIR) and is one of only three South African computer scientists to hold an A-rating from the NRF.

The SARChI chair will boost AIRU's work and further establish the university as a leading hub for responsible AI development in Africa. The unit also hosts a second DSTI/NRF SARChI chair in Artificial Intelligence Systems held by Associate Professor Deshen Moodley and co-funded by UCT.

KATYE ALTIERI SCOOPS OPPENHEIMER MEMORIAL TRUST'S NEW FRONTIERS RESEARCH AWARD

ASSOCIATE PROFESSOR KATYE ALTIERI HAS RECEIVED THE OPPENHEIMER MEMORIAL TRUST'S NEW FRONTIERS RESEARCH AWARD FOR 2025 – MAKING HER THE SECOND EVER WINNER OF THE FIVE-YEAR R7.5 MILLION PRIZE.

The Oppenheimer Memorial Trust introduced this award to bolster South Africa's global reputation for research excellence and to attract and retain early- to mid-career researchers who will build diverse, high-performance research teams, foster collaboration and strengthen the country's academy. The award gives exponentially talented researchers the freedom and flexibility to pursue bold ideas and push the boundaries of knowledge. In 2024, senior lecturer in UCT's Department of Physics Dr James Keaveney received the inaugural award.

Ground-breaking research

This year's winner, Associate Professor Altieri, is a scholar in oceanography in UCT's Faculty of Science. Thanks to the award, her research over the next few years seeks to establish whether air pollution-derived nitrogen improves the ocean's ability to remove greenhouse gasses from the atmosphere or whether it creates an even bigger problem.

Assoc Prof Katye Altieri

Altieri's proposal to secure her entry topped 175 entries across various disciplines, including astrophysics, visual arts, food security, ecology, paediatric immune disease, as well as neuroscience. The announcement was made during a special event held in Johannesburg on Monday, 12 May.

"We must support South African academia with the resources they need to compete globally and contribute knowledge that changes our world for the better," said Rebecca Oppenheimer, the chairperson of the Oppenheimer Memorial Trust.

"Altieri is precisely the kind of researcher we envisage for the award. Her [research] idea... is certainly bold and it addresses a significant gap in our knowledge of how the air pollution we create impacts climate change."

Forging new ways of scientific thinking

As an atmospheric chemist and oceanographer, Altieri said it is widely known that oceans help to remove the greenhouse gas carbon dioxide (CO_2) from the atmosphere, and nitrogen helps the oceans do that. However, she added, nitrogen can also spur the production and release of nitrous oxide (N_2O), another greenhouse gas 300 times more potent than carbon dioxide.

"We have doubled the amount of nitrogen in the atmosphere through activities such as fossil fuel combustion and agriculture. That nitrogen, even from far inland, is swept out to sea and settles in the ocean," she said.

"But we don't know exactly how much pollution-derived nitrogen reaches the open ocean, and we don't know exactly what happens when it ends up in the ocean: does it increase the ocean's ability to remove greenhouse gases from the atmosphere, or the emission of much more deleterious N_2O into the atmosphere?"

The reason for this knowledge gap, Altieri explained, is because atmospheric chemists and oceanographers tend to work in silos and not together.

"I intend to help change that by forging new ways of scientific thinking about both our atmosphere and our oceans, helping us to build knowledge in ways we haven't before. This multidisciplinary approach will inform governments' climate change policy frameworks going forward," she said.

Ideal location

Because the country is a leading emitter of air pollution and provides access to three diverse ocean systems: the nutrient-rich, cold Benguela current up the west coast of Africa; the ocean desert of the South Atlantic Ocean, which is comparatively nutrient-poor and has limited marine life; and the "time machine" Southern Ocean, which is closer to the pre-industrial atmosphere compared with anywhere on earth – it makes it the ideal location for this research.

"Being able to measure and compare these environments will be invaluable to our research. Added to this, we have access to the world-class polar research vessel, the R/V SA Agulhas II, which allows for research operations in these diverse ocean regions," Altieri said.

"While South Africa is the springboard, the integration between the atmosphere and the ocean is, from a scientific perspective, inherently global. So, what we learn from the oceans around South Africa will have bearing on our entire planet."

Proud moment

Professor Jeff Murugan, UCT's acting Deputy Vice-Chancellor for Research and Internationalisation said Altieri's award is a proud moment for the university. He thanked

the Oppenheimer Memorial Trust for its visionary trust in early and mid-career researchers during a time when science, especially climate science faces challenges.

"We are immensely proud of our researchers at UCT, in particular [Associate Professor] Altieri. We're dedicated to [producing] research that matters," Professor Murugan said.

HERI AWARDED WENNER-GREN GRANT TO SUPPORT SOCIALLY RESPONSIVE PRACTICES

The Human Evolution Research Institute (HERI) has been awarded a prestigious Wenner-Gren Foundation Workshop Grant to support its role facilitating dialogue and best practices for decolonisation in palaeoanthropology.

The grant, totalling USD 20,000, is earmarked for a first-of-its-kind workshop titled, "Theorising a More Socially Responsive Practice in African Palaeoanthropology" to be held in Cape Town, South Africa.

Planned for July 2025, participants will explore how palaeoanthropologists working in Africa can engage with socially responsive practice as a means for decolonising the discipline.

"We want to shift the way palaeoanthropology is done, so that the discipline itself is transformed," says HERI Co-director Professor Rebecca Ackermann, the lead grant holder and workshop organiser.

Best practice guidelines

Palaeoanthropology in Africa has since its inception been intertwined with colonial pursuits, race science and racism. Recent efforts to confront this legacy have shown that systematic transformation is needed, including training and supporting local scientists to aid capacity building, combatting 'helicopter science', and working with and for local communities.

"While there has been general support for such transformative efforts, there is currently no roadmap for how this can be accomplished by researchers or institutions," explains Ackermann.

The workshop aims to fill that gap by co-creating best practice guidelines to help researchers move away from extractive science and a unidirectional dissemination of knowledge toward more engaged, ethical and relevant research practice.

Participants will include researchers at African institutions and Africans across the diaspora who conduct research on the continent including several HERI members who are leaders in palaeoanthropology.

A rich history of socially responsive practice will be added by the workshop venue, the !Khwa ttu San Heritage Centre, which will catalyse linkages with local community leaders while further reinforcing African research networks.

Recognising the need

Reviewers of the Wenner-Gren grant specifically praised the workshop's aims to go beyond criticism of helicopter science and focus on co-creating models for ethical engagement to help the field move forward.

The foundation's support is recognition of the important role socially responsive practice plays in palaeoanthropology, which means acknowledging the social, cultural and ethical implications of research and actively seeking to address them.

It also means acknowledging that palaeoanthropological research impacts living communities, indigenous peoples and broader society, and enabling research to be conducted in ways that are respectful, inclusive and beneficial to all involved.

The need for this cannot be understated. According to research from Ackermann and HERI's Lauren Schroeder, the co-organiser of this workshop, high-profile researchers and their teams are still majority foreign and white, reaping intellectual benefit and prestige, including first authorship. Meanwhile, field workers are generally local and black, remaining primarily paid field help.

"Disrupting this dynamic requires a collaborative approach and support from leaders in our discipline who can help pave the way for change," says Schroeder.

"Wenner-Gren should be recognised for taking on that role, providing important international investment in decolonisation in Africa."

HONORARY DOCTORATE FOR KELLY CHIBALE

THE UNIVERSITY OF CAPE TOWN'S (UCT) PROFESSOR KELLY CHIBALE WAS AWARDED AN HONORARY DOCTORATE BY LEIDEN UNIVERSITY IN THE NETHERLANDS DURING THE INSTITUTION'S 450TH ANNIVERSARY CELEBRATIONS.

Prof Kelly Chibale

In a significant recognition of his groundbreaking scientific contributions, Professor Chibale's award highlights his pivotal work in developing innovative medicines to address endemic diseases in Africa.

Chibale has dedicated his career to creating new drugs that target critical health challenges facing Africa. His most notable achievement includes leading an international project team that discovered a small molecule antimalaria drug candidate, the first small molecule drug candidate for any disease researched on African soil by an African-led international team and advancing it to the clinical development phase.

Exceptional leadership

Beyond his scientific breakthroughs, Chibale has demonstrated exceptional leadership through the establishment of UCT's Holistic Drug Discovery and Development Centre (H3D) in 2010 and the associated H3D Foundation in 2019. Both the centre and foundation are crucial in training and supporting African scientific talent, embodying a commitment to advancing research capabilities across the continent.

The honorary doctorate represents more than a personal accolade. It is a testament to Chibale's remarkable contributions to science, education, and societal development. Notably, the nomination originated from three prestigious departments within Leiden University, the Faculty of Science, the Faculty of Social & Behavioural Sciences, and the Leiden University Medical Center (LUMC).

"This honorary doctorate is special on two levels. First, my nomination was jointly initiated by three different entities at Leiden University: Faculty of Science, Faculty of Social & Behavioural Sciences, and the University Medical Centre. Second, it will be given on the university's 450th anniversary. I would like to thank God, my team members, past and present,

as well as research and funding partners for their support and contributions to this recognition," Chibale said.

Professor Gilles van Wezel, a professor of molecular biotechnology, will personally present the honorary doctorate to Chibale during the anniversary celebrations, further emphasising the significance of this recognition.

PROF CHIBALE ELECTED TO PRESTIGIOUS US NATIONAL ACADEMY OF SCIENCES

PROFESSOR KELLY CHIBALE, ONE OF AFRICA'S LEADING SCIENTISTS IN THE FIELD OF DRUG DISCOVERY, HAS BEEN ELECTED AS AN INTERNATIONAL MEMBER OF THE UNITED STATES (US) NATIONAL ACADEMY OF SCIENCES (NAS), ONE OF THE HIGHEST HONOURS IN THE GLOBAL SCIENTIFIC COMMUNITY.

Professor Chibale, the Neville Isdell Chair in African-centric Drug Discovery & Development at the University of Cape Town (UCT), was among 30 international members elected this year, alongside 120 US-based scientists. His election recognises his "distinguished and continuing achievements in original research", particularly in the development of treatments for diseases that disproportionately affect African populations.

The announcement, made by the NAS last week, brings the total number of international members to 556. International members are non-voting and hold citizenship outside the US.

The NAS is a private, nonprofit institution that was established under a congressional charter signed by President Abraham Lincoln in 1863. It recognises achievements in science by election to membership, and provides science, engineering, and health policy advice to the federal government and other organisations.

"I was working a night shift on 29 April when an email from a US colleague popped up at 20:15, replying to a message I sent back in 2021," Chibale recalled. *"The message simply read, 'I just wanted to say congratulations on being elected to the US National Academy of Sciences!!' I thought he'd made a mistake and was referring to my election to the National Academy of Medicine last October. But then the congratulatory emails started pouring in. That's when I realised it was real breaking news. Apparently, my US colleagues had learnt about my election that afternoon, US time."*

Trailblazer

Chibale's latest honour follows closely on his 2024 election into the US National Academy of Medicine, making him one of the few African scientists to be recognised by both prestigious institutions.

Prof Kelly Chibale is one of the few scientists in Africa to be recognised by the US-based National Academy of Sciences.

A trailblazer in his field, Chibale is the founder and director of the Drug Discovery and Development Centre (H3D), Africa's first centre of such kind, housed at UCT's Department of Chemistry and the Institute of Infectious Disease and Molecular Medicine. Under his leadership, H3D has spearheaded

several groundbreaking initiatives, including the discovery of the first small-molecule clinical candidate for any disease researched on African soil by an African-led team.

"This recognition is a great honour and a responsibility," he said. *"I intend to contribute meaningfully to the academy's mission, advising on science matters and helping shape science policy. I also want to bring prominence to scientific entrepreneurship. Science should not only satisfy curiosity but also drive development and create jobs."*

Reflecting on his amazing journey as a leading scientist, Chibale said there are no formulas for success. *"I've always believed in making the most of every opportunity, staying consistent, and using my God-given talents. Challenges are inevitable, but I see them as opportunities."*

He emphasised the importance of investing in basic science research and supporting the next generation of African science entrepreneurs. *"Young scientists need to be incentivised to think entrepreneurially. Supporting young basic scientists better, ensuring their career progression and supporting scientific entrepreneurship can help move the African continent forward. In a world that is increasingly polarised, science is a unifier,"* he said. *"It knows no boundaries and belongs to all of humanity."*

PROF KELLY CHIBALE RECEIVES QUEENS' COLLEGE HONORARY FELLOWSHIP

PROFESSOR KELLY CHIBALE, THE FOUNDER AND DIRECTOR OF THE UNIVERSITY OF CAPE TOWN'S (UCT) HOLISTIC DRUG DISCOVERY AND DEVELOPMENT (H3D) CENTRE, HAS BEEN CONFERRED AN HONORARY FELLOWSHIP BY QUEENS' COLLEGE, UNIVERSITY OF CAMBRIDGE, IN RECOGNITION OF HIS OUTSTANDING LEADERSHIP, RESEARCH AND INNOVATION IN THE FIELD OF DRUG DISCOVERY.

Professor Chibale has an impressive list of accolades behind his name, including having received the Royal Society Africa Prize, serving as the first editor-in-chief (EIC) from Africa of an American Chemical Society (ACS) journal when he was appointed EIC of ACS Medicinal Chemistry Letters and being named one of the World's 50 Greatest Leaders by Fortune magazine.

In December 2024, he reached yet another milestone as he was conferred an honorary fellowship by Queens' College, University of Cambridge, where he completed his PhD in synthetic organic chemistry in 1992.

According to the institution, *"Honorary fellows are elected by the governing body, having achieved excellence in their profession or chosen field, given distinguished service to the college or university, an institution, movement, region or nation, or been nationally or internationally recognised for any of the above."*

For Chibale, this fellowship stands out among his myriad accomplishments not only because it is the highest honour that a Cambridge college can give to an individual, but also because it comes from his alma mater.

"The fellowship was given to me for my accomplishments to this point. It's a rare honour and it was very special to receive it from Queens' College in particular, because this is my alma mater that's recognising all my personal and professional achievements," he said.

The magic of molecules

While his achievements are plentiful – and impressive – Chibale's congeniality would never lead you to guess at his acclaim. This may be down to his uninhibited passion for his field of study, driven in part by the fact

Prof Kelly Chibale

that it stands at the point where mystery and predictability converge.

"At secondary school in Zambia, we would do these simple experiments, like titrations, where we would mix chemicals and, suddenly, the colour of the mixture would change. It was like magic and it just fascinated me," he recalled.

"When I got to the University of Zambia (UNZA), I fell in love with organic chemistry and the logic behind it. How you can take a molecule and transform its chemical structure and, with those modifications, create a completely new molecule with properties that have a range of applications and benefits."

After graduating from UNZA, Chibale moved to Zambia's Copperbelt province where he worked for a company tasked with developing commercial explosives for the mining industry. It was there that he met his wife, Bertha, and obtained a scholarship to study at the University of Cambridge.

"I was accepted to do my PhD in synthetic organic chemistry at Cambridge. That brought me into this world where we put the art and science of developing synthetic methods and using them in the synthesis of complex molecules that have biological and medical applications in the real world," he said.

From there, the young scientist went on to complete two postdoctoral fellowships, one at the University of Liverpool and another at the Scripps Research Institute in La Jolla, California, following which he joined UCT in October of 1996.

Building Africa's scientific future

During his time at the Scripps Research Institute, Chibale had the privilege of working with and coming across internationally renowned scientists, including some Nobel Prize laureates. He noticed that many of these researchers were also entrepreneurs, something which sparked an idea that proved to be a landmark moment in his professional career.

"That drove me to think about science not just as a vehicle for satisfying my curiosity, but as a way to do things that are for the benefit of society," he explained.

"When I moved to South Africa, I started to ask myself, 'How can I use science for development?' I wanted to figure out how we could use science to address health challenges, for example, and simultaneously create jobs.

"Many of the problems that exist in Africa can be linked to unemployment. Even when we educate scientists, they go to more developed nations because there are no jobs for them in Africa. So, I wanted to help to create an absorptive capacity, where we can develop, nurture and retain talent."

Another important outcome of establishing scientific entrepreneurship in Africa was combatting Afro-pessimism, whether on the continent itself or further afield.

"Afro-pessimism is not just the negative perceptions of those outside of Africa, it's also the lack of belief of Africans that we can be scientifically innovative. It's not entirely difficult to understand given the image of Africa in the media, but I wanted to find a way to change that narrative and those perceptions," he said.

A legacy of innovation

Since the founding of the H3D Centre at UCT in 2010, the centre's work has attracted millions of dollars in funding, led to the creation of 75 jobs and established vital infrastructure that has put Africa on the map as a significant contributor to drug discovery.

It is this legacy that Chibale is most proud of and hopes that future generations of African scientists can build on to create a better world for all.

"I hope that people can look at my path and see that it doesn't matter who you are or where you come from, but that you seize every opportunity that comes your way; that if you make the most of what you're given, you make it count and you are consistent, that you can be successful," he shared.

"God has given us all unique talents and gifts, so you must recognise that and put it to good use. Nobody has the monopoly on success and all things are possible if you build the right partnerships and you stand on the shoulders of giants."

In that vein, the professor notes that we must be careful to preserve institutions like UCT, which give those associated with them immeasurable opportunities to achieve unmatched success.

"We must be careful to protect the brand of UCT that has given us so much. It is the best academic institution on the African continent. We must not only be grateful for it, we must also take on the responsibility of preserving what those who have come before us have achieved."

A historic honour

In addition to his recent Queens' College fellowship, Chibale has also been conferred an honorary doctorate by Leiden University in the Netherlands in recognition of his pioneering work on the development of novel medicines to fight African endemic diseases through both the H3D Centre and H3D Foundation.

The ceremony takes place on the occasion of the university's 450th anniversary and will be attended by King Willem-Alexander and Queen Máxima of the Royal House of the Netherlands. The last African scholar to receive a doctorate in this context was former president Nelson Mandela in 1999.

KELLY CHIBALE ELECTED TO THE US NATIONAL ACADEMY OF MEDICINE

PROFESSOR KELLY CHIBALE HAS BEEN ELECTED AS AN INTERNATIONAL MEMBER OF THE ESTEEMED UNITED STATES NATIONAL ACADEMY OF MEDICINE (NAM) FOR PIONEERING INFECTIOUS DISEASE DRUG DISCOVERY ON THE AFRICAN CONTINENT.

Election to the academy is considered one of the highest honours in health and medicine. It recognises individuals who have demonstrated outstanding professional achievement and commitment to service.

The election citation recognises that Professor Chibale, the Neville Isdell Chair in Africancentric Drug Discovery & Development and founder, has led international project teams, including one that discovered the first small molecule clinical candidate for any disease, researched on African soil by an African-led international team. Chibale is also the founder and director of H3D, UCT's drug discovery and development centre based in the Department of Chemistry and Institute of Infectious Disease and Molecular Medicine (IDM).

NAM elected 90 regular and 10 international members during its annual meeting on Monday, 21 October 2024.

"Since election to the United States, NAM is considered one of the highest honours in the fields of health and medicine, I am incredibly honoured considering that I am a synthetic organic chemist by training. It shows that regardless of one's scientific background, it is the impact of one's research on health and medicine that is recognised by this prestigious academy. I am grateful to my nominators, team members, past and present, from my UCT academic group and H3D as well as research collaborators and funders for their contribution to this election," said Chibale.

The newly elected members bring NAM's total membership to more than 2 400, which includes nearly 200 international members.

Major contributions

Current members elect new members through a process that recognises individuals who have made major contributions to the advancement of the medical sciences, healthcare and public health. A diversity of talent among NAM's membership is assured by its Articles of Organization, which stipulate that at least one-quarter of the membership is selected from fields outside the health professions such as law, engineering, social sciences and humanities.

"This class of new members represents the most exceptional researchers and leaders in health and medicine, who have made significant breakthroughs, led the response to major public health challenges, and advanced health equity," said NAM president, Victor J Dzau. *"Their expertise will be necessary to supporting NAM's work to address the pressing health and scientific challenges we face today. It is my privilege to welcome these esteemed individuals to the National Academy of Medicine."*

Addressing critical issues

Established originally as the Institute of Medicine in 1970 by the National Academy of Sciences, NAM addresses critical issues in health, science, medicine and related policy, and inspires positive actions across sectors. NAM works alongside the National Academy of Sciences and National Academy of Engineering to provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and inform public policy decisions.

The National Academies of Sciences, Engineering, and Medicine also encourage education and research, recognise outstanding contributions to knowledge, and increase public understanding of science, technology, engineering, and mathematics (STEM). With their election, NAM members commit to volunteer their service in national academies activities.

Prof Kelly Chibale has been elected as an international member of the US National Academy of Medicine for pioneering infectious disease drug discovery on the African continent.

Faculty News

HOW THE SKA TELESCOPE DREW ME FROM ITALY TO SOUTH AFRICA

ASTRONOMER LUCIA MARCHETTI'S CAREER TOOK HER TO SOUTH AFRICA, WHERE SHE NOW LEADS A DATA-VISUALISATION LAB.

The first time I moved to South Africa was in 2016, after I won a research grant to spend six months at the South African Astronomical Observatory (SAAO) in Cape Town. I was drawn to the country by the boom in astronomy and related studies sparked by the news, four years earlier, that South Africa would co-host the Square Kilometre Array (SKA), one of the biggest international radio telescope project currently under construction.

My first trip to South Africa was a few years earlier. After finishing my PhD at the University of Padova in Italy, I attended a conference as part of the South African Large Telescope (SALT) consortium. I then applied for and received a joint postdoc between the University of Cape Town (UCT) and the nearby University of the Western Cape.

South Africa was a good place to study and work in astronomy, especially because of SALT, the South African MeerKAT radio telescope, and the upcoming SKA telescope. At the time when I moved to Cape Town, the universities were looking to attract international astronomers to help building a community of astronomers in the country in preparation for the SKA.

Lucia Marchetti

It has been a challenge at times, but South African astronomy has seen amazing growth, especially among black and female students. Programmes like the National Astrophysics and Space Science Programme (NASSP) that we host at UCT, which specifically looked to recruit and retain students from historically disadvantaged institutions, have been a huge success. In 2000, South Africa had 40 astronomers with PhDs, all of whom were white. By the end of 2023, the NASSP had produced over 460 honours graduates and more than 230 master's graduates in astrophysics and space science. That includes over 70 graduates from almost 20 other African countries.

I'm currently the director of the Vislab, a data-visualisation laboratory that looks to build capacity in data-intensive research. Vislab is one of the units of what's known as the Inter-university Institute for Data Intensive Astronomy (IDIA), a consortium of three South African universities that aims to build capacity in data-intensive research within the broader research community. This was originally set up with MeerKAT and SKA in mind, to support their science.

A highlight for the Vislab has been the development of our novel software – the immersive Data Visualisation Interactive Explorer or iDaVIE in short – designed to analyse radio data cubes in virtual reality. Radio data cubes are three-dimensional representations of astronomical data collected by radio telescopes. iDaVIE uses virtual reality (VR) technology, including headset and controllers, that allow users to explore massive datasets in 3D. In astronomy, and especially in radio astronomy, we often have to deal with things that are 3D by nature. Think, for example, of a galaxy, like our own Milky Way. Think of its spiral arms that move around the central black hole. If you are trying to understand something that moves or has a 3D projection, and you slice it into 2D layers to analyse it, you are missing out on something. Now with iDaVIE, we can see the data in their original form and in doing so we can easily discover 3D structures in our data that would be otherwise missed in the surrounding noise, or that would take longer to discover with the more conventional 2D tools.

We imagine that we can apply these tools to countless other fields, including medicine, engineering or biology. These are fields where scientists would also benefit from seeing complex data and interacting with them in an immersive environment.

I'm excited about seeing the completion of the next phase of the SKA telescope. It will be thrilling to experience what the telescope will allow us to discover, and it will be a real privilege to be able to contribute to science from South Africa.

MEERKAT HELPS UCT SCIENTISTS UNCOVER GIANT RADIO GALAXY

A TEAM OF SCIENTISTS AT UCT TOGETHER WITH SOUTH AFRICA'S MEERKAT RADIO TELESCOPE, HAVE DISCOVERED A GIANT RADIO GALAXY (GRG), THAT IS GUARANTEED TO HELP BROADEN ASTRONOMERS' UNDERSTANDING OF THE LARGEST STRUCTURES IN THE UNIVERSE.

Named Inkathazo, which means trouble in isiZulu and isiXhosa, GRGs like this are extraordinary cosmic phenomena. They emit massive galaxies of plasma jets millions of light years across the intergalactic space and are powered by supermassive black holes located at their centres. And though previously considered rare, an increase of GRG discoveries has been made possible in recent years thanks to cutting-edge technology like MeerKAT.

The research study, which explores Inkathazo and highlights the findings, was published in a research paper in the Monthly Notices of the Royal Astronomical Society, and features contributions from researchers and scientists globally.

A 'significant' find

"The number of GRG discoveries has absolutely exploded in the past five years thanks to powerful new telescopes like MeerKAT. Research into GRG is developing rapidly that it's becoming hard to keep up. It's incredibly exciting," said Kathleen Charlton, a UCT master's student and co-author of the study.

Charlton said the discovery is particularly significant because it revealed a giant radio galaxy with plasma jets extending 3.3 million light years, more than 32 times the size of the milky way. She said the name Inkathazo was chosen especially because the galaxy's features have posed challenges for researchers attempting to understand its unique physics.

The newly discovered giant radio galaxy 'Inkathazo'. The glowing plasma jets, as seen by the MeerKAT telescope, are shown in red and yellow. The starlight from other surrounding galaxies can be seen in the background.

"It doesn't have the same characteristics as many other giant radio galaxies. For example, the plasma jets have an unusual shape. Rather than extending straight across from end-to-end, one of the jets is bent," she said.

Marvelous MeerKAT

Thanks to MeerKAT's advanced capabilities, researchers were able to create high-resolution spectral age maps, which track the age of the plasma jets across different regions. And these maps revealed unexpected energy boosts in the electrons within the jets, likely caused by collisions with hot gas between galaxies in the cluster. This discovery challenges existing plasma physics models and highlights the complexities of these extreme cosmic objects.

MeerKAT is operated by the South African Radio Astronomy Observatory (SARAO) and has proven to be a revolutionary tool for exploring the southern sky. As a precursor to the Square Kilometre Array (SKA), it offers unmatched sensitivity and resolution, making it a key player in uncovering cosmic mysteries like Inkathazo.

And Dr Jacinta Delhaize, a researcher in UCT's Department of Astronomy, agreed.

"The fact that we unveiled three GRGs by pointing MeerKAT at a single patch of sky goes to show that there is likely a huge treasure trove of undiscovered GRGs in the southern sky," Dr Delhaize said.

"We're entering an exciting era of radio astronomy. While MeerKAT has taken us further than ever before, the SKA will allow us to push these boundaries even further and hopefully solve some of the mysteries surrounding enigmatic objects like giant radio galaxies."

UCT SCIENTISTS LEAD STUDY THAT UNCOVERS FOUR DISTINCT GIRAFFE SPECIES

IN A GROUND-BREAKING RESEARCH STUDY, SCIENTISTS UNCOVERED FOUR DISTINCT SPECIES OF AFRICA'S MUCH-LOVED GENTLE GIANT: THE GIRAFFE, WHICH IS QUITE THE OPPOSITE TO THE WIDELY ASSUMED NOTION THAT JUST ONE SPECIE EXISTS.

This distinction was confirmed in an interdisciplinary research study that analysed the skull morphology of giraffes. And with just 117 000 giraffes left in the African wild, these findings demonstrate the importance of shining a spotlight on the silent extinction of these gentle giants. The enormous collaborative research project was conducted by scientists at UCT in collaboration with partner institutions like the Giraffe Conservation Foundation, the Universidad Autónoma de Madrid, other European institutions, as well as African government partners.

Uncovering four species

During the research process, scientists studied and discussed giraffe taxonomy and evolution at length and different theories emerged. However, genomic research

conducted by the Giraffe Conservation Foundation and the Senckenberg Biodiversity and Climate Research Centre, has shown the distinction of four giraffe species. They've been around for close to a decade and include the masai, northern, reticulated and southern giraffe.

In this study, researchers assembled the largest known dataset for any medium to large wildlife by 3D, scanning 515 giraffe skulls from African national parks, game farms, taxidermists, and museum collections globally. Using 3D geometric morphometric analysis, the study showed distinct differences between male and female giraffe skulls. And the four genetically distinct giraffe species also have different cranial morphologies largely linked to their ossicones (the bony horn-like structures on their skulls).

A large study of the skull shape of giraffe confirms that there are four distinct species of the gentle giant.

UCT'S VERY OWN LEADS BIODIVERSITY CONSERVATION EFFORTS

THE UNIVERSITY OF CAPE TOWN'S PROFESSOR LYNNE SHANNON FROM THE DEPARTMENT OF BIOLOGICAL SCIENCES AND MARINE AND ANTARCTIC RESEARCH CENTRE FOR INNOVATION AND SUSTAINABILITY (UCT-MARIS) CONTINUES HER EFFORTS FOR OCEAN EQUITY THROUGH HER CONTRIBUTIONS TO THE INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES).

Professor Shannon is a coordinating lead author in IPBES's landmark thematic assessment on transformative change. Her work bridges science and policy and provides critical insights for governments and stakeholders striving for equitable and effective solutions. The IPBES platform hosted its historic first-ever African Plenary in Windhoek, Namibia, in December 2024. This gathering brought together representatives from nearly 150 nations, marking a milestone in global efforts to combat nature's decline.

At the event, two ground-breaking reports were adopted: the Nexus Assessment, addressing interlinked crises in biodiversity, water, food, health, and climate change; and the Transformative Change Assessment, proposing systemic shifts for a sustainable and just world.

"This (the Transformative Change) assessment deals with the urgency of transformative change to address the underlying causes of nature's decline and biodiversity loss. It is only through fundamental, system-wide shifts in views (our ways of thinking, knowing and seeing the world), structures (our ways of organising, regulating and governing) and practices (our ways of doing, behaving and relating) that we can begin to effectively curb biodiversity loss and nature's decline," said Shannon.

Co-create

"Each one of us has a role to play. Through a range of actions, from individual to organisational levels, we can co-create aspirational visions for a better future," she added.

Prof Lynne Shannon

Her contribution was hailed by UCT Vice-Chancellor, Professor Mosa Moshabela, who said, *"Professor Shannon's achievements highlight UCT's leadership in addressing global environmental challenges. As Africa's leading university, UCT remains committed to advancing research that informs policy, fosters collaboration, and delivers solutions for the benefit of both people and the planet."*

EMPOWERING THE NEXT GENERATION: UCT HOSTS SHESTEAM SUMMIT 2025

UCT proudly hosted the 2025 SheSTEAM Summit on Saturday, 25 January, in partnership with the South African Council for Natural Scientific Professions (SACNASP) and the US-based African Research Collaborative. With strong support from UCT's Faculty of Science's Transformation portfolio, this inspiring event aimed to empower young female learners from disadvantaged backgrounds by exposing them to exciting opportunities in Science, Technology, Engineering, Arts, and Mathematics (STEAM).

The summit brought together 300 female Grade 10–12 learners from underprivileged schools across the Western Cape, offering them a chance to immerse themselves in hands-on learning, interactive workshops, and mentorship sessions led by professionals from a wide range of STEAM fields.

The event kicked off with a powerful welcome address by Dr. Nompumelelo Obokoh, CEO of SACNASP, and Professor Elelwani Ramugondo, UCT's Deputy Vice-Chancellor for Transformation, Student Affairs, and Social Responsiveness. UCT's Dean of Science, Prof. Hussein Suleman, and Prof. Sarah Fawcett, Deputy Dean of Transformation, were also present, underscoring the university's dedication to promoting diversity and inclusion in STEAM careers.

The UCT Department of Chemistry participated in the event with Laa-iqa Rylands and Dr. Samantha Douman leading a chemistry exhibition table that captivated the learners. The booth offered hands-on scientific demonstrations, where learners could engage with chemistry experiments, ask questions about the field, and explore potential career paths in chemistry. The interactive nature of the exhibition inspired curiosity and enthusiasm, providing young

curiosity and enthusiasm, providing young learners with a unique opportunity to see chemistry beyond the classroom.

The SheSTEAM Summit 2025 was an inspiring and impactful event, and we are grateful for the opportunity to contribute to such a worthwhile initiative. The support of UCT's science postgraduate students, who volunteered throughout the day, was invaluable. Their contributions in assisting with logistics and mentoring learners played a key role in the event's smooth operation and positive impact.

We look forward to supporting future outreach events that empower young women to explore careers in STEAM and encourage their passion for science and technology.

UCT AND MEERKAT MAKE GIANT STRIDES IN UNVEILING MYSTERIES OF THE UNIVERSE

BY HARNESSING THE EXTRAORDINARY CAPABILITIES OF SOUTH AFRICA'S WORLD-RENOWNED MEERKAT RADIO TELESCOPE, SCIENTISTS AT THE UNIVERSITY OF CAPE TOWN (UCT) IN PARTNERSHIP WITH THE SOUTH AFRICAN RADIO ASTRONOMY OBSERVATORY (SARAO) AND SEVERAL LEADING GLOBAL INSTITUTIONS HAVE MADE NEW, INNOVATIVE STRIDES IN UNVEILING MYSTERIES OF THE UNIVERSE.

Thanks to this partnership, compelling evidence for a low-frequency gravitational wave background – cosmic ripples in spacetime that stretch and squeeze the fabric of the universe – has emerged. The findings stem from MeerKAT Pulsar Timing Array Project, a five-year initiative that kicked-off in 2019, using the precision of pulsars as natural cosmic clocks. These celestial bodies are located thousands of light years away, act as the largest galactic gravitational wave detector of its kind and produces the most detailed gravitational wave maps ever created. MeerKAT's state-of-the-art design, developed by SARAO and operated as a National Research Foundation (NRF) facility, continues to push the boundaries of astronomical research.

"To find evidence for a gravitational wave background, we first need to model the timing behaviour of each of the pulsars in our network very precisely. Once we know the individual pulsars well, we can start analysing the combined behaviour of the group of pulsars. If we see pulsars in the same direction in the sky lose time in a connected way, we start suspecting that it is not the pulsars that are acting funny, but rather a gravitational wave background that has interfered," said Dr Marisa Geyer, co-author and lecturer at UCT and former commissioning scientist of MeerKAT.

Ground-breaking findings

In just one-third of the time when compared to other global experiments, the MeerKAT team is seeing signs of a gravitational wave background. The background, likely from merging supermassive black holes, is also a stronger signal than other published results. These and other findings, which offer unprecedented insights into the likely sources of these spacetime ripples – primarily the colossal merges of supermassive black holes – were published in the Monthly Notice of the Royal Astronomical Society, a peer-reviewed scientific journal, which showcases the power of collaboration between international partners from South Africa, Australia, Europe and SARAO.

"Pulsar timing array experiments are long-term in nature, and searching for a gravitational wave background is a slow process. From past experience, we know that this may need 15 years of data. It is amazing to see that with MeerKAT evidence for [a] signal is possible, even in a data-span of just 4.5 years," said Dr Jaikhomba Singha, a postdoctoral research fellow in UCT's Faculty of Science.

This research project sets a firm foundation to further explore the evolution of galaxies and the formation of supermassive black holes. And the upcoming SKA-Mid telescope, which is currently under construction in the Karoo and incorporates MeerKAT, promises to expand these discoveries even further and position South Africa as a leader at the forefront of the next generation of cosmic exploration.

Regular observations of 80 millisecond pulsars (shown here as bright point sources emitting white radio beams) over the last five years with MeerKAT have revealed evidence for a gravitational wave background. These ripples in spacetime are likely caused by a population of inspiraling supermassive black holes that reside at the heart of massive galaxies (depicted as pink spirals).

ZOMBIE PLANTS FOUND BLOOMING IN SOUTH AFRICA

In the arid landscapes of South Africa, Professor Jill Farrant first encountered plants that seemed to defy the laws of life itself—brown, brittle, and seemingly lifeless, yet capable of springing back to vibrant green after a single rainfall. Known as 'resurrection plants,' or sometimes referred to as 'zombie plants' due to their apparent ability to come back from the dead, these botanical wonders have captivated scientists for their ability to survive extreme drought and revive almost instantly when rehydrated. Farrant's lifelong fascination with these plants has evolved into groundbreaking research that could transform agriculture in a world increasingly shaped by climate change.

Desiccation tolerance expert Jill Farrant first noticed the remarkable abilities of resurrection plants when she was a child.

Jill Farrant's initial fascination with these "resurrection plants" began in her childhood in South Africa in the 1970s, where she observed plants seemingly returning to life after prolonged dry periods. These plants, as she later discovered, can endure six months or more without water, their leaves becoming brown and brittle, only to regreen and resume photosynthesis within hours of receiving moisture.

Now a professor of desiccation tolerance at the University of Cape Town, Farrant has dedicated over three decades to understanding these unusual plants. She and other researchers believe that the genes responsible for this drought resistance could be crucial for adapting agriculture to a future marked by increasing droughts. The article highlights that while most plants die after losing 10-30% of their water content, resurrection plants can tolerate over 95% water loss. Furthermore, unlike some drought-stressed crops that may recover but with compromised growth, resurrection plants appear to return to their pre-drought state, maintaining their productivity.

Some of the mechanisms behind this resilience include the replacement of water with sugars to create a glass-like substance within cells (vitrification) and the deconstruction of photosynthetic machinery during dormancy. Farrant describes the preservation of their tissue as "quite a miracle."

A significant focus of the article is Farrant's current research into transferring these traits to food crops. While traditional genetic modification (introducing foreign DNA) was initially considered, Farrant's recent findings suggest that activating existing genes—the same toolkit found in plant seeds—might be a less controversial approach to enhancing drought tolerance in mature plants.

Farrant's exploration of the root microbiome (rhizosphere) of resurrection plants, such as *Myrothamnus flabellifolia*, aims to identify beneficial microbes that could enhance drought tolerance in other plants. Her team's initial survey of this plant's rhizosphere revealed over 900 unique bacterial and fungal groups.

Another key aspect of Farrant's work discussed is her research on teff, a cereal with a close relative that is a resurrection plant, Eragrostis nindensis. By comparing these two species, she hopes to pinpoint the genes responsible for drought tolerance that might have been lost or silenced in teff and could potentially be reintroduced. One observed difference is E. nindensis's ability to produce protective antioxidants and anthocyanins against sunlight during drought, a trait teff lacks.

Farrant emphasizes that even if introducing desiccation tolerance leads to slightly lower yields in crops like teff, it could provide subsistence farmers with a reliable harvest even in the face of unpredictable rainfall. The resilience of resurrection plants offers a glimpse into nature's ingenuity, inspiring hope for more sustainable farming practices. By unlocking their secrets, scientists like Jill Farrant are paving the way for crops that can withstand harsher climates and unpredictable rainfall, ensuring food security for future generations. As this research continues to unfold, it serves as a reminder of the untapped potential hidden in the natural world.

UNLOCKING THE FUTURE OF MEDICINE

THE UNIVERSITY OF CAPE TOWN'S (UCT) HOLISTIC DRUG DISCOVERY AND DEVELOPMENT CENTRE (H3D) HAS PROUDLY LAUNCHED THE CENTRE FOR TRANSLATIONAL AMR RESEARCH (CTAR) PROGRAMME, BACKED BY A SUBSTANTIAL £5 MILLION INVESTMENT FROM LIFEARC. THIS STRATEGIC PARTNERSHIP AIMS TO COMBAT THE ESCALATING THREAT OF ANTIMICROBIAL RESISTANCE (AMR), PARTICULARLY FOCUSING ON MULTIDRUG-RESISTANT (MDR) GRAM-NEGATIVE BACTERIA SUCH AS ACINETOBACTER BAUMANNII.

Prof Kelly Chibale

Both Professor Kelly Chibale, the director of H3D; and Dr Dave Powell, the chief scientific officer at LifeArc, delivered opening addresses for the launch on 3 December, highlighting the innovative approaches being taken to tackle AMR. They also emphasised

the importance of strengthening local research capacity in Africa through knowledge exchange and collaborative efforts.

This was followed by a keynote presentation by Dr Ghada Zoubiane from the International Centre for Antimicrobial Resistance Solutions (ICARS), titled "AMR Innovation Uptake – Partnering for Impact". Richard Alm, the chief scientific officer at Combating Antibiotic-Resistant Bacteria (CARB-X), also delivered a keynote presentation, titled "The AMR Burden and Need for New Antibiotics".

Dr Zoubiane and Dr Alm joined Dr Sandeep Ghorpade (H3D) and Dr Ed McIver, the scientific director at LifeArc, for a panel discussion, "The Significance and Potential Impact of CTAR", where Dr McIver commented: *"A key output for LifeArc is to ensure CTAR delivers at least one preclinical candidate within five years; this is what success would look like to me."*

During the closing remarks, Professor Chibale said, *"The correct pronunciation of the programme is STAR, not C-TAR, and we are thrilled to partner with LifeArc in this crucial endeavour. This partnership stresses the importance of international collaborations in tackling pressing global health issues such as AMR."*

The investment from LifeArc will contribute to the sustainability of H3D, which is a soft-funded research entity. UCT will aim to achieve the following:

- preclinical discovery of precision antibiotics
- strengthening AMR research capacity at H3D and training the next generation of scientists
- contribute to a foundational model of sustainable creation of an absorptive capacity to attract, develop, nurture and retain talent on the African continent through job creation
- with H3D being a platform, CTAR represents an anchor point for new (research and funding) partnerships and models.

UCT CHEMISTRY HOSTS PROFESSOR DAVID CLARKE FOR GROUNDBREAKING NATIVE MASS SPECTROMETRY EXPERIMENTS

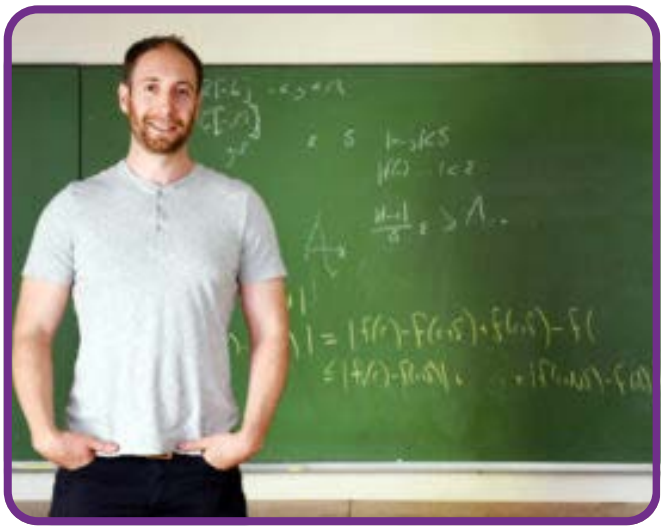
Through the support of the UCT Visiting Scholar Fund and the Scottish Funding Council supported International Science Partnership Fund, the Department of Chemistry had the privilege of hosting Professor David Clarke, Chair of Mass Spectrometry at the University of Edinburgh.

During his visit, Professor Clarke assisted in installing a new source for the department's Q-TOF mass spectrometer, enabling the successful execution of Native Mass Spectrometry (MS)—a powerful technique in chemical biology that preserves biomolecular structures in their natural state during analysis. In addition, he gave a series of lectures on advanced mass spectrometry.

Native MS is widely recognized as a transformative technology, yet it is not currently practiced in South Africa. The experiments conducted with Professor Clarke mark a significant milestone: the first successful Native MS experiments on the African continent.

This achievement highlights UCT Chemistry's commitment to advancing cutting-edge analytical techniques and opens new opportunities for research in structural biology, protein-ligand interactions, and biomolecular characterization.

THE FUTURE FOR AI, MACHINE LEARNING AND PAN-DISCIPLINARY APPROACH



Dr Jonathan Shock

"What we need are people who can think deeply about complex questions, people who are technologically savvy and understand the value of the scientific method, and people who have a desire to make a difference. I have seen time and again the evolution of students as they come from undergraduate, into graduate studies and become well-rounded scientists, and I am ever proud of the work I see them do. We need more people like this, and I cannot understate the amazing privilege of being able to study the workings of the universe at all its scales, as a career." These are the words of Dr Jonathan Shock, Associate Professor in the Department of Mathematics and Applied Mathematics at the University of Cape Town (UCT) and interim director of the new UCT AI initiative.

"My broad research questions relate to how we can use machine learning to better understand the way organisms survive in a complex world, and conversely how we can improve machine learning systems by studying simple and complex organisms."

He explains in more detail: *"It includes research in reinforcement learning – a field which has evolved from psychology, control theory and machine learning. It is the study of how computers can learn to perform tasks using trial and error learning, receiving feedback signals from the environment in the form of rewards."*

He continues: *"My specific research in this area focuses on multi-agent systems, offline learning (where the computer doesn't have direct access to the environment), and meta-learning (learning how to learn). I am also currently working on active inference, which takes a Bayesian perspective on the brain as an inference engine, with only indirect access to the world through our observations, and evolutionarily determined preferred states that promote survival. On this topic, I work closely with Professor Mark Solms and a team investigating what are the factors that lead to affective consciousness."*

The Shocklab ecosystem

Additionally, Dr Shock also uses machine learning to study neuroimaging, 'including for the purpose to understand the aging process and identify brain regions that may be particularly important for detecting pathological aging signatures.'

His work with statistical methods to understand the brain initially sparked his interest in machine learning and lead him to utilise the Coursera platform to develop a range of skills including deep learning, probabilistic graphical models, and natural language processing. At the heart of his projects is the Shocklab ecosystem comprising extremely talented graduate students who collaborate across numerous departments at UCT and beyond. This

includes physics, statistics, computer science, psychiatry, psychology, computational chemistry, education and engineering.

"Many of these students have also worked very closely with Instadeep, an industry partner, working in both pure research and applied areas of machine learning, and who have been instrumental in mentoring and guiding these students to publish at the top machine learning conferences in the world. Instadeep is very rare as an industry partner in both their desire to take on and mentor students, as well as the opportunity they afford to do essentially pure academic research which then leads into their applied groups."

The future for AI, machine learning and pan-disciplinary approach

"I believe we are at a crossroads, not just for the field, but potentially for humanity. There is great excitement, but also well-founded fear, about what we may have created," Dr Shock says.

"It is vital that we continue with caution but with an openness to working together and for sharing insights. We must get out of our silos and work as a global community so that we can leverage the power of AI for good and mitigate the clear and present dangers as much as we possibly can. At the same time, it is vital that Africa is not left behind as it has been during previous industrial revolutions. The teams of researchers around the continent must speak up and show the world the richness of what we have to offer, intellectually, culturally and philosophically. The 2024 IndabaX (the local version of the Deep Learning Indaba – the continent's largest machine learning conference) was held in over 40 African countries. This shows that there is passion, expertise and a drive to be heard."

He adds that "we have a long way to go to educate those around us in what AI is. There is a belief by many that AI is ChatGPT, but of course it entails far more than this and includes applications as diverse as climate modelling, drug discovery, radiological examining, species identification, crop management and so much more."

'In this context,' Dr Shock says, interdisciplinary research *"allows us to leverage expertise across fields, often revealing how ideas from one area can advance another with minimal adaptation. While working within specialized domains can produce amazing results, there's immense value in learning from other fields when we invest the time to understand one another's perspectives, methodologies and importantly, languages. We can accelerate our own research by both learning about others' work and sharing our own expertise as widely as possible."*

In true pan-disciplinary spirit, Dr Shock, who is an adjunct professor at the Institut National de la Recherche Scientifique (INRS) in Montreal (Canada), works with a INRS group on how to use machine learning for material discovery. *"We are investigating ways to accelerate the discovery of materials useful for direct air carbon capture to mitigate climate change. Traditional approaches use time and compute-intensive DFT (Density Functional Theory) to predict material properties. Our work with graph neural networks trained on DFT data has already achieved an order of magnitude speedup in calculating the ground state of these important materials."*

Turning to the role of NITheCS in this context, Dr Shock as *"As Associate of NITheCS I've seen firsthand how vital such institutes are for strengthening local talent, facilitating interdisciplinary teams, and nurturing the next generation of researchers. NITheCS plays a crucial role in showcasing South African research globally through platforms like YouTube, and initiatives like SATACS that are moving to address historical resource imbalances in our country."*

Background

Dr Shock talks briefly about his background, saying his father, a chemical engineer, showed him what it meant to be a scientist

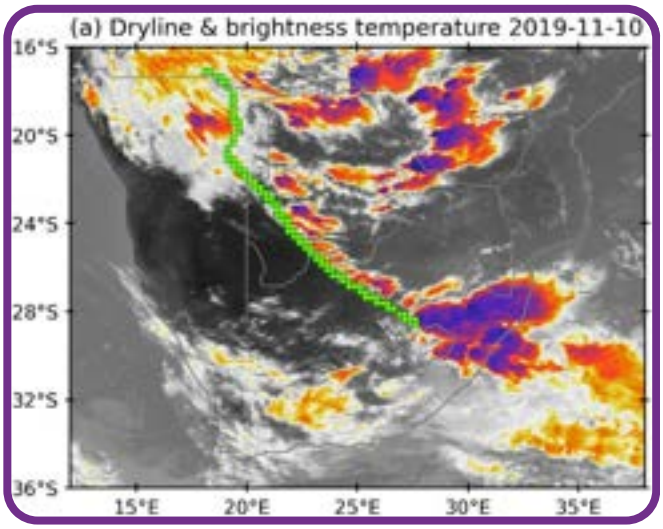
and guided his early development. *"My mother, an artist, provided a complementary perspective that, I think, has enabled my broad approach to research. At high school I was extremely lucky to have a passionate physics teacher, Thomas Garnier, who fostered my growing interest in the subject and helped me to overcome my often very messy approach to problem solving."*

He then studied physics at Bristol university, became fascinated with string theory, and earned a PhD in the subject at the University of Southampton. *"Finding a postdoc position was not easy, but the Institute for Theoretical Physics in Beijing gave me an opportunity to become a researcher there, and I had two incredible years in China. I grew in confidence in terms of my research, and discovered a new culture. Two more postdocs later I came to UCT, found myself in front of 400 bright-eyed firsts year students, and fell in love with teaching. UCT has given me a great deal of freedom in the work that I do, and I have been very lucky to have massive support from the faculty of Science and the Department of Maths and Applied Maths."*

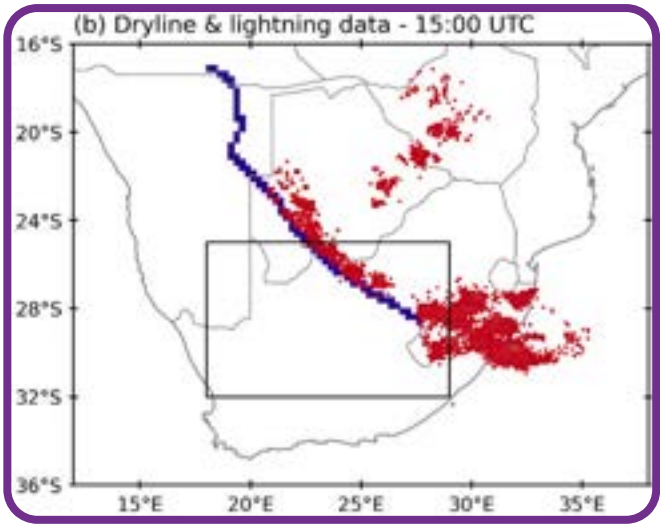
KAPEX 2025 – CHASING DRYLINES ACROSS THE SOUTH AFRICAN INTERIOR

It was an unusual start to the New Year for Prof. Chris Reason and Dr. Lynette van Schalkwyk from the Oceanography Department at the University of Cape Town. Joined by 6 researchers from the Climate Research group of the University of Oxford, they drove thousands of kilometers across the Kalahari, often on dirt roads, in an attempt to make more sense of drylines.

But what are drylines and why are they important? Drylines are found during summer at the interface of a moist airmass, originating from the Indian Ocean, and the ambient dry air over the western southern African plateau.

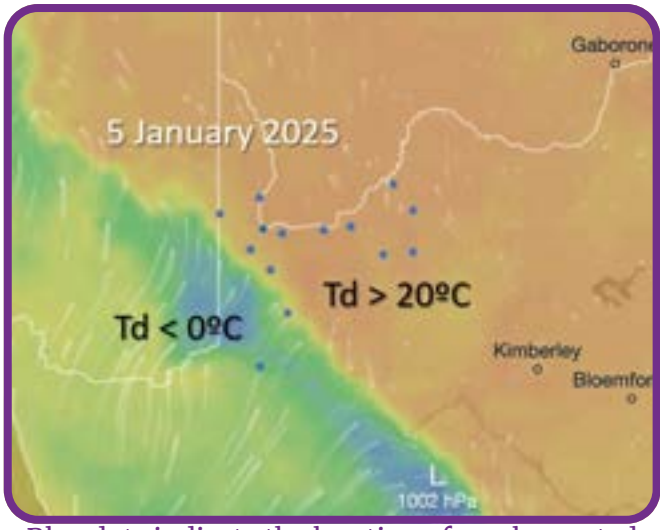


Above - Eumetsat Infrared satellite image showing brightness temperature with the location of the dryline shown in green. Cold temperatures (purple colours) represent strong convection taking place, which can be seen to the east of the dryline (along the moist side). Below - the red dots are lightning strikes from the South African Weather Service's lightning detection network, that occurred around the same time the satellite image was taken. It can be seen that a lot of lightning activity occurs right along the dryline on the moist side.



Supervised by Prof. Reason and Dr. Ross Blamey, Dr. Van Schalkwyk has shown in her PhD thesis that drylines play an important part in the development of thunderstorms in central South Africa. Very little is known about drylines in South Africa, which is partly because there are very little observations of these features. This was something the 2025 Kalahari Atmospheric Processes Experiment (KAPEX 2025) aimed to address by establishing a network of weather

stations in the data sparse Kalahari region and to collect in situ data on both the dry and moist side of drylines. Fourteen VOX Tornado Twister weather stations were installed between 31 December 2024 and 12 January 2025. During this period altogether 40 weather balloons, with radiosondes attached to them, were released and instrumented vehicle drives permitted transects of 4 drylines at favourable times of day.



Blue dots indicate the location of newly erected weather stations, concentrated in a region where drylines occur regularly in summer. Colours represent dewpoint temperatures of the ICON weather prediction model and shows a sharp boundary between very dry air (blue colours to the west) and very moist air (orange colours to the east) on 5 January at 20:00 SAST.

The weather data collected from the station network will be used to improve our understanding of dryline movement and intensity, but can also be used to study the impact thunderstorms have on localised rainfall and wind speeds in a data sparse region where storm impacts often go unnoticed.

People living in the Kalahari region are faced with many climate-related challenges such as low and extremely variable rainfall, extreme heat and occasional severe thunderstorms. Accurate observation data and improved monitoring and forecasting of drylines and potential associated thunderstorms is a high priority.

SAMRC / UCT DRUG DISCOVERY UNIT'S TRACK RECORD SECURES FIVE MORE YEARS OF FUNDING

THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL (SAMRC) HAS APPROVED A FIVE-YEAR CONTINUATION FOR THE SAMRC / THE UNIVERSITY OF CAPE TOWN (UCT) DRUG DISCOVERY AND DEVELOPMENT RESEARCH UNIT (DDDRU), UNDER THE DIRECTORSHIP OF PROFESSOR KELLY CHIBALE. THIS DECISION FOLLOWS A COMPREHENSIVE SCIENTIFIC REVIEW THAT HIGHLIGHTED THE UNIT'S CRUCIAL WORK IN ADDRESSING TUBERCULOSIS (TB), MALARIA, AND ANTIMICROBIAL RESISTANCE (AMR) – HEALTH CHALLENGES PARTICULARLY AFFECTING SOUTH AFRICA, AFRICA, AND OTHER LOW- TO MIDDLE-INCOME COUNTRIES.

The vice president of the SAMRC, Professor Liesl Zühlke, congratulated Professor Chibale and his team, expressing anticipation for their ongoing contributions to the SAMRC's strategic objectives. The unit will receive continued annual funding and remain eligible for additional incentivised funding, with the next five-year cycle starting on 1 April 2025.

Responding to the renewal announcement, Chibale emphasised the significance of this continued support of his unit's work. *"As the largest local funder of health research, medical diagnostics, medical devices, and therapeutics, the SAMRC has played a significant role in supporting our unit's work over many years. For this we are most grateful. At a time of global uncertainty around research and development funding for global health, this renewed funding commitment over the next five years is a major boost to the long-term sustainability of our unit at UCT. Working with my team and our partners, I look forward to implementing the report recommendations and leveraging the SAMRC brand to maximise impact."*

Exceptional rating

The review panel, chaired by Professor Christo Muller of SAMRC's Biomedical Research and Innovation Platform and including international experts Professor Ian Gilbert (University of Dundee, United Kingdom), Professor Lyn-Marie Birkholtz (Stellenbosch University), and Professor Yahya E Choonara (University of the Witwatersrand), awarded the DDDRU an impressive average score of 4.7 out of 5 across nearly all evaluation criteria.

This exceptional rating reflects the unit's outstanding scientific output, as evidenced by both the quantity and quality of its research. During the review period, the DDDRU published 100 peer-reviewed articles and research reviews, three non-peer-reviewed journal articles, seven book chapters, and 15 research journal editorials and commentaries. The unit's work has gained significant attention in high-impact journals, as demonstrated by publication and citation metrics.

Additionally, the unit has established a strong international presence, with team members delivering 20 invited plenary/keynote presentations at conferences outside South Africa and three invited plenary keynote addresses within the country.

The director of the Drug Discovery and Development Research Unit, Prof Kelly Chibale.

Pivotal leadership

Chibale's leadership has been pivotal to the unit's success. Reviewers characterised him as possessing the qualities of "a good politician with a good entrepreneurial brain". His numerous accolades include being named among the 100 Most Influential Africans by New African magazine in 2019 and recognition as one of the world's top 60 most influential leaders in the pharmaceutical industry by The Medicine Maker in both 2020 and 2021.

In 2023 alone, Chibale received several prestigious honours, including the Royal Society (United Kingdom) Africa Prize, a Schmidt Sciences AI2050 Senior Fellowship (one of only seven worldwide), and an honorary doctorate from the University of Basel's Faculty of Science. He also made history as the first editor-in-chief from Africa of an American Chemical Society (ACS) publication when appointed to lead ACS Medicinal Chemistry Letters.

Looking ahead

The unit has demonstrated a strong commitment to capacity development, with 16 PhD students and eight master's students graduating during the review period, four of whom received distinctions. This emphasis on training the next generation of African scientists underscores the DDDRU's holistic approach to addressing continental health challenges.

Looking ahead, Chibale plans to address recommendations highlighted in the review report, including developing a detailed succession plan, nurturing emerging and mid-career scientists to become independent contributors, and consolidating efforts on specific, high-potential platforms rather than diversifying into too many new areas all of which will improve and sustain areas of excellence.

UCT SCIENCE ALUMNI REFLECT ON THEIR CAREER PATHS

The UCT Faculty of Science recently featured two accomplished alumni who shared insights into their diverse career trajectories at rising star distinguished alumni lecture: Pavitray (Pavs) Pillay, an MSc graduate in Marine Biology, and Iviwe Mtubu, who holds an honours degree in Environmental and Geographical Science and is pursuing his master's degree.

Iviwe's journey exemplifies the versatility of an Environmental and Geographical Science degree. His coursework at UCT enabled him to register as an Environmental Assessment Practitioner without prior work experience. During his presentation, he emphasized the transformative impact of UCT's Applied Geography programme, which took students beyond traditional classroom settings to engage with geographical concepts in real-world environments. His passion for education subsequently led him to pursue a Postgraduate Certificate in Education, allowing him to share his knowledge and inspire future generations.

Iviwe Mtubu

Pavs, who serves as the Corporate Engagement and Environmental Behaviour Change Lead at WWF South Africa, shared her evolution from marine biologist to environmental advocate. Under the mentorship of Emeritus Prof George Branch and Prof John Field at UCT, she developed her research expertise, culminating in a Master's degree in Marine Biology. In her current role at WWF, she applies behavioural science principles to promote sustainable practices among consumers and businesses.

Her work focuses on developing practical solutions that empower people to make sustainable choices, moving beyond traditional awareness campaigns. She highlighted initiatives such as the 'WWF-SASSI' FishID app, which uses technology and gamification to engage consumers in marine conservation efforts. Pavs emphasizes the critical role of engaging businesses in sustainability efforts, highlighting how investors and shareholders can drive corporate accountability.

Pavs Pillay

Both speakers stressed the importance of collaboration in achieving meaningful environmental impact. Iviwe described his work with various organizations and academics to implement practical geography programmes, while Pavs discussed the necessity of partnering with businesses to accelerate sustainability initiatives.

During the question-and-answer session, the speakers addressed challenges within higher education. Iviwe advocated for increased interaction between undergraduate and postgraduate students to inspire academic advancement. Pavs emphasized the need to balance theoretical knowledge with practical training and internship opportunities, ensuring graduates are equipped with skills for real-world impact.

The event demonstrated how science education can lead to diverse career paths while contributing to environmental conservation and sustainability. Through their different yet complementary approaches, both alumni exemplified how academic knowledge can be transformed into practical solutions for global challenges.

ANCIENT GENETIC DATA REVEALS BIOLOGICAL SEX AND GENETIC VARIABILITY OF PARANTHROPUS ROBUSTUS

A team of researchers, spearheaded by the University of Copenhagen and the University of Cape Town (UCT), have revealed the biological sex of four ancient pre-human relatives after successfully retrieving ~2-million-year-old protein remains from teeth belonging to Paranthropus robustus.

The work, published in the journal Science, marks a significant breakthrough in human evolution studies by providing some of the oldest human genetic data from Africa and reveals previously undetected genetic variability.

"Because we can sample multiple African Pleistocene hominin individuals classified within the same group, we're now able to observe not just biological sex, but for the first time genetic differences that might have existed among them," says the study's co-lead Palesa Madupe.

Madupe is a postdoctoral research fellow at the Globe Institute at the University of Copenhagen, and research associate at the Human Evolution Research Institute (HERI) at UCT. HERI Co-director Professor Rebecca Ackermann was a senior author on the study, with contributions from Co-director Robyn Pickering and several HERI research associates.

The researchers used a technique called palaeoproteomics to retrieve ancient protein sequences from the teeth of four P. robustus fossils recovered from the cave site Swartkrans, in the Cradle of Humankind, South Africa. Using state-of-the-art mass spectrometry techniques, they were able to partially reconstruct the ancient enamel protein sequences from the teeth.

Detecting specific variants of one protein called amelogenin, the team identified a male-specific variant assigning two of the Paranthropus specimens as male individuals. A novel quantitative approach allowed the researchers to infer that the other two specimens were female.

Study co-leads Dr Palesa Madupe, Dr Claire Koenig and Dr Ioannis Patramanis with a replica of Paranthropus robustus.

"Enamel is extremely valuable because it provides information about both biological sex and evolutionary relationships. However, since identifying females relies on the absence of specific protein variants, it is crucial to rigorously control our methods to ensure confident results." says Claire Koenig, paper co-lead and a Postdoctoral Researcher at the Center for Protein Research, University of Copenhagen.

A single genetic variant in another protein, enamelin, was also identified that differentiated the four Paranthropus specimens among themselves. Two specimens carried one version of the protein, a third carried another, and a fourth specimen appeared to be carrying both.

"When studying proteins, specific mutations are thought to be characteristic of a species and, as such, used to identify it. We were thus quite surprised to discover that what we initially thought was a mutation uniquely describing Paranthropus robustus, was actually variable within that group; some individuals had it while others did not," says paper co-lead Ioannis Patramanis, a Postdoctoral Research Fellow at the Globe Institute, University of Copenhagen.

The findings not only challenge long-held assumptions around P. robustus based solely on skeletal morphology, or the study of form and structure of the skeletal system. It also opens new avenues for understanding the complex evolutionary history of our ancient relatives.

"With this data, we shed light on how evolution worked in the deep-past and how recovering these mutations might help us understand genetic differences we see today," says Madupe.

Paranthropus is an extinct hominin genus that emerged and evolved in Africa between 2.8 and 1.2 Ma. Considered to be a side branch of our evolutionary tree, Paranthropus walked on two legs and coexisted with early species of Homo in Africa, possibly interacting.

This breakthrough research represents a shift toward more robust palaeoproteomic studies, where existing African hominin fossils that were previously considered beyond the reach of genetic analysis may be able to yield critical biomolecular data. It also demonstrates the potential for that work to be driven by African researchers.

"As a young African researcher, I'm honoured to have significantly contributed to such a high impact publication as its co-lead. But it's not lost on me that people of colour have a long journey to go before it becomes commonplace - more of us need to be leading research like this," Madupe says.

The Human Evolution Research Institute (HERI) at UCT, where Madupe is a member, actively encourages that shift. It led a programme introducing palaeoproteomic applications to a pan-African group of young researchers. Other projects are also in progress to support skills development for researchers interested in integrating the approach into their work.

"We are excited about the capacity building that has come out of this collaboration. The future of African-led palaeoanthropology research is bright," says Ackermann.

B1 RATING AWARDED TO PROFESSOR GAIN

Professor James Gain, of the Department of Computer Science, has been awarded a prestigious B1 rating by the National Research Foundation (NRF). This rating is given to researchers who are internationally recognised by their peers for the high quality and impact of their recent research outputs.

Gain's research is primarily focused on the computer science domains of computer graphics, virtual reality, human-computer interaction, and visualisation, with cross-disciplinary application. Within computer

graphics his focus is on procedural and geometric modelling as a means of empowering computer animators to create natural scenes and objects more effectively, including terrain, plant ecosystems, and weather. In the area of virtual reality his expertise is in health and wellbeing applications, with a particular focus on emotion elicitation. Similarly, with respect to visualization, he is interested in the visualization of computational science datasets, in fields such as astronomy and geomatics.

Prof James Gain

He received a Master of Science with distinction from Rohes University in 1995, before obtaining a PhD from the University of Cambridge in 2000 entitled "Enhancing Spatial Deformation for Virtual Sculpting". In that same year he started work at UCT. He has received numerous accolades and awards, including UCT's Distinguished Teacher Award in 2014 that recognised the many innovations he has introduced into his teaching, such as a cost-effective method of checking responses to multiple-choice questions in class, based on images captured on a cell phone; course gamification, in which elements of games are incorporated to encourage engagement and active learning; and automatic assessment of algorithms so that students receive immediate feedback.

As with many computer scientists, he was inspired to enter the field by early efforts at programming, initially creating his first computer game in 1984 in Basic on a ZX Spectrum and later working on rudimentary rendering of terrains. While most people associate computer graphics with its use in film visual effects and computer games, and this is certainly an important application area, it is also a field that has a multi-disciplinary impact through visualization on a broad range of scientific disciplines. It is this broad range of application areas and the underpinnings of applied mathematics and human-centric computing that has most informed Gain's research.

His future research plans include an interactive exploration of climate change through virtual reality. *"Our ultimate plan is to develop the Climate Horizon, a system for viscerally experiencing climate change that will allow non-technical users to alter climate parameters and interactively explore the consequences, including entering a virtual environment that displays through multi-sensory input at human scale the combined biosphere, hydrosphere, atmosphere, and anthroposphere for a chosen location. We envisage this as a museo-graphic installation that will assist in educating and informing participants about climate change."*

NEW B2 NRF RATING FOR THE DEPT OF COMPUTER SCIENCE

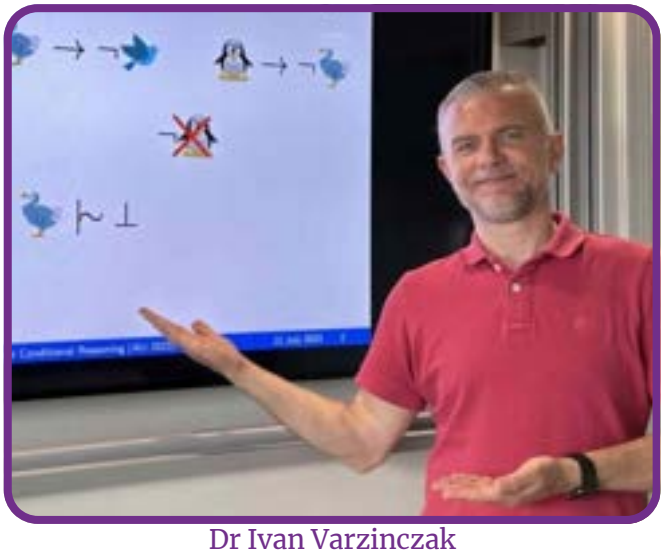
The National Research Foundation (NRF) has awarded Dr Ivan Varzinczak with a B2 rating. This rating is awarded to researchers who enjoy considerable international recognition by their peers for the high quality and impact of their recent research outputs.

His primary research area is knowledge representation and reasoning in artificial intelligence. He focuses on logic-based specification languages, the formalisation of different types of human reasoning and the

design of algorithms for their implementation and verification. He is an active member of the Artificial Intelligence Research Unit (AIRU) that provides research and thought leadership to academia, industry, government and civil society, so that they can leverage AI to improve people's lives.

Varzinczak is an Honorary Professor with the Department of Computer Science. He holds a PhD (2006) in artificial intelligence from Université Paul Sabatier, France, an MSc (2002) and a BSc (2000), both in computer science, from the Federal University of Paraná, Brazil.

Ivan was the recipient of the first Louis Couturat Logic Prize and of the first Universal Logic Prize (2018).



Dr Ivan Varzinczak

A SPLASH OF SCIENCE AND STORYTELLING: 2024 JACK ELSWORTH LECTURE

On the evening of Tuesday, 5 December 2024, the UCT Department of Chemistry transformed into a vibrant underwater world, as young minds and curious audiences of all ages gathered for the much-anticipated annual Jack Elsworth Lecture (JEL). Hosted in collaboration with the Royal Society of Chemistry (RSC), this year's production, Under the Sea, brought chemistry to life through an imaginative and immersive theatrical experience.

This beloved event continues the tradition established by the late Prof. Jack Elsworth, whose vision was to engage the public—especially children—in the wonders of chemistry through interactive lectures. The lecture theatre was packed with energy and excitement as Prof Susan Bourne started us off with a welcome on behalf of the RSC and the department before characters including King Neptune, Ursula, and a curious diver took the audience on a whimsical journey beneath the waves. Along the way, thrilling experiments and colourful performances intertwined to create an unforgettable fusion of science and storytelling. The evening ended with ice creams for everyone thanks to Prof Alan Hutton and the RSC.

The script, originally written by Ana Andrijevic, was adapted and directed by Dr Cesarina Edmonds-Smith and brought to life by a talented cast including:

- King Neptune – Mymoena Davids
- Ursula – Emma Parsons
- Minion – Chloe Netta
- The Diver – Taella Thiart
- Sitara – Sitara Hooseria
- Captain Morgan – Jarid Du Plooy
- Arthur – Dr Cesarina Edmonds-Smith

Back Row- Talente; Sophie; Thabo; and Dalielah; Middle Row- Joey; Roxanne; Taella; Jonathan; Jarid; Sitara; Mymoena; Emma and Chloe; Front Row- Laa-iqa and Cesarina

TLC 2024: AUTOMATION CAN CHANGE STUDENTS' LIVES

NEW VISIONS THAT WILL ULTIMATELY SHAPE THE FUTURE DIRECTION OF TEACHING AND LEARNING IN HIGHER EDUCATION UNDERPINNED AND GUIDED IMPORTANT DISCUSSIONS DURING THE UNIVERSITY OF CAPE TOWN'S (UCT) 13TH ANNUAL TEACHING AND LEARNING CONFERENCE.

Delivering the welcome address, UCT Vice-Chancellor Professor Mosa Moshabela commended delegates for their unrelenting commitment to teaching and learning, especially given the university's research-intensive standpoint.

"In order to protect the integrity of what we do as educators, these are the kinds of things that we need; [spaces] where we can all come together, [bring] diverse perspectives to think about curriculum change and to think about the future we want [and] how we educate," Professor Moshabela said.

Be intentional about adopting change

In a demanding and ever-changing world, Moshabela said there's a need to be agile and to adapt current teaching and learning practices. And as the top university in Africa, UCT needs to be at the vanguard of educational development. This means losing old, dated models and being intentional about adopting change and creating a culture where change will thrive. And while doing so, he said, adapting to the needs of today's students and those who will be part of the university community in the next five years and beyond is important.

What this means is starting the groundwork and setting the wheels in motion for change now – preparing bit by bit on how best to accommodate future students with teaching and learning infrastructure that is relevant and state-of-the-art. And there will be other things to consider too, like teaching infrastructure, policies, digitisation, and online teaching and learning. Importantly, these elements will need to adapt and align and for it to work, it requires cross-faculty buy-in and input from different constituencies across the university.

"We can almost be certain that the student we are going to have five years from now will be a different student than the one we have today. So, that also speaks to our curriculum. What kind of changes are we putting into our curriculum and what informs them? It's imperative that our students have the best learning experience," he said.

"If we want to be celebrated and benefit from being the top institution that we are; if we want the world to engage us on those terms, then we must surely represent that kind of best practice and be deserving of the stature that we claim to have."

Automate learning spaces

It would be remiss to talk curriculum change and how to transform learning spaces without touching on the role technology and automation play in the process. So, Professor Hussein Suleman, the dean of UCT's Faculty of Science, spent a few moments delving into the topic. His talk was titled *"Automation for Transformation in Learning Spaces"* and honed in on educational technology and computer science education.

"Underlining all of this is this thinking that this is all about intent – it's about how we use the technology and how we think about this. It's not just about importing some sort of solution from somewhere else," he said.

Professor Suleman used his talk to foreground some of his research projects like a 2010 study that explored whether students would be more open to using Vula – UCT's learner management system at the time – if it mirrored social media platforms like Facebook. He also presented snapshots of fitting work led by postgraduate students

who he described as "experimentalists". In line with his 2010 study and a few years later, one student's research highlighted which social media style is more student-centric; as well as the value of developing games to help students learn.

"Now, I'm not an experimental computer scientist. I build real systems to test ideas to see if we can actually have some kind of impact in how we design technology, and in this particular case, to support the learning process," he said.

Understanding transformation

But to undergo changes in learning, it's important to understand what transformation means, Suleman added.

"We know that transformation requires change. I want to argue that it's reaching a point of continuous change. There is no simple end goal. There's no such thing as becoming transformed," he said. *"Transformation is understanding the need for continuous change; the need to move away from a system where we have some kind of static notion that this is the norm. [But] there is no norm. It's about continuous improvement."*

He then proceeded to list several other concepts that tie in with continuous transformation. These, he said, include equality, opportunity and empowerment. And it begs several questions: *"How do you give people access to equal education using technology? And I always tell people, the most evil thing about apartheid was the denial of opportunity. So, when we think about designing systems for teaching and learning that involve technology, how do we give people opportunity? And the third thing is empowerment. We have to empower students and staff in every possible way."*

Support the teacher

To effectively transform learning spaces, the teacher must be placed in pole position.

"Supporting the teacher [in the process] can have an unbelievable effect. A lot of the time we say, we discard the teacher, and we go straight to the learner and focus on the learner entirely. I think that's wrong," Suleman said. "There's a greater chance for us to have a massive impact if we put some time into focusing on the teacher."

Prof Hussein Suleman delivers his address.

He also took a moment to provide his take on the future of automation in the classroom, what it's likely to look like and the benefits for the teacher and the learner. He said detecting artificial-intelligence-based plagiarism won't happen. However, computers will soon be able to explain different concepts and will be able to direct student learning and support the student in various ways. Within a few years, software tools will be able to carry out teachers' final-year marking and in time the machine will also be able to assemble course material with the necessary resources in line with teachers' requirements.

But what else can computers not do?

"I don't think we are going to have a machine that will give us a current view of education. I often go into my classroom and teach about something that was on the news last night and how it relates to what we are studying. We are not going to be able to do this given the way the machines are currently structured. It will give you a general or historical perspective but that's not the currency of education," he said.

"And the last thing is values-driven education, [which is] absolutely critical. We all have value systems; the institution has a value system. We can't rely on general tools to somehow put across this value system for the students."

Automation is not evil

In closing, Suleman reminded the audience that automation is not evil and despite what many think, computers are not bad.

"[Everything] is about intent and should be driven by an agenda that is about societal needs and principles. We have to know what we want and why we are doing this. Whatever your intent is, you can amplify that with the appropriate use of technology and that is what we need to be thinking about," he said.

Ultimately, automation can change the lives of students.

"The reason we do it is to improve the experience of the students [and] to think about technology as a vehicle for transformation. This is the intent that I'm bringing here. We have to think about the fact that we have this goal, which is transformation, how do we use technology for it and make sure all our students are treated equally ... and very importantly, how do we use these tools to empower the students and the teachers?" he asked.

Students in the News

CELEBRATING THE BRIGHTEST MINDS IN SCIENCE FOR THE 2024 ACADEMIC YEAR

During the Science Student Awards ceremony on Monday, 28 May 2025, nearly 110 students were awarded over 160 class and departmental awards for the 2024 academic year.

The Dean of Science, Professor Hussein Suleman, welcomed guests and students, expressing pride in the faculty's achievements.

Notable students receiving multiple awards include Andreia De Sousa, who received the Chemistry Prize for the best second-year chemistry student progressing to third year in the department, along with class awards in molecular and cell biology and statistics.

Reflecting on her achievements, De Sousa shared, *"It feels incredible to have my efforts and achievements recognised by the faculty. In a field saturated with talented and passionate individuals, it can be difficult to stand out or make a name for yourself, and so I never expected to have my achievements highlighted this way that they have been. I am both extremely grateful and overwhelmed."*

Justin Powell continued his streak of excellence at the postgraduate level, claiming the Gordon Percy Memorial Award for best

Assoc Prof Will Horowitz & Prof Hussein Suleman

chemistry honours student, the Alistar Stephen Memorial Award for his outstanding honours project, and the Best Poster Award for his research presentation.

Powell credits his work ethic and hopes to inspire future scientists, saying, *"My mother always told me: 'The difference between potential and reality is work'. While I don't work hard for recognition, being acknowledged as a top achiever in the chemistry department truly makes the hours feel worth it. I hope to inspire the next generation of chemists and scientists."*

Associate Professor Will Horowitz accepted the Joseph Arenow Prize and the PhD Medal awarded for the faculty's best PhD thesis on behalf of Blessed Arthur Ngwenya, who was unable to attend the event.

Ngwenya's PhD thesis titled The Casimir Effect in Non-Abelian Gauge Theories on the Lattice is a study within the field of quantum chromodynamics. It explains the measured change in the zero-point energy of a

quantum vacuum due to fluctuations in vacuum fields when physical objects of different geometries are placed in the vacuum of three- and four-dimensional non-abelian gauge theories with varying degrees of freedom. He conducts numerical studies of the zero-point energy shifts through the measured Casimir potential on the geometries of static parallel wires and plates, as well as the non-trivial geometries of symmetrical and asymmetrical tubes and boxes. He demonstrates that the pressure is negative for all the geometries considered and that the pressure for the symmetrical tube is contrary to the abelian non-interacting scalar field theory, which measures a positive pressure. He proposes various techniques to model the energy requirements for creating the different geometries in a quantum vacuum. He shows that increasing the temperature from a confined to a deconfined phase does not alter the measured pressure.

On receiving the faculty's highest honour, Ngwenya expressed, *"It's a deep honour to receive the PhD Medal and the Joseph Arenow Prize. This recognition is a tribute not only to years of rigorous research but also to the support of my mentors, peers, and community who helped shape this journey. I hope this serves as encouragement to young scientists, especially from underprivileged backgrounds, that they too can contribute meaningfully to the frontier of knowledge."*

UCT STUDENT PART OF SUSTAINATHON WINNING TEAM

Christopher Blignaut, a UCT computer science student is part of the team that took top honours in the 2024 TCS (Tata Consultancy Services) Sustainathon Challenge, a global competition that challenges youth to leverage technology for sustainable solutions.

Currently working towards his final/honours year of a Bachelor of Business Science, Christopher was busy with his third-year examinations when he came across the Sustainathon Challenge through an email from Careers Services. As most of his fellow students were hitting the books, he reached out to two of his high school friends, Talha Niazi, a 4th-year Medical student at the University of the Witwatersrand and Ethan Tilney, a final-year Electrical Engineering student at the Nelson Mandela University.

"We believed that our diverse academic backgrounds and perspectives — shaped by different universities and social settings — would be a great advantage, so after a late night call of catching up, brainstorming and hyping ourselves up, we decided to enter the competition under the team name Nexura," said Christopher.

Leveraging his medical background, Talha identified the pressing issue of excessive medical waste in South Africa, particularly due to cold chain management (CCM) failures. The team then came up with an energy-efficient and portable cooling solution for storing vaccines in rural areas of Africa, that often lack electricity and reliable cellular connections. Users could control the temperature of the cooling devices via a local network, making sure that vaccines are kept at the right temperature. Notably, approximately 43% of the continent's population lacks access to electricity.

Since then, Nexura has gone through two iterations of the prototype and learned that there is still a long way to go. They have designed the third iteration and are waiting for the competition winnings to come through so that they can begin production.

Nexura presented their solution to a global panel of judges earning their first-place prize which consists of R35,000 and an opportunity for a three-month internship and training programme at TCS in India.

Reflecting on their achievement, Christopher stated *"What started as just an idea for a competition has evolved into something we believe can genuinely make a difference. While academics remain our priority, we plan to continue iterating on our product and aim to have a finalized version by the end of the year,"*.

The TCS Sustainathon South Africa 2024, held under the theme "Affordable and Clean Energy," attracted over 180 registrations from more than 40 universities. The competition, in collaboration with partners such as Pick n Pay, Geekulcha, University of Witwatersrand, SkillsLab, and the Centre for Student Development, aims to inspire youth to develop innovative solutions addressing energy challenges in Africa.

L'ORÉAL-UNESCO AWARDS RECOGNISE YOUNG UCT RESEARCHERS TACKLING AFRICA'S GRAND CHALLENGES

FOUR UNIVERSITY OF CAPE TOWN (UCT) RESEARCHERS – THREE DOCTORAL STUDENTS AND A POSTDOCTORAL FELLOW – ARE AMONG 30 OUTSTANDING SCIENTISTS RECOGNISED IN THE FONDATION L'ORÉAL-UNESCO FOR WOMEN IN SCIENCE SUB-SAHARAN AFRICA YOUNG TALENTS AWARD PROGRAMME. THIS ACCOLADE IS A HAT TIP TO THEIR PIONEERING RESEARCH THAT IS SHAPING AFRICA'S FUTURE ACROSS VARIOUS SCIENTIFIC DISCIPLINES.

A total of 25 PhD and five postdoctoral students from several African countries were recently selected by a jury of esteemed African scientific experts. They were awarded for their innovative work in tackling major scientific challenges including food security, public health and climate change.

Sambatriniaina Rajohnson, Hilja Eelu, Dr Irene Nandutu and Mbithe Nzomo at the Fondation L'Oréal-UNESCO for the Women in Science Sub-Saharan Africa Young Talents Award

Recognised from a pool of nearly 800 applicants, the awardees receive financial support, leadership training and skills development in communication and negotiation, including tools to navigate gender biases in the scientific field. PhD candidates receive a research grant worth €10 000, while postdoctoral researchers are awarded €15 000 to advance their work.

For over 15 years, the Fondation L'Oréal and UNESCO has worked together to platform the scientific excellence of researchers throughout the continent and encourage women to pursue careers in science.

Meet UCT's awardees

Hilja Eelu, Department of Statistical Sciences

Inspired by her mother's work in science, Eelu, a PhD mathematics student in the Department of Statistical Sciences, is using mathematical modelling to improve malaria elimination strategies in Namibia.

Her research projects future malaria cases and evaluates the cost-effectiveness of various interventions. She is currently working with the National Vector Borne Disease Control Programme in Namibia to help optimise available resources to reduce malaria cases.

"I integrate malaria, biology, health systems and stakeholder expertise to provide robust, viable recommendations for prevention and treatment programmes and decision-making," Eelu explained.

As a woman in science, Eelu described her success as a testament to the abilities of women and girls to pursue and achieve any goal, against all odds. *"In general, women may face a major challenge in maintaining a long-term professional career in science as the primary caregivers,"* she said.

Dr Irene Nandutu, Department of Computer Science

Nandutu, a postdoctoral researcher in computer and information sciences, is harnessing AI to investigate child brain development. She is affiliated with the Artificial Intelligence Research Unit (AIRU) and the Neuroscience Institute (NI). She is developing formal concept ontology models – a way of organising medical knowledge – to help neuroscientists better understand conditions affecting brain development in children.

"I use ontologies to acquire and organise complex knowledge and state-of-the-art machine learning techniques to design preliminary models. This will help us determine the extent to which these techniques can help neuroscientists identify and better understand the factors influencing early childhood brain development, including infections, prenatal exposure to substances, the environment and brain structure," she said.

Her research aims to predict the risk of children developing particular neurodevelopmental conditions and neurological disorders, ultimately improving early diagnosis and treatment strategies.

Mbithe Nzomo, Department of Computer Science

Wearable health devices have revolutionised healthcare. Nzomo, a PhD candidate in computer science, is using AI to analyse such data and enhance early disease detection and prediction. Her research focuses on predicting the likelihood of developing serious conditions, such as atrial fibrillation (AF) – a heart rhythm disorder that increases the risk of stroke and heart failure.

"My approach combines pattern detection in health data with AI-driven knowledge models to help predict and mitigate conditions such as atrial fibrillation before they become life-threatening," Nzomo said.

Her automated reasoning system can be used to assess risk factors and propose potential preventative measures which will ultimately improve healthcare outcomes through proactive treatment strategies.

Sambatriniaina Rajohnson, Department of Astronomy

Since childhood, Rajohnson has been fascinated by science fiction, discovery and space exploration adventure films, particularly those that feature the discovery of ancient relics and new planets. Now, as an astronomer, she's working to uncover hidden galaxies behind the Milky Way.

Using South Africa's MeerKAT radio telescope situated 90km outside the small Northern Cape town of Carnavon, Rajohnson is mapping the Vela Supercluster, a massive but previously obscured cosmic structure.

"By detecting hydrogen emissions and analysing the radio waves emitted by the gas, we can map these hidden galaxies and their possible impact on the Universe's expansion," she said.

As a woman in astronomy, Rajohnson has overcome limited access to resources and equipment by collaborating with experts and finding creative solutions. *"These challenges have made me stronger, more adaptable and willing to step outside my comfort zone,"* she said.

In Sub-Saharan Africa, policy shifts, cultural changes and gender initiatives are helping turn the tide on underrepresentation. While the number of women in science is growing, UNESCO estimates that only 31.5% of researchers in Sub-Saharan Africa are women. This highlights the importance of investing in African women scientists, whose contributions are vital in addressing local and global challenges.

SSC OUTREACH INITIATIVE: INSPIRING FUTURE SCIENTISTS

As part of its ongoing commitment to community outreach and educational transformation, the Science Students' Council had the privilege of engaging with learners through the Tomorrow Trust's Saturday School Programme at Bonsmansdam High School. This meaningful initiative represents the SSC's dedication to extending their impact beyond the university campus and into the broader community where they can make a lasting difference in young people's lives.

The interactive session was carefully designed to inspire, educate, and equip learners with valuable insights into university life and the exciting possibilities that await them in scientific fields. SSC members shared their personal journeys through higher education, offering authentic perspectives on what it means to pursue science at university level and the opportunities that such studies can unlock.

Central to the discussion was the journey of studying science, with council members breaking down common misconceptions and addressing the challenges that many learners face when considering scientific careers. They emphasized that success in science is not solely dependent on natural talent, but rather on curiosity, dedication, and the willingness

to embrace both failures and successes as learning opportunities. The students learned about the diverse career paths available to science graduates, from research and academia to industry applications and entrepreneurship.

University life was demystified through detailed discussions about campus culture, academic expectations, support systems, and the vibrant community that awaits new students. The SSC members addressed practical concerns about financial aid, accommodation, and academic preparation, ensuring that learners left with concrete information about how to navigate the transition to higher education.

This outreach initiative exemplifies a broader mission to create positive change beyond the university walls, recognizing that today's investment in young minds contributes directly to building tomorrow's generation of innovative scientists, researchers, and leaders.

SCIENCE STUDENTS' COUNCIL GAMES NIGHT: A WELL-DESERVED BREAK FROM STUDIES

The Science Students' Council (SSC) organized a vibrant games night that brought together students from across the faculty for an evening of fun, laughter, and friendly competition. The event provided a much-needed respite from the academic pressures of university life, creating an atmosphere where students could unwind and connect with their peers in a relaxed setting.

Recognizing that academic success requires balance, the SSC designed this event to offer students an opportunity to step away from textbooks, assignments, and examination preparation. The evening served as a reminder that maintaining mental well-being and social connections are essential components of a holistic university experience.

The success of the games night reinforced the importance of social events in the academic calendar, providing students with memorable experiences that contribute to their overall university journey and help build the strong community spirit that defines the Science Faculty.

SSC CAREER DEVELOPMENT WORKSHOP WITH DELOITTE

The Science Students' Council successfully hosted a comprehensive career development workshop in partnership with Deloitte, providing science students with invaluable insights into professional readiness and workplace success. The interactive session drew an enthusiastic crowd of students eager to enhance their career prospects and develop essential professional skills.

The Deloitte team delivered practical guidance across three key areas that are crucial for student transition into the professional world. Their expertise in career development proved instrumental in helping students understand what employers expect from graduates entering the competitive job market.

Interview skills formed a central component of the workshop, with participants learning effective techniques for presenting themselves professionally and confidently. The session covered everything from preparation strategies and common interview questions to body language and follow-up protocols.

Career readiness was thoroughly addressed through discussions about essential workplace competencies, professional networking, and personal branding. The Deloitte representatives shared insights about industry trends, skill requirements across different sectors, and strategies for building a compelling professional profile that stands out to potential employers.

Work-life balance, often overlooked in career preparation, received significant attention during the workshop. The team emphasized the importance of maintaining personal well-being while pursuing professional excellence, sharing practical strategies for managing stress, setting boundaries, and creating sustainable work habits that promote long-term career success.

The workshop concluded with an interactive Q&A session where students could address specific concerns about their career paths and receive tailored advice. This collaboration between the SSC and Deloitte demonstrates the council's commitment to providing students with resources that extend beyond academic support, preparing them for successful transitions into their chosen careers.

UCT POSTDOC RESEARCH SHOWCASE

The annual event, which brings together postdoctoral scholars from various fields, focused on the theme, "Research Driving Innovation, Transformation, & Sustainability for Africa's Future." Representing the Department of oceanography, Minto and Faith's research presentations aligned perfectly with this theme, highlighting the crucial role of oceanographic studies in promoting sustainable solutions for the continent.

Faith's presentation, titled "Seasonal Variability of Southern Ocean Sea Spray Aerosols," examined the impact of seasonal changes on aerosol levels in the Southern Ocean, shedding light on their potential effects on regional climate patterns.

Minto's presentation, titled "Effect of Stratospheric Aerosol Injection on Marine Heatwave Events off the Coast of South Africa," explored how geoengineering techniques, particularly stratospheric aerosol injection, could influence marine heatwaves along the South African coast.

Both presentations were met with enthusiasm and interest from fellow researchers, faculty, and industry experts in attendance. The showcase provided an exciting opportunity for Minto and Faith to

engage with leading professionals, share their insights, and contribute to the ongoing dialogue on sustainability and innovation in Africa's future.

THREE MINUTES TO IMPRESS AT POSTGRADUATE DAY

At the Faculty of Science Postgraduate Day, students from multiple departments transformed their research findings into captivating three-minute lightning presentations, followed by an engaging Q&A session alongside vibrant academic posters that brought their discoveries to life. This annual event is organized by a subcommittee within the broader Science Faculty Research Committee. The purpose of the event is to showcase the exceptional postgraduate talent within the faculty and to foster opportunities for collaboration.

The Dean of the Faculty of Science, Professor Hussein Suleman, offered insights into the motivations behind pursuing postgraduate studies. He recalled his own experience as a PhD student, spending significant time in a coffee shop with other PhD peers from different disciplines. They discussed global challenges and potential solutions, which he deemed one of the most valuable aspects of his postgraduate life. He highlighted how the Faculty of Science Postgraduate Day provides an opportunity for students to deeply engage with their own disciplines while also learning from others, fostering relationships that last a lifetime and engaging with peers to create positive outcomes.

The six students who presented were all recipients of a fellowship from the faculty, awarded on merit to the most outstanding applicants. This programme is highly regarded in the faculty, and there are plans to evaluate its current format to potentially expand the number of recipients in the future.

The following students presented their research:

- Bedone Mugabe: Metallurgy at Great Zimbabwe: Rethinking Copper-bronze Provenance and Circulation in Pre-Colonial Southern Africa (cal 1000-1650CE)
- Williams Benjamin Darko: Cyperaceae in Africa - Biogeography, Evolution and Taxonomic revision with a focus on Ficinia Schrad.
- Caroline Robertson: Taxonomic rearrangement of the genera Planomonospora and Planobispora and proposal of Thiemannella venezuelensis gen. nov. comb. nov.
- Hana Petersen: Understanding observed climate change impacts on plant communities in Mediterranean-type ecosystems
- Nirvashi D. Autar: Redox-mediated Interactions of Dansyl-imidazolium Diruthenium Metallodrugs Promote their Anti-cancer Properties in Breast Cancer
- Victoria Chama: Designing Defeasible Ontologies

Addressing the students, Deputy Dean for Postgraduate Matters, Associate Professor Deena Pillay, said, *"it is a great privilege to be here with you today. The postgraduate portfolio holds significant meaning for me, and I want to acknowledge several of you whom I had the pleasure of teaching during your undergraduate studies. Congratulations on your academic excellence in receiving these fellowships."*

UCT CHEMISTRY HONOURS 2024: RESEARCH, RECOGNITION, AND CELEBRATION

The Department of Chemistry celebrated the achievements of the 2024 Honours class with a poster presentation and year-end function held on Friday, 29 November in the Chemistry Boardroom. The event marked the culmination of a rigorous and rewarding year for the Honours cohort, as students presented the outcomes of their research projects to staff and peers.

The poster session followed a day of oral presentations on Thursday, 28 November, where each student had the opportunity to showcase their project findings and scientific communication skills.

Two students stood out for their exceptional performance were Vuyolwethu Polson was awarded Best Oral Presentation and Justin Powell received the awards for Best Poster Presentation and Overall Honours Project. He was also recognised as one of the top-performing Honours students in Chemistry, receiving the Percy Gordon Memorial Award and earning a nomination for the prestigious SACI James Moir Medal.

The Department congratulates all Honours students for their outstanding presentations and successful completion of the programme. Their work reflects the depth of talent and dedication within the student body.

A special thank you is extended to Ms Deirdre Brooks for coordinating the décor and catering for the celebratory event, which added a festive touch to the occasion. Appreciation is also due to Dr Siya Ngubane, the Honours course convenor, for his leadership and guidance throughout the year.

The 2024 Honours presentations not only celebrated academic excellence but also reinforced the Department's commitment to fostering the next generation of chemists through rigorous training, mentorship, and support.

Honours Class of 2024 with the Honours course convenor: Dr Siya Ngubane. From left to right: Malikah; Tessa; Danile; Thabo; Sitara; CJ; Sesethu; Talente; Vuyo; Enso; Chloe and Justin

Staff News

WELCOME TO THE NEW STAFF

THE FACULTY OF SCIENCE WELCOMED THE FOLLOWING NEW STAFF MEMBERS DURING OCTOBER 2024 - MAY 2025

ACDI:
- Dr Cherie Janine Forbes - Research Officer
- Dr Farai Kapfudzaruwa - Deputy Director: Team Science
- Dr Nicholas Philip Simpson - Chief Research officer

ARCHAEOLOGY:
- Assoc Prof Amanda Beth Esterhuysen - Associate Professor

ASTRONOMY:
- Mrs Roslyn Georgina - Administrative Officer
- Prof Daniel Joseph Pisano - SARChI Chr: Extragalactic Multi-Wavelength

BIOLOGICAL SCIENCES:
- Dr Sally Dorothy Hofmeyr - Administrative Assistant

BIOGRIP:
- Ms Shaakirah Adams - Data Manager

CHEMISTRY:
- Mr Stephen George De Doncker - NMR Operator
- Dr Nabanita Chatterjee - Junior Research Fellow
- Mrs Noluthando Ngqanya - Senior Laboratory Assistant
- Mr Thobani Mthokozisi Zulu - Laboratory Assistant

COMPUTER SCIENCE:
- Ms Paige Kristan Buxey - Senior Secretary
- Ms Krupa Prag - Lecturer

ENVIRONMENTAL & GEOGRAPHICAL SCIENCE:
- Dr Willem Stefaan Conradie - Lecturer
- Ms Kolosa Ntombini - Assistant Lecturer

GEOLOGICAL SCIENCES:
- Ms Ramolokwane Mapaseke Mashego - Scientific Officer
- Mr Joshua Van Blerk - Scientific Officer

FACULTY OF SCIENCE - FINANCE:
- Ms Kesolofetse Kehiloe - Faculty Stores & Waste Coordinator
- Ms Shihaam Brown - Senior Finance Officer

H3D:
- Dr Dirk Antonie Lamprecht - Chief Investigator
- Ms Bokamoso Sebati - Senior Research Scientist
- Mrs Raygaana Jacobs - Senior Research Scientist
- Mr Mbongeni Exelent Magagula - Laboratory Assistant
- Dr Mwila Mulubwa - Investigator

MATHEMATICS & APPLIED MATHEMATICS:
- Dr Malcolm Thomas Hillebrand - Lecturer
- Dr Hendrik Jacobus Rust Van Zyl - Lecturer

MOLECULAR AND CELL BIOLOGY:
- Dr Alexis Joanna Bick - Junior Research Fellow
- Dr Johnson Mosoko Moliki - Junior Research Fellow

PHYSICS:
- Dr Kevin Nicholas Barends - Lecturer
- Mr Khwezi Jiza - Senior Laboratory Assistant

STATISTICAL SCIENCES:

• Ms Nomfundo Sinethemba Hlongwa - Administrative Assistant
• Assoc Prof Allan Ernest - Senior Lecturer
• Ms Nontobeko Tandiswa Nasiphi Ntshongwana - Administrative Assistant
• Dr Vernon Visser - Research Officer

STAFF FAREWELLS & RETIRING STAFF

WE SAY GOODBYE TO STAFF RETIRING FROM THE FACULTY OF SCIENCE

CHEMISTRY:

• Emer Assoc Prof Neil Ravenscroft
• Dr Sarah Wilson
• Mr Kenneth Mncedisi Sigam

ENVIRONMENTAL & GEOGRAPHICAL SCIENCE:

• Prof Sophie Oldfield

MOLECULAR AND CELL BIOLOGY:

• Mrs Annastine Lorna Aranjo

STATISTICAL SCIENCES:

• Prof Francesca Little
• Dr Juwa Nyirenda
• Assoc Prof Lee-Anne Scott

THE FACULTY SAID GOODBYE TO THE FOLLOWING STAFF:

BIOLOGICAL SCIENCES:

• Dr Mageshnee Mayshree
• Mrs Johanna Mariana Lot

CHEMISTRY:

• Ms Martina Ntombizine Mayiya

COMPUTER SCIENCE:

• Assoc Prof Catharina Maria Keet

H3D:

• Dr Rudy Edgar Cozett
• Mr Tinavhuyo Evans Matundu
• Ms Jessica Akester

MATHEMATICS & APPLIED MATHEMATICS:

• Dr Francesco Russo

MOLECULAR AND CELL BIOLOGY:

• Ms Ingrid Jacobs-Hoffman

PHYSICS:

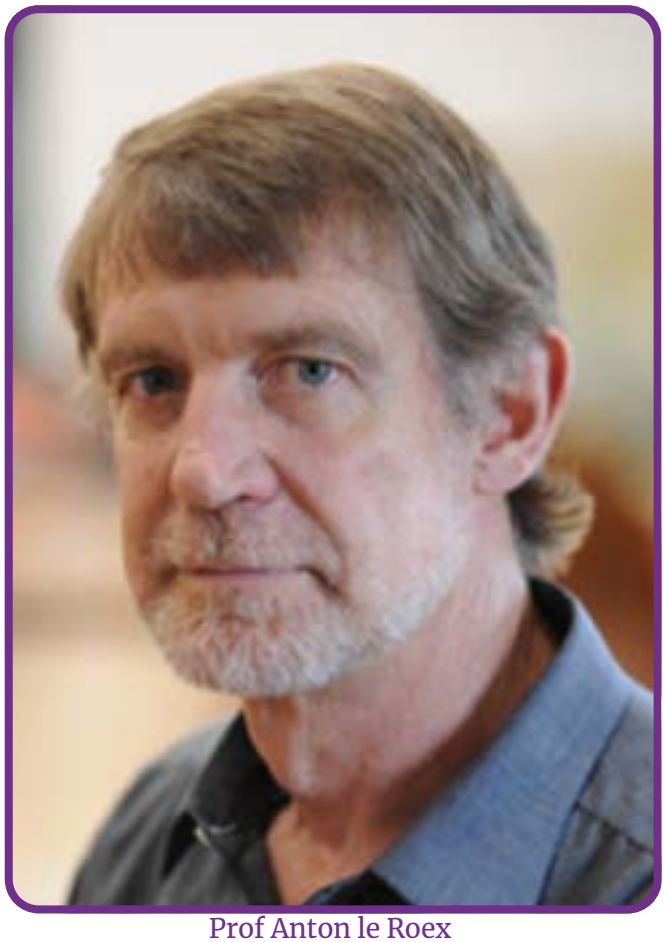
• Dr Ntombizikhona Beaulah Ndabeni

STATISTICAL SCIENCES:

• Dr Wessel Christiaan Oosthuizen
• Mrs Deslynne Davids

IN MEMORIAM

PROFESSOR ANTON LE ROEX (1953-2025)



Prof Anton le Roex

THE UNIVERSITY OF CAPE TOWN COMMUNITY MOURNS THE PASSING OF RETIRED PROFESSOR ANTON LE ROEX, WHO DIED ON THURSDAY, 9 JANUARY, AFTER A LONG BATTLE WITH CANCER.

Professor le Roex spent more than three decades in his academic home – the Faculty of Science – and was based in the Department of Mineralogy and Geology, which was later renamed the Department of Geological Sciences. He served as the dean of the faculty from 2011 to 2017. During his tenure, he established a faculty research review, which involved several local and international scholars, who were tasked with providing input on how best to leverage UCT's strengths and geographical advantage to make better use of its resources to ultimately maximise the university's impact and profile.

As the inaugural head of the Department of Geological Sciences, he spent 15 years at the helm and served the faculty in other capacities too, which included deputy dean. In addition to his teaching and research activities, le Roex held numerous other administrative posts. He was a member of Senate, a faculty student advisor and was elected to several science faculty standing committees.

Le Roex was an acclaimed scientist in the petrology and geochemistry of igneous rocks from the oceans. He participated in many research cruises to the Atlantic and Indian oceans and continents. He authored over 100 research papers and chapters in scientific journals and other publications. He also conducted several seminal studies of rocks from the Mid-Atlantic, Southwest Indian and American-Antarctic mid-ocean ridges, as well as still-authoritative studies of the petrology and geochemistry of volcanic rocks from the islands of Tristan da Cunha, Gough and Marion and Prince Edward. He retired from UCT in 2019.

His academic legacy lives on in the many honours, master's and PhD students, as well as postdoctoral fellows whom he mentored over the years and who have now gone on to become prominent researchers in the field both locally and internationally. His colleagues have described him as a highly capable teacher with a legendary work ethic and dedication to UCT.

Le Roex is survived by his wife, Sue; children, grandchildren and many friends and colleagues at this university.

PROFESSOR JOHN HAROLD WEBB (1953-2025)

Emeritus Prof John Harold Webb

It is with profound sadness that we inform you of the passing of our colleague, John Webb (83), on Wednesday, 14 May 2025. John was an Emeritus Professor in the Department of Mathematics and Applied Mathematics.

John Harold Webb was born in Cape Town. He attended Wynberg Boys' High School and then UCT, where he got a BSc in 1961 and BSc(Hons) in Mathematics in 1962. In 1966 he was awarded a PhD by the University of Cambridge for the thesis Sequential Convergence in Locally Convex Spaces. He was appointed as a Lecturer in the Department of Mathematics at UCT in 1966 and was promoted to Senior Lecturer in 1970, Associate Professor in 1975, and Professor in 1994. He retired from MAM at the end of 2007 after 41 years of teaching. In 1985 he was awarded the university's Distinguished Teacher Award.

John's formal mathematical background was in functional analysis. It was in mathematics education and outreach, however, that he had an enormous impact. He established the magazine Mathematical Digest, which was distributed to high schools across South Africa from 1971 until the final issue, number 177, was published in 2014. He was involved with the UCT Mathematics Competition, which annually brings thousands of bright high schoolers to UCT's campus, from its inception in 1977. He served as its Director from 1988 to 2020. In 1990, he organized the first Interprovincial Mathematics Olympiad in South Africa. He served on the organizing committee of the South African Mathematics Olympiad. He was for many years the Chair of the South African Committee for the International Mathematical Olympiad (IMO). He served as Secretary of the IMO Advisory Board from 2000 until 2012. He was the Director of IMO2014, held at UCT and the only time the IMO has been held in Africa. He convened the 10th Pan African Mathematics Olympiad in Cape Town in 2000.

His work gained him significant recognition in South Africa and internationally. In 1992, he was the recipient of the Paul Erdös National Award from the World Federation of National Mathematics Competitions. He received a Claude Harris Leon Championship in Mathematics Teaching Award in 1997, the Award for the Advancement of Mathematics from the South African Mathematical Society in 2002, was a Finalist in the South African National Science and Technology Forum Awards in 2004 and received the South African Mathematics Foundation Award in 2015.

John is survived by his wife, Anthea, three children, Ian, Lindy, and Jonathan, and five grandchildren.






UCT Faculty of Science
Chris Hani Building, Level 6
University Avenue North, Upper Campus
Rondebosch, 7700