

28-29 OCT
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SPOTLIGHT ON
**School of Agriculture
&
Science**

Postgraduate research within the School of Agriculture and Science continues to drive innovation and address societal challenges. Research spans food security, sustainable agriculture, materials science, quantum physics, environmental chemistry, biodiversity conservation, microbial biotechnology, data science, machine learning and artificial intelligence. Building on a sixty-year legacy of influencing continental agricultural policy, the School remains committed to advancing scientific knowledge and sustainable development.



28 OCT

ORAL PRESENTATIONS

09H05 -15H30



Professor Ademola Olaniran
Dean & Head of School

29 OCT

FLASH PRESENTATIONS

09H00 -12H30

OPENING PLENARY: KEYNOTE SPEAKER



Professor Frank Matose
*Professor and Environmental Sociologist,
University of Cape Town*

Frank Matose is professor and environmental sociologist in the Department of Sociology, University of Cape Town, South Africa.

His research focuses on the political ecology of conservation, collaborative forest management, and commons governance in Africa. His current research project is titled Resilient and Equitable Nature-based Pathways in Southern African Rangelands (REPAiR).

SCIENCE WITH JAZZ

Full Professor in the Discipline of Chemical Engineering at UKZN, where he also received his BSc Eng, MSc Eng and PhD degrees. He joined the Institution in 2013 as a lecturer and ascended to the position of Full Professor in 2024.

Lokhat was the Academic Leader for Chemical Engineering from 2019 to 2026 and is currently the uMngeni-uThukela Water Chair in Water Resources Research and Innovation, and the African Rainbow Minerals Chair in Sustainable Engineering and Process Intensification.



Professor David Lokhat
*Professor in Chemical Engineering,
University of KwaZulu-Natal*



Lu Dlamini

*Vocalist, Composer and traditional
instrumentalist*

Durban-based vocalist, composer and a traditional instrumentalist. Dlamini, who hails from the Natal South Coast and comes from a musical family, is known for her distinctive style, as showcased in her previous album, “Ulimilam.” In her reflections, Dlamini draws on South Africa’s complex history, noting the contrast between the hopeful songs of the past and the current challenges faced by many.

GALA DINNER KEYNOTE SPEAKER



Dr Kiara Worth
Storyteller and Photographer

Dr Kiara Worth is a storyteller and photographer based in Cape Town, South Africa, known for her work in sustainability activism and international negotiations. She has a background in political science and agriculture, and she covers topics such as climate change, biodiversity, and sustainable development in her photography and writing.

Kiara has been featured in major publications like the New York Times and The Guardian, and she has worked as a photo-journalist in Papua New Guinea, using her stories to communicate sustainability issues.

POSTGRADUATE RESEARCH PROJECTS



What happens when the needs of wildlife and rural communities meet at the boundaries of protected areas?



Mr Sakhile Nsukwini
PhD Candidate

Mr Sakhile Nsukini will present on his research exploring the experiences of communities living alongside two very different conservation landscapes in KwaZulu-Natal: the state-managed Hluhluwe-iMfolozi Park and the community-owned Somkhanda Game Reserve. Drawing on research with 300 households, as well as interviews, focus groups and field observations, he reveals how wildlife damage, competition for water and grazing, poverty and access to conservation benefits shape relationships between communities and protected areas. By comparing the two sites, his research offers valuable insights into how conservation can better accommodate livestock production, local livelihoods and community knowledge – and what is needed to make coexistence between people and wildlife more sustainable and equitable.

Could the way calves are fed in their earliest weeks improve their growth and feed efficiency?

Ms Kireszni Naiker's study explores this question through two trials, each lasting eight weeks and involving 30 female Holstein Friesian calves on a commercial dairy farm in KwaZulu Natal. The first compared whole milk feeding with whole milk supplemented with milk replacer for either 28 or 56 days. The second examined starter feeds differing in physical form and protein content. Calves supplemented with milk replacer for 56 days achieved the highest final body weights and the best overall feed conversion. Changes in starter protein content and physical form did not significantly affect growth or feed intake, although pelleted starters showed potential for improved feed utilisation, warranting further research. The findings highlight the importance of liquid feeding strategies in supporting calf growth and feed efficiency before weaning.



Ms Kireszni Naiker
PhD Candidate



Ms Zenande Ngubo
MSc Candidate

Where are invasive bird species spreading across KwaZulu-Natal – and what can a decade of observations tell us?

Ms Zenande Ngubo's study tracks three familiar but invasive species – the Common Myna, Common Starling and Rose-ringed Parakeet – using more than ten years of citizen-science records from BirdLasser. By combining these observations with spatial analysis, she reveals that the three species have markedly different distributions and habitat preferences across the province. The Common Myna was the most widespread, particularly around residential areas, while Common Starlings were concentrated around Pietermaritzburg and natural grasslands. Rose-ringed Parakeets, meanwhile, were largely associated with Durban and surrounding urban areas.

Can artificial intelligence help us understand complex fluid flow without replacing the mathematics behind it?

Mr Kizito Nwajeri's research brings together advanced numerical mathematics, statistical modelling and artificial intelligence to study how heat and mass are transported in a rotating viscoelastic fluid. The work first develops and verifies a high-accuracy spectral solution of the governing equations, then uses response-surface methods and artificial neural networks to interpret and predict the resulting transport behaviour. The study shows that rotation strongly affects transverse fluid motion, while thermal and mass diffusion parameters play leading roles in heat and species transfer. By separating high-fidelity numerical modelling from machine-learning prediction, the research demonstrates how AI can complement, rather than replace, rigorous mathematical modelling.



Mr Kizito Nwajeri
PhD Candidate

Could locally focused AI make STEM education more accessible in South African classrooms?



Mr Cebolenkosi Msweli
PhD Candidate

Mr Cebolenkosi Msweli's study explores whether a small, African-centric language model can effectively support isiZulu-English code-switched STEM learning on modest, school-level hardware. The study compares Lelapa AI's InkubaLM-0.4B with Meta's larger Llama 3.2 3B model, both fine-tuned under the same low-resource conditions, simulating the limited computing power available in many South African public-school laboratories. Using 1,200 test cycles and ZulSTEM, a purpose-built, CAPS-aligned isiZulu-English dataset covering Grade 4–6 Mathematics and Natural Sciences and Technology, the research examines how accurately the models handle bilingual scientific reasoning within simulated 4GB and 8GB GPU memory environments. The study is particularly interested in whether a smaller, African-focused model can maintain semantic consistency and reduce errors when switching between languages.



Ms Thandokuhle Sithole
MSc Candidate

Could tiny vesicles derived from cannabis plants offer a new approach to wound healing?

Ms Thandokuhle Sithole's research explores the potential of cannabis-derived extracellular vesicles (CDEVs) – microscopic, membrane-bound particles that can transport biologically active molecules between cells – as a possible new tool for addressing chronic and non-healing wounds. She successfully isolated and characterised these nanoscale vesicles, finding that they contained protein cargo as well as several bioactive cannabinoids, including CBG, CBC and THCV. Their distinctive structure and composition suggest that CDEVs could potentially act as naturally occurring nanocarriers, delivering beneficial plant compounds to target tissues.

What happens to potentially harmful chemicals when wastewater is treated – and could they still be making their way into our water systems?

Ms Numeerah Ally's research focuses on contaminants of emerging concern (CECs), a diverse group of substances, including pharmaceuticals, personal care products, pesticides, stimulants, and hormones, that are increasingly detected at trace levels in water. The study developed a sensitive gas chromatography-mass spectrometry (GC-MS) method capable of simultaneously detecting 12 different CECs in wastewater. By optimising a chemical preparation step known as silylation, Ally improved the separation and detection of these compounds across a broad concentration range, achieving strong analytical performance.



Ms Numeerah Ally
PhD Candidate

What can a river tell us about the spread of antibiotic resistance?



Mr Nkosingathi Ndlazi
PhD Candidate

Mr Nkosingathi Ndlazi's research investigates the Msunduzi River in Pietermaritzburg as a potential environmental reservoir and pathway for antibiotic-resistant bacteria, bringing together human, animal and environmental health through a One Health approach. The study involves seasonal sampling at three locations along the river using a solar-powered Dead-End Ultrafiltration (DEUF) system to concentrate large volumes of water, combined with advanced laboratory techniques to detect and isolate WHO-priority antibiotic-resistant ESKAPE pathogens, including drug-resistant *E. coli* and *Enterococcus* spp. Early findings have already revealed multidrug-resistant bacteria in the river, including extended-spectrum beta-lactamase (ESBL)-producing *E. coli* and vancomycin-resistant *Enterococcus* spp. The study continues to investigate the distribution of these bacteria, the resistance mechanisms they carry, and how they may be disseminated through the river system.



Mr Sifiso Nxumalo

PhD Candidate

Could engineered nanoparticles help us understand – and potentially improve – crop growth?

Mr Sifiso Nxumalo explores how modifying magnesium ferrite nanoparticles with nickel affects their physical and magnetic properties and what this means for their application to spinach seedlings. He synthesised and carefully characterised the nanoparticles using a range of advanced techniques, including X-ray diffraction, spectroscopy and high-resolution electron microscopy, while coating some of the materials with biocompatible chitosan to alter their properties.

The research then moved from the laboratory to the living plant, testing how magnesium ferrite, nickel ferrite and a nickel-magnesium ferrite formulation affected the early growth of spinach. The different treatments produced noticeably different responses, with the mixed nickel-magnesium formulation showing an intermediate effect and evidence of improved growth characteristics compared with the nickel ferrite treatment.



SCHOOL OF AGRICULTURE & SCIENCE



HIGHLIGHT VIDEO



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