

UNIVERSITY OF THE FREE STATE

RESEARCH REVIEW

2022 - 2024

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UNIVERSITY OF THE **FREE STATE**
UNIVERSITEIT VAN DIE **VRYSTAAT**
YUNIVESITHI YA **FREISTATA**

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FOREWORD

Prof Hester C. Klopper ‖ Vice-Chancellor and Principal

We live in an era of polycrisis and compounding complexity. Climate change and disruption, the aftermath of the pandemic, rising inequality, geopolitical instability, food insecurity, and the rapid transformation of knowledge itself are interconnected forces that are reshaping the world our graduates will inhabit, the communities our research must serve, and the very purpose that universities fulfil. At the University of the Free State (UFS), we have chosen to meet this moment not with uncertainty and anxiety, but with intention and purpose. This Research Review, covering the period 2022 to 2024, is a testament to that purpose.

The pages that follow offer compelling evidence of what purposeful research looks like in practice. Rooted in the realities of the Free State Province, of South Africa, and of the African continent, our researchers have identified the fault lines of human suffering – disease, hunger, environmental degradation, social injustice, conflict, and displacement – and positioned themselves at the frontline of response. This publication reflects the integrative, collaborative, and transdisciplinary thinking that has become a hallmark of the University of the Free State's research culture.

The university has made a deliberate commitment to move from the margins and elevate indigenous knowledge systems, develop African languages as languages of scholarship, and amplify the voices of youth, women, rural communities, and those rendered invisible by structural inequality. We believe that a university that claims to serve South Africa must draw on the full breadth of South African ways of knowing and being.

What distinguishes the university in this period is not only the breadth of our research portfolio, but the depth of our embeddedness in place. The Free State is our home. Its landscapes, its waterways, its mountains, its small towns, its farms, and its communities are not merely the backdrop to our work – they are its motivation and, increasingly, its co-creators. One example of this occurred when a tailings dam collapsed at Jagersfontein in September 2022. Our researchers were on the ground within days to assess the environmental damage, counsel traumatised residents, engage communities in healing through art, and produce scholarly analysis that will guide future disaster mitigation and management. This is what it means to be a university that is part of the society it serves.

The next generation of researchers, practitioners, and leaders will face challenges that we cannot fully anticipate. Our responsibility is to equip them not only with technical mastery, but also with the intellectual courage, ethical grounding, and collaborative instinct to navigate uncertainty wisely. The university has invested significantly in this endeavour – from the Emerging Scholar Accelerator Programme and the Future Professoriate Mentoring Programme to targeted initiatives that advance women in academia, and postgraduate training pipelines that deliberately recruit students from across the African continent. Diverse scholars ask different questions, challenge inherent assumptions, and open new pathways to knowledge that more homogeneous research communities cannot access.

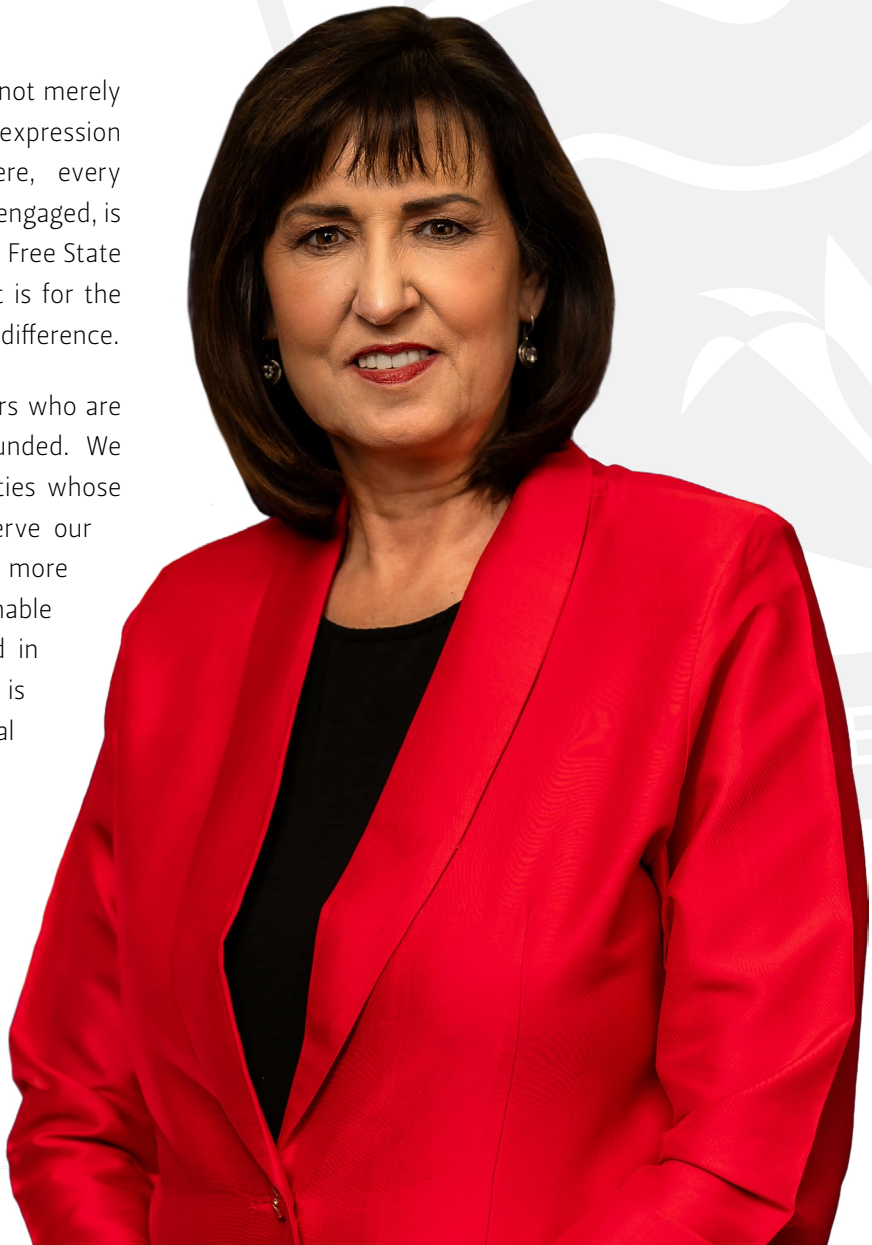
I am particularly proud of the way in which our researchers have been engaging with the African continent as a space of scholarly ambition. They collaborate with partners in Mozambique, Zimbabwe, Kenya, Namibia, Uganda, and beyond in genuine partnership, co-producing knowledge that is relevant to African realities and accountable to African communities. The African Union's Agenda 2063 envisions a continent that is integrated, prosperous, and peaceful. The research documented in this review is a contribution to this vision.

None of this is possible without the conditions that sustain excellent research. Our Platinum Certification in the Good Financial Grant Practice Standard reflects the institutional integrity and governance that underpins everything else. Our world-class facilities – from our High-Performance Computing Unit and Next Generation Sequencing platform to our Biosafety Level 3 laboratory and Centre for Microscopy – give our researchers the infrastructure to compete at the global frontier.

Our research chairs, both NRF SARChI chairs and the collaborative ARC-UFS chairs, provide anchoring frameworks that translate strategic priorities into sustained programmes of work. And the extraordinary human talent represented in this review, from senior professors to emerging doctoral candidates, is the living embodiment of our university's commitment to excellence in service of society.

I therefore invite you to read this review not merely as a record of achievement, but as an expression of values. Every study described here, every researcher celebrated, every community engaged, is a statement of what the University of the Free State believes a university is for. We believe it is for the advancement of knowledge that makes a difference.

We believe it is for the training of scholars who are technically excellent and ethically grounded. We believe it is for the service of communities whose needs are real and whose futures deserve our best efforts. And we believe it is to build a more just, more humane, and more sustainable society than the one we have inherited in South Africa, Africa, and beyond. This is our commitment to Responsible Societal Futures.



PREFACE

Prof Vasu Reddy ||
Deputy Vice-Chancellor: Research, Innovation and Postgraduate Studies

This Research Review, covering the period 2022 to 2024, is more than just a record of achievements. It captures a university deeply engaged with some of the defining wicked problems of our time. It provides a lens on how we at the University of the Free State take stock of where we are, what we have accomplished, and where we are headed. This review also demonstrates the breadth, depth, and impact of scholarship across our campuses, disciplines, and communities. It illustrates how research at our institution is increasingly characterised by collaboration, innovation, social responsiveness, and a commitment to improving lives.

The stories documented reveal research that matters. We see researchers transforming cancer treatment through the introduction of artificial intelligence-assisted radiotherapy planning, making the university and Universitas Academic Hospital the first clinical site in the world to integrate the Radiation Planning Assistant into patient care. We see pioneering work in cervical cancer treatment that established Southern Africa's first interstitial brachytherapy programme. We witness advances in cardiovascular research, tissue engineering, and simulation-based medical training that are positioning the UFS as a continental leader in translational health sciences.

Equally compelling are the contributions being made in food security and sustainable agriculture. Researchers are developing climate-resilient, nutritious, and disease-resistant crop varieties, while innovative agro-processing technologies are creating opportunities for rural livelihoods and improved nutrition. Work addressing child food poverty, maternal nutrition, and community food security reminds us that research excellence is at its most meaningful when it improves the dignity and well-being of vulnerable populations.

The review also highlights the university's active leadership in responding to environmental and climate-related challenges. From phycoremediation technologies that offer low-cost, sustainable wastewater treatment solutions, to the development of green concrete and climate-smart agricultural systems - UFS researchers are helping to shape more sustainable futures.

The pioneering work undertaken in the Maloti-Drakensberg mountains further demonstrates the university's commitment to understanding and protecting critical social-ecological systems that support water security, biodiversity conservation, and community resilience in Southern Africa.

At the same time, our researchers in the social sciences, the humanities, law, education, economic and management sciences, theology and religion, and the arts continue to deepen our understanding of the human condition. Their work explores social justice, migration, identity, language, gender, indigenous knowledge systems, social disruption, youth development, conflict, belonging, and transformation. These themes are not peripheral to development; they are central to it. In a country and a world still grappling with entrenched inequalities and historical legacies, research that illuminates pathways towards justice, inclusion, and human flourishing remains indispensable.

Another central thread running through the review is the growing recognition that the challenges we face cannot be solved by disciplines working in isolation. The future belongs to aligned inter-, multi-, and transdisciplinary approaches that bring together diverse forms of expertise, knowledge systems, and lived experiences. Whether addressing public health, climate adaptation, food security, disaster risk reduction, or social transformation, the most impactful research increasingly transcends traditional boundaries.

This review also celebrates the people behind the achievements. It recognises researchers, postgraduate students, postdoctoral fellows, technicians, support staff, administrators, community partners, industry collaborators, and international networks who collectively sustain the university's research and knowledge enterprise. Their efforts are supported by a growing ecosystem of world-class facilities, advanced research platforms, high-performance computing capabilities, simulation units, sequencing technologies, specialised laboratories, and robust research governance systems that continue to strengthen our institutional capacity.

Importantly, this review is not only about recognising what has been achieved. It is equally about imagining what remains possible in the context of persistent local and global challenges that are complex and evolving. Responding to these challenges requires scholars who are willing to ask difficult questions, challenge conventional assumptions, and work across boundaries in pursuit of solutions.

I believe that this review should serve not simply as a record of past accomplishments, but also as a source of inspiration for future discoveries. We enter the next phase of our research journey with confidence and purpose. We do so, rooted in the understanding that research is not merely an academic exercise. It is a public good. It is a vehicle for innovation, transformation, and hope. It enables us to better understand our world, improve the human condition, and imagine futures not yet visible, as we collectively continue to push the boundaries of knowledge in service of society.

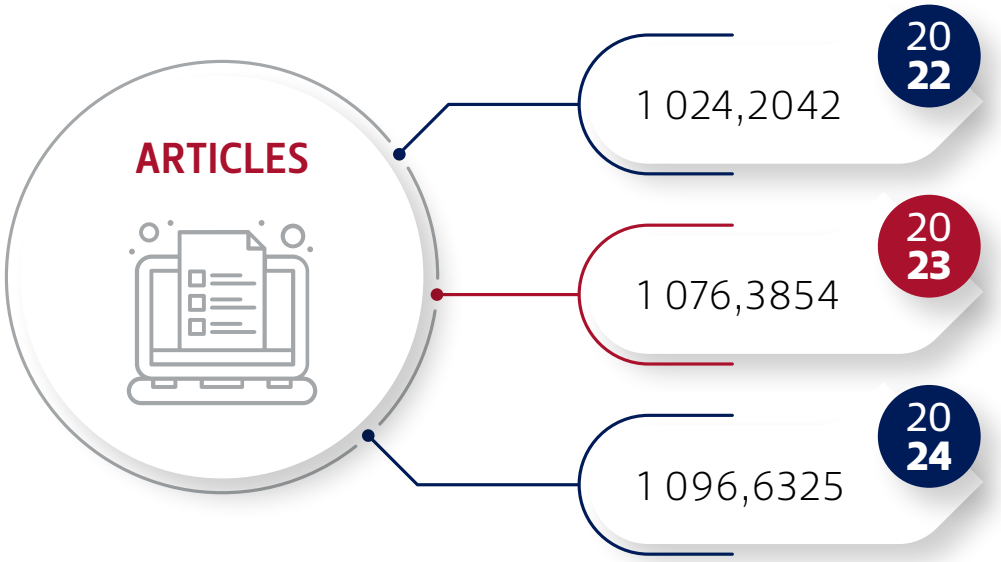
The future will be shaped by the questions we ask today and by the courage with which we pursue their answers.

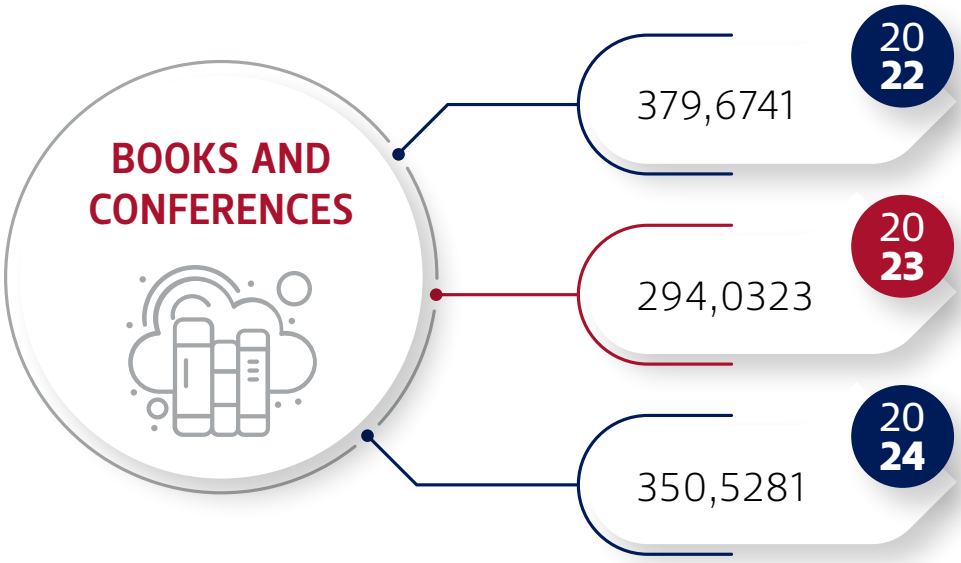


UFS RESEARCH 2022 TO 2024
TRACKING THE NUMBERS

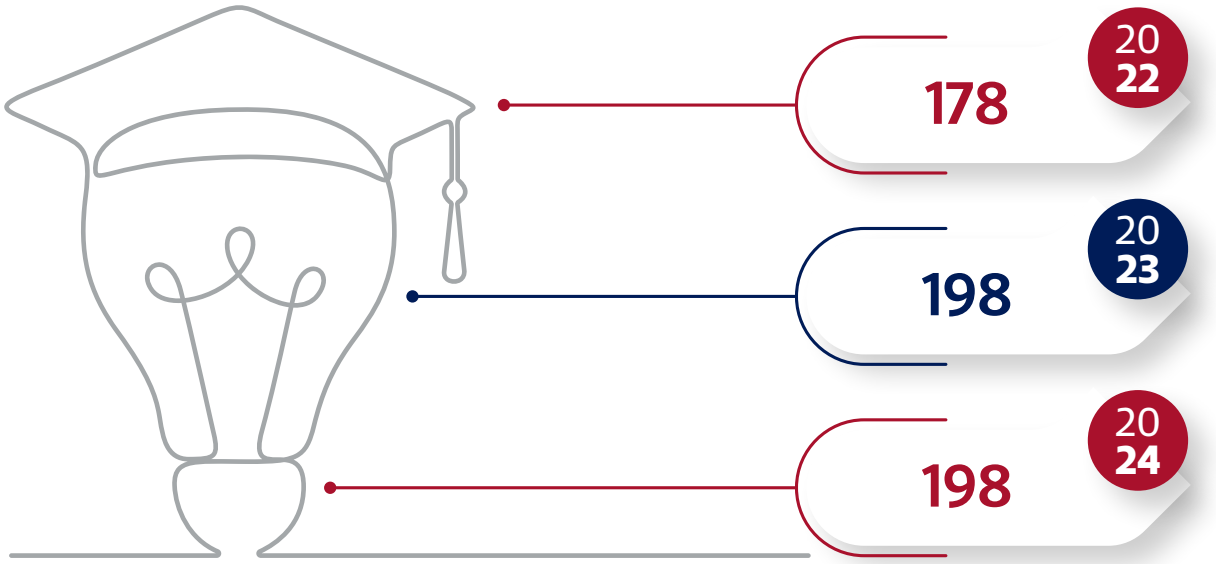
Research at the UFS continues to grow in reach and depth, reflected in thousands of publications, books, and conference contributions across faculties. Alongside these outputs, the university's work is visible in its postdoctoral fellows, postgraduate students, NRF-rated researchers, and a portfolio of patented technologies managed through the Technology Transfer Office. Together, these numbers show a vibrant research environment where ideas move from classrooms and laboratories into wider society, building knowledge that connects disciplines, people, and practice.

PUBLICATION OUTPUTS ‖ ARTICLES, BOOKS, AND CONFERENCE CONTRIBUTIONS



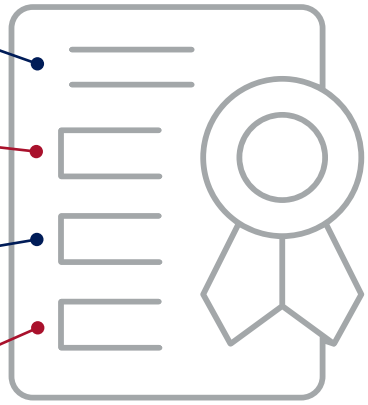


POSTDOCTORAL FELLOWS

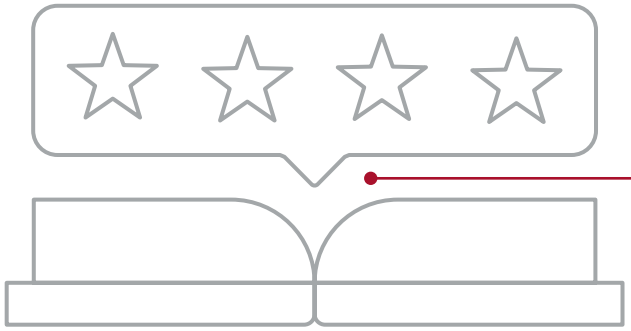


UFS TECHNOLOGY TRANSFER OFFICE PATENTS ‖ AS AT 31 DECEMBER 2024

- 25 active patent families representing distinct UFS technologies and inventions
- Patent protection secured or being pursued in South Africa and internationally
- Portfolio includes both granted patents and pending patent applications
- Reported by patent family to provide a consolidated measure of the university's technology portfolio



NRF RATINGS



2022 ‖ **212**

2023 ‖ **217**

2024 ‖ **247**

*Variations in the reported figures are attributable to employee resignations, lapsed ratings, and transfers to other institutions during the reporting period.

RESEARCH CHAIRS

1 SANRAL CHAIR IN SCIENCE AND MATHEMATICS EDUCATION

1 ETDP-SETA RESEARCH CHAIR IN MATHEMATICS EDUCATION

7 ARC-DALRRD-UFS RESEARCH CHAIRS

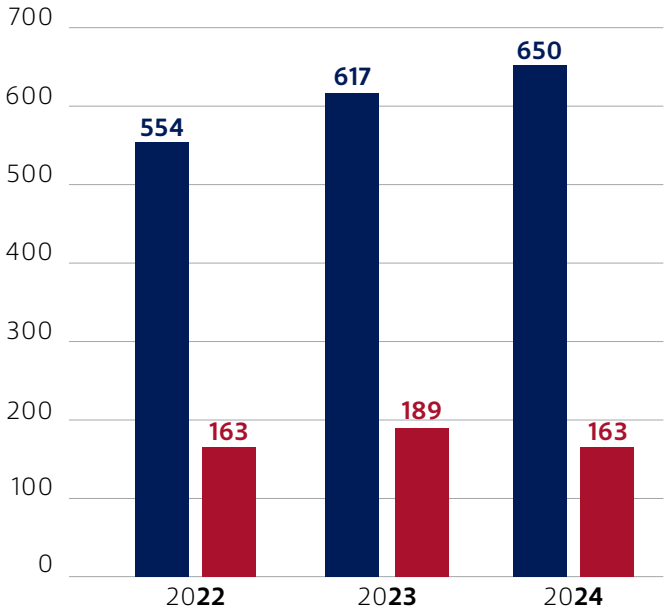
- Climate Change Impacts and Mitigation in Agriculture
- Innovative Agro-Processing for Climate-Smart Food Systems
- Agriculture Risk Financing
- Sustainable Livestock Production
- Breeding of Climate-Resilient Vegetables and Grains
- Impact Assessment of Climate-Smart Interventions
- Communication for Innovation



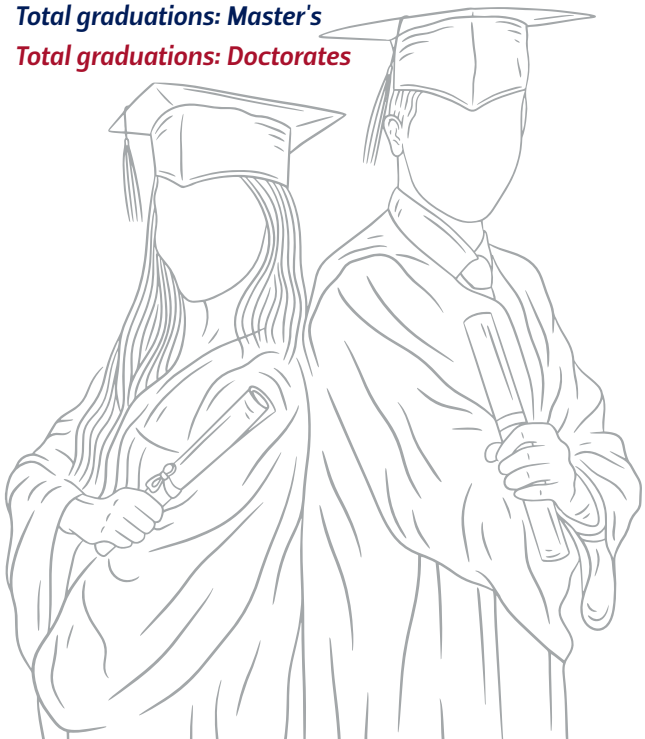
6 SARCHI RESEARCH CHAIRS

- Solid-state Luminescent and Advanced Materials
- Higher Education and Human Development
- Disease Resistance and Quality in Field Crops
- Vector-borne and Zoonotic Pathogens
- Pathogenic Yeasts
- Strengthening Urban Economies: People, Place, Production and Policy

POSTGRADUATE STUDENTS



Total graduations: Master's
Total graduations: Doctorates





HEALTH **FOR** ONE, **HEALTH** FOR **ALL**

Health is a fundamental human right, guaranteeing every person the highest attainable standard of physical and mental health, including access to medical services, sanitation, nutrition, housing, and healthy working conditions without discrimination. Recognised internationally and in Section 27 of the South African Constitution, this right ensures equitable access to care and addresses underlying determinants for a dignified life.

NON-COMMUNICABLE DISEASES

Diseases are generally broadly categorised as communicable versus non-communicable diseases (NCDs). NCDs are long-lasting conditions that cause 74% of global deaths, particularly affecting low- and middle-income countries. The four primary types are cardiovascular diseases (heart attack, stroke), cancer, diabetes, and chronic respiratory diseases. In South Africa, deaths due to major NCDs such as cardiovascular diseases, cancer, diabetes, and chronic lower respiratory diseases increased by 58,7% over 20 years, from 103 428 in 1997 to 164 205 in 2018. The median age at death in years was 65 for men and 69 for women.



The UFS Faculty of Health Sciences, through its School of Clinical Medicine, has a long and proud record of actively researching and addressing NCDs such as diabetes, cancer, and cardiovascular diseases – both nationally and internationally renowned.

ONCOLOGY



Cancer in South Africa is a significant health concern, with high rates of prostate, breast, cervical, colorectal, and lung cancers. South Africa could see an increase of 78% in the number of cancer cases by 2040. More than 100 000 South Africans are diagnosed each year. The fact that the Department of Oncology has been fighting cancer for more than 55 years places it at the forefront of this battle.

Breast cancer is the second most diagnosed cancer globally. An average of 2,3 million new cases and 458 000 deaths from breast cancer are recorded each year. The incidence among South African women is increasing; it is one of the most common cancers among women in South Africa, with a lifetime risk of 1 in 27, according to the National Cancer Registry (NCR). Although breast cancer mortality rates have decreased in developed countries due to early screening programmes and modern therapy, the majority of women in South Africa still present with advanced-stage cancers, which has a negative impact on their prognosis. It is the most prevalent cancer among white and Asian women, and the second most common cancer among black and coloured women.

Researchers in the Department of Oncology, led by ***Prof Alicia Sherriff***, have been doing advanced research on breast cancer, including a project in collaboration with the Department of Pathology, on evaluating the pathological, clinical, and prognostic features of breast carcinoma in South African women 35 years or younger. In addition, they have been involved during the past 40 years as contributors to a vast variety of clinical trials, e.g. international multi-centre open-label 2-arm phase III trial of adjuvant bevacizumab in triple negative breast cancer, a multicentre phase III randomised trial of adjuvant therapy for patients with HER2-positive node-positive or high-risk node-negative breast cancer comparing chemotherapy plus trastuzumab with chemotherapy plus trastuzumab plus bevacizumab; a phase III, randomised, open-label study to compare pharmacokinetics, efficacy, and safety of subcutaneous (SC) trastuzumab with intravenous (IV) trastuzumab administered to women with HER2-positive early breast cancer (EBC); and a randomised phase III, double-blind placebo-controlled multicentre trial of everolimus in combination with trastuzumab and paclitaxel, as first-line

therapy in women with HER2-positive locally advanced or metastatic breast cancer.

Cervical cancer is the second most common cancer among South African women, with roughly 11 000 new cases and 5 900 deaths annually, particularly impacting those aged 15 to 44. It is strongly linked to the human papillomavirus (HPV) and HIV, with a 1 in 41 lifetime risk. Due to late/delayed presentation and diagnosis, most cervical cancer patients seen have more advanced stages where the cancer has infiltrated outside of the cervix into the surrounding tissue.

Researchers associated with the Universitas Academic Complex have been approaching cervical brachytherapy with computed tomography (CT)-based image guidance for more than a decade and have been doing adaptive CT-based image-guided brachytherapy for the past five years. Prof Sherriff, Head of the UFS Department of Oncology and a clinical oncologist, explained that brachytherapy is a method of internal radiation therapy, where a source of radiation is placed inside or near the cancer.

This type of radiation travels only a short distance and makes it possible to deliver curative doses to the cancer while staying within the tolerance of the surrounding bladder, rectum, and small bowel. Based on their research, a multidisciplinary team consisting of an anaesthetist, clinical oncologists, application specialists, medical physicists, radiation therapy radiographers, and professional nurses from the UFS and the Universitas Academic Complex became the first in Southern Africa to use interstitial brachytherapy as a method for treating cervical cancer in June 2023.



The medical staff who were involved in the first interstitial cervical cancer brachytherapy in Southern Africa were, from the left: Dr Marnus Booyens, anaesthetist; Dr Karin Vorster, Head: Clinical Unit and clinical oncologist; Dr William Shaw, Head of Medical Physics for the Division of Radiation Oncology; Khalil Ben Fredj, Application Specialist at Elekta for the TIMEA region and medical physicist; Prof Alicia Sherriff, HOD Oncology and clinical oncologist; Dr Dedri O'Reilly, medical physicist; Chantel Stroebel, radiation therapy radiographer at brachytherapy; Dr Lourens Strauss, medical physicist; Karl Sachse, medical physicist; Sr Angelique Engelbrecht, professional nurse; Marga Claassen, Clinical and Commercial Account Specialist, SA for Elekta and medical physicist.

The UFS is planning to expand this to other cancers. While not the first globally to implement this specialised technique, the Bloemfontein team is among the earliest adopters on the African continent, helping to expand access to this advanced modality in settings where it is most needed. Prof Sherriff and Dr Dalene van Jaarsveld – via an international grant from the Bristol-Myers Squibb Foundation (BMSF) – set up palliative care structures and training platforms in the Free State, which has opened up another research avenue that is currently in development.



Dr William Shaw.

Under the leadership of ***Dr William Shaw***, of the Department of Medical Physics, the department has built a long-standing academic partnership with Prof Laurence Court and his team at the MD Anderson Cancer Center (MDACC) in Houston, Texas – a collaboration that is now yielding transformative results. Since 2020, they have been working on adopting the Radiation Planning Assistant (RPA), a web-based AI platform developed at the MDACC, to assist in the creation of radiotherapy trials. Their research came to fruition in 2024 when the UFS Departments of Medical Physics and Oncology became the first clinical site worldwide to integrate artificial intelligence (AI) into cancer treatment planning. The introduction and clinical integration of the RPA at the UFS and Universitas Hospital represents a major advancement for oncology services – both regionally and nationally. It signifies the transition from research collaboration to real-world application, where artificial intelligence is being used to improve access to safe, high-quality cancer care.

According to Dr Shaw, this is a significant advancement for cancer care in South Africa. It reflects the UFS and Universitas Hospital's commitment to safe innovation, rigorous clinical standards, and patient-centred care. Through their leadership, this technology is not only improving efficiency and access, but it is also raising the standard of care for cancer patients across the province and beyond. Designed to support clinical teams in both high- and low-resource settings, the RPA helps streamline one of the most time-consuming steps in cancer care: the formulation of patient-specific radiation treatment plans.

The RPA is a cloud-based software platform designed to support radiotherapy services by automating key components of the treatment planning process. While the RPA was initially implemented for the treatment of cervix cancer, It will be applied and tested for other cancers, including across a broader range of clinical indications. These include breast cancer, head and neck cancers, and primary brain tumours. With continued institutional input, the system holds significant promise for broader application across nearly all major tumour types treated with external beam radiotherapy.

This multidisciplinary collaboration has laid the foundation for further research and innovation at the interface of medical physics, oncology, and data science. This work was supported by the Nuclear Technologies for Medicine and Biosciences Initiative (NTeMBI). NTeMBI is a national technology platform developed and managed by the South African Nuclear Energy Corporation (Necsa) and funded by the Technology Innovation Agency (TIA).

Read more on how the RPA works here.



Prof Alicia Sherriff.

Prof Sherriff, and ***Prof Jan du Plessis***, Head of the Paediatric Oncology Unit, are at the forefront of establishing a dedicated Adolescent Oncology Unit aimed at addressing the unique needs of young cancer patients aged 13 and above and providing age-appropriate care. The Paediatric Oncology Unit treats major childhood cancers – including leukaemia and lymphoma – using chemotherapy, surgery, and radiation.

CARDIOVASCULAR DISEASE

Cardiovascular disease (CVD) is the leading cause of death from non-communicable diseases (NCDs) in South Africa, estimated to be responsible for one-fifth of all deaths. Nearly 80% of premature CVD deaths are preventable.

CARDIOTHORACIC SURGERY

Research in the Department of Cardio-thoracic Surgery has a long legacy, originating with the establishment of a homograft bank, animal research, and laboratory-based cardioplegia studies under Prof Hannes Meyer in the 1980s.

ROBERT FRATER CARDIOVASCULAR RESEARCH CENTRE

A renewed period of strategic growth began in 2004 with the appointment of ***Prof Francis Smit***, culminating in the establishment of the ***Robert W M Frater Cardiovascular Research Centre*** (Frater Centre) in 2015. The centre was named after Prof Robert (Bob) WM Frater – an international icon in heart surgery and mitral valve repair – whose enthusiasm for scientific research and deep understanding of heart valves and tissue engineering have significantly shaped the centre's research focus to this day. The Frater Centre is now a leading interdepartmental and interdisciplinary cardiovascular research centre and is a nationally and internationally recognised contributor to cardiovascular science, translational research, and advanced simulation-based education.

A hallmark of the Frater Centre is its model of collaboration in which multidisciplinary clinicians and scientists work together across departments, universities (local and international), and industry to design and implement translational projects that address Africa's cardiovascular disease challenges. Its integrated translational model spans molecular and cellular biology, cell culture platforms, pharmacology,

tissue engineering and biomaterials science, preclinical animal research, clinical investigation, epidemiology, and simulation-based surgical training.

View the Frater Centre video here.

Laboratory discoveries are systematically advanced towards validation through small- and large-animal research, enabling clinically aligned innovation and credible pathways for research-based development and commercialisation. The Frater Centre's collaborative footprint includes national partnerships with the Central University of Technology (CUT), Stellenbosch University, and the University of Cape Town, as well as international academic engagements with Brazil, Germany, and Spain, among others.



The Frater Centre comprises three main divisions:

CLINICAL RESEARCH DIVISION

This division addresses cardiovascular disease across a broad spectrum – from population and prevalence studies to healthcare solutions and clinical outcomes research – within a South African and African context.

Under the academic leadership of ***Prof Stephen Brown*** from the UFS and Prof Angélique Botes from the CUT, the division has strengthened its position as a nationally recognised hub for clinically relevant cardiovascular research with growing international visibility. Research activities are strategically aligned with regional disease burden and healthcare system limitations. This has fostered a research culture that integrates clinical service delivery, postgraduate training, and translational investigation, ensuring that scholarly outputs translate into meaningful improvements in patient care, diagnostic access, referral pathways, and evidence-based clinical practice, while also supporting sustainable academic and research capacity development. In line with the United Nations Sustainable Development Goals (SDGs), the division's work supports Goal 3 (Good Health and Well-Being), and Goal 4 (Quality Education). A key strength of the division is its collaborative academic partnership between the UFS and CUT, which enhances research capacity, expands access to shared clinical and academic platforms, and strengthens postgraduate training pipelines. The division's research programme has generated several thematic advances in cardiovascular science and clinical practice,

particularly within the resource-limited healthcare settings. These include research on cardiomyopathies and heart failure. This includes studies on viral contributions to idiopathic dilated cardiomyopathy and multicentre investigations into cardiomyopathy aetiology and phenotypes. These studies contribute to improved regional characterisation of myocardial disease. Research also covers congenital heart disease and single-ventricle physiology. This includes outcome studies in single-ventricle patients, advances in the conceptual understanding of Fontan circulation, and long-term outcomes following percutaneous pulmonary valve implantation. Pulmonary hypertension and right heart adaptation have also been studied. These studies highlight patterns of right ventricular adaptation and provide insights into diagnostic and management strategies in resource-constrained environments.

Work on atherosclerotic and vascular disease has identified contemporary cardiovascular risk factors. It has also evaluated vascular imaging markers, including carotid and radial intima-media thickness, as accessible surrogate indicators of vascular disease burden and patient outcomes in regional populations. Cardiovascular imaging and diagnostic innovation has strengthened the role of echocardiography as a frontline diagnostic and referral tool in underserved settings. Structural and interventional cardiology research includes device-related complications, such as pacemaker-related tricuspid regurgitation, and the long-term outcomes that followed the percutaneous pulmonary valve replacement. Finally, the biomarkers and translational cardiovascular science include work on APRi as a prognostic biomarker for liver disease, as well as investigations of endothelial and cytokine profiles associated with mortality in severe infectious disease states. A particularly important contribution of the Clinical Research Division is the development of an epidemiological data set on cardiac disease in central South Africa, which represents a critical resource for future healthcare planning and policy development.

View the video: Celebrating a heart hero.



Prof Stephen Brown.

RESEARCH, DEVELOPMENT, AND COMMERCIALISATION DIVISION

This division includes Tissue Engineering and Cell Biology, Tissue Banking, and Large Animal Studies, supported by bioengineering capacity to develop African solutions and technology. The division is underpinned by an integrated translational pipeline in which molecular biology, cell biology/cell culture, pharmacology, tissue engineering and bioengineering outputs inform and are validated through small- and large-animal platforms.

The portfolio is organised into two complementary themes:

- TISSUE ENGINEERING AND XENOGRAFT BIOMATERIALS

Strategic and scientific leadership of the tissue engineering programme is provided by the Director of the Frater Centre, Prof Smit, Dr Hans van den Heever, and Prof Angélique Lewies. Key collaborators include Stellenbosch University and Prof Francisca da Costa (Brazil), alongside multidisciplinary partners that are supporting biomaterials development, decellularised tissue research, in vitro evaluation, and translational validation. The tissue engineering stream focuses on developing processed xenograft tissues with reduced immunogenicity and calcification risk, while preserving structural integrity and mechanical performance. A primary focus is on decellularised bovine pericardium and related cardiovascular biomaterials intended for use in patches and bioprosthetic applications.

- CELL BIOLOGY



Prof Angélique Lewies.

Prof Lewies provides primary leadership of the Cell Biology programme.

The workstream is supported through multidisciplinary collaborations within the UFS Faculty of Natural and Agricultural Sciences (Departments of Chemistry, Genetics, and Biochemistry), the UFS Department of Pharmacology, and the Centre for Rapid Prototyping and Manufacturing (CRPM) at the CUT.

The Advanced Cell Culture Systems (ACCS) stream develops and applies new approach methodologies (NAMs) for drug discovery and mechanistic research, with an emphasis on ***advanced 2D and 3D cell culture models*** (including spheroids, organoids, and induced pluripotent stem cell (iPSC)-derived platforms). This in vitro capability is complemented by small-animal disease models to support translational alignment and to validate key findings across biological scales. In parallel, ACCS integrates *in silico* approaches – including network pharmacology and molecular docking – to prioritise targets, refine mechanistic hypotheses, and guide experimental design.

Current commercialisation opportunities include tissue-derived product development and processing innovations (including the improved processing/detoxification workflows for decellularised bovine pericardium) being advanced within the Tissue Engineering workstream, while the 3D-printed mini-bioreactor platform for scalable spheroid/organoid production is progressed within the Cell Biology workstream through a multidisciplinary collaboration. This is underpinned by collaboration with Stellenbosch University, which provided us with an opportunity to combine our tissue-engineering expertise and valve-construction capabilities with their transcatheter valve technology.

SIMULATION

Simulation in cardiac surgery and related disciplines has been a focus of the Frater Centre and the Department of Cardiothoracic Surgery's educational objectives since 2008.



Prof Francis Smit.

Prof Smit is the lead in this programme. The programme at the UFS strives to offer an integrated, multidisciplinary programme that blends theoretical learning with advanced simulation. For more information, refer to the chapter on 'Making the system work' (Facilities and platforms).

ATHEROSCLEROSIS AND THROMBOSIS

Atherosclerosis is the most common disorder associated with CVDs, and thus, believed to be a good indicator of the CVD profile in a population, yet little is known on its prevalence in sub-Saharan African populations. A study by researchers, led by ***Prof Wattie Janse van Rensburg*** in the Human Molecular Biology Unit within the School of Biomedical Sciences, aimed to determine the prevalence of atherosclerosis in a diverse South African population as found in post-mortem investigations. The investigation found that men of European descent over the age of 50 are the most vulnerable to the development of atherosclerosis, in contrast to roughly one-tenth of African-descent men and women in the same age bracket. More than a third of women of European descent over 50 had visible atherosclerosis in their coronary arteries. One hypothesis regarding a possible explanation for this discrepancy is based on the theory that socioeconomic status may be a driving force behind CVD. The study also found that the prevalence of CVDs and the incidence of premature CVD-related deaths are steadily increasing in both rural and urban communities and across the socioeconomic spectrum.

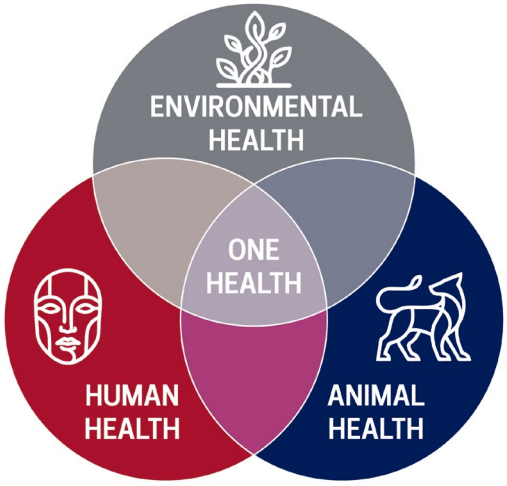
An associated study contributing to our understanding of the origins and contributory factors of CVDs in our region focused on the prevalence of excessive blood clots (thrombosis) as the underlying cause of death. Pulmonary embolisms (PEs) were much more common than coronary thrombosis. Most PEs had known contributory risk factors, whereas the coronary thrombosis-related deaths occurred suddenly without known risk factors. Bone fractures were the most prominent risk factor associated with PEs. Women of African descent had a consistently high prevalence of thrombosis after the age of 30 years. Men of European descent showed an unexpected peak in prevalence during their 40s.

Prof Wattie Janse van Rensburg.



ONE HEALTH – CHALLENGING COMMUNICABLE DISEASES

The definitions of One Health differ widely, but most agree that it involves a collaborative, multisectoral, and transdisciplinary approach to achieving optimal health outcomes and recognising the interconnection between people, animals, plants, and their shared environment. At the UFS, One Health is interpreted as a practical, transdisciplinary approach that recognises the interdependence of human, animal, and environmental health and explicitly links it to food security and local livelihoods.



One Health recognises the interconnection between people, animals, plants, and their shared environment.

One Health means (1) integrated surveillance and diagnostics across species and environmental reservoirs; (2) collaborative research and training that brings together microbiology, veterinary science, ecology/environmental management, public health, social science, and law; and (3) applied research that produces policy-relevant outputs and practical interventions for rural communities (e.g. improved diagnostics, surveillance pipelines, community engagement, and training). The UFS interpretation prioritises local, achievable impact – i.e. focused, place-based interventions (Free State province and surrounding rural systems) that can be scaled or adapted nationally, rather than unfunded national-level ambitions. This aligns with the World Health Organisation (WHO) definition and explanation. Groups at the UFS actively involved in One Health activities include the Kovsie One Health Research Unit, the hub for TB One Health, diagnostics and field surveillance; the Department of Microbiology and Biochemistry (molecular diagnostics); Division of Virology (vector-borne and high-containment pathogen research); Department of Zoology and Entomology (wildlife, vector and disease ecology, zoonotic diseases); Centre for Environmental Management (environmental health, ecosystem services, and land use); and the Faculty of Natural and Agricultural Sciences (veterinary and animal health research).

Prof Wynand Goosen leads the Kovsie One Health Research Unit at the UFS, with a focus on pathogenic mycobacteria across human, animal, and environmental interfaces. His work integrates field surveillance, molecular diagnostics, genomic characterisation, and One Health translation (training, stakeholder engagement, and policy inputs).



Prof Wynand Goosen.

ZOONOTIC DISEASES

Zoonotic diseases, those transmitted from animals to humans, are a global public health concern, comprising approximately 60% of all human pathogens and nearly all emerging infectious diseases. Factors such as burgeoning human populations, anthropogenic impacts on ecosystems, climate change, land-use alterations, pollution, and wildlife trafficking contribute to the heightened risk of emerging and re-emerging diseases. Diseases such as bovine tuberculosis pose significant threats to human and animal health, particularly in rural communities with close associations with animals.

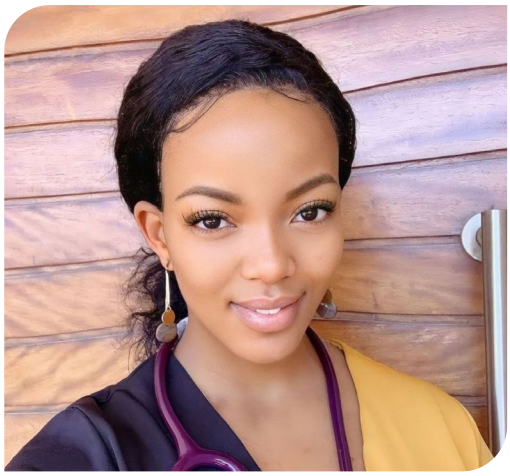
Prof Felicity Burt is a principal medical scientist in the Division of Virology at the National Health Laboratory Service and the UFS. She holds a ***South African Research Initiative Chair (SARChI) in Vector-Borne and Zoonotic Pathogens Research.*** Her research focuses on the detection, pathogenesis, and molecular epidemiology of medically significant arboviruses and viral haemorrhagic fevers found in Southern Africa.

The research primarily focuses on host immune responses to arboviral infections, specifically characterising humoral and cellular immune responses in patients with infections such as Crimean-Congo haemorrhagic fever (CCHF) virus and Sindbis virus; epitope discovery for the development of diagnostic tools; development of molecular and serological assays for surveillance purposes; virus discovery; and the development of vaccines. Raising awareness of these viruses, defining associated diseases, and developing tools for surveillance programmes will contribute to understanding these pathogens and the public health implications. Arboviruses cause disease outbreaks in South Africa annually. Outbreaks are usually associated with heavy rainfall favouring mosquito breeding, but these viruses also have the capacity to spread and become endemic in new areas where competent vectors are present. In addition, she leads a research group that investigates human papillomaviruses (HPV) associated with head and neck cancers and recurrent laryngeal papillomas. The focus of this research group is to ascertain the genotypes of HPV causing these diseases, identification of novel biomarkers for early detection, and complete genome sequencing for molecular characterisation of HPV isolates.

Prof Felicity Burt.



Dr Nyembe Nthatisi's research on parasites that infect animals focuses on the detection, diagnosis, and possible treatment of these pathogens by utilising medicinal plant extracts, synthetic compounds, and/or nanoparticles. Her research aligns with the One Health approach by considering the environment where these pathogens are circulating, as well as their potential zoonotic ability. She and her team, based in the Department of Zoology and Entomology on the UFS Qwaqwa Campus, work with the royal houses, ensuring additional access to the community at large, farmers, and animal keepers. The research involves working hand-in-hand with farmers to ascertain their knowledge of parasites, effective treatment, and their animal husbandry practices, collecting faecal and blood samples and ectoparasites from the animals, which are tested in the laboratory for various parasitic infections. Furthermore, the currently available drugs are no longer effective, due to widespread resistance of the parasite to the drugs because of farmers' lack of skills in preparing correct dosages, inaccessibility of the drugs, high costs, and the absence of veterinary services.



Dr Nyembe Nthatisi.

Therefore, Dr Nthatisi's research investigates alternative treatment for parasites using tolerable, cost-effective, and accessible drugs. This includes testing of medicinal plant extracts while characterising the existing resistant strains of the pathogens.

Based in the Department of Zoology and Entomology on the Bloemfontein Campus, ***Dr Edward Netherlands'*** research on various blood parasites of ectotherms, which include species closely related to malaria and trypanosomes, contributes to a broader understanding of vector-borne diseases and their impact on the ecosystem. By studying these asymptomatic blood parasites and their interaction with wildlife, we can gain insights into the dynamics of these diseases. This knowledge has implications for wildlife conservation and public health, as understanding the ecology and transmission of these parasites is vital for developing effective strategies to control vector-borne diseases and protect biodiversity.



Dr Edward Netherlands.

Rodents, particularly rats, are significant maintenance hosts that contribute to the spread of zoonotic diseases affecting animals, wildlife, and humans.



Prof Peter Taylor.

Research undertaken by ***Prof Peter Taylor*** and other researchers from the Afromontane Research Unit and the Department of Zoology and Entomology on the Qwaqwa Campus has led to the establishment of the ***One Health rodent pests in South African townships (OHRatSA) project***. This collaborative research initiative, which includes leading researchers from the UFS, the University of Venda, and the University of Greenwich, aims to link the co-existence of rodents and human beings to the prevalence and increase of zoonotic diseases in rural communities. The project, which officially launched in 2025, uses demonstration trials within identified smallholder and commercial farmer communities and food vendors to showcase simple ecologically based real-world solutions to reduce food contamination and the risk of disease transmission by rats, as a much more effective alternative to using harmful pesticides.

Dr Yolandi Schoeman, who is associated with the Centre for Mineral Biogeochemistry and the Centre for Environmental Research, spearheads a groundbreaking research initiative in partnership with Madikwe Game Reserve, South African National



Parks (including the Kruger National Park, the Phinda Private Game Reserve, and the Tswalu Private Game Reserve).

This project is dedicated to unravelling the intricate interplay between human and natural systems, framing it within the context of planetary health. Spanning over 20 000 km² across South Africa, the study aims to establish a comprehensive water-climate-food-rewilding-land nexus.

This innovative framework seeks to assess the current state and limits of ecosystems when viewed as interconnected human-natural systems.

ENVIRONMENTAL HEALTH

As stressed by the WHO, a One Health approach has to take into account environmental health, such as water pollution, air pollution, and climate change. Climate projections for the Southern African region strongly indicate that the occurrence of rainfall extremes and prolonged drought periods may increase in the near future. Such extreme events pose a severe threat

to water resources, food security, public health, infrastructure, biological diversity, and ecological systems in the region.

Extensive work done by the Centre for Environmental Management, colleagues, and collaborators, continues to emphasise this. Their study of rivers in the Qwaqwa region found that water quality, in general, deteriorated from upstream to downstream, with the water at the most downstream sites being hypertrophic, acutely toxic, and having high levels of manganese, iron, and a range of emergent pollutants such as dioxins, caffeine, pharmaceuticals, and herbicides.



Prof Patricks Voua Otomo.

This study was the first to detect and confirm the presence of organic micropollutants such as sulfamethoxazole, Bisphenol-4, ibuprofen, carbamazepine, atenolol, nevirapine, efavirenz (or its metabolite 8-OH-efavirenz), and the classical indicator of human impact, caffeine, in the catchment. Biotests indicated elevated estrogenic activity, as well as highly increased activity of aryl-hydrocarbon, which can induce inflammatory responses upon exposure and may lead to chronic inflammatory diseases, including asthma, cardiovascular diseases, and increased cancer risk.

The Ecotoxicology Research Laboratory, housed in the Department of Zoology and Entomology on the Qwaqwa Campus, focuses on the toxicological evaluation of potential environmental contaminants. Current projects make use of earthworms, algae, water fleas, and mosquito larvae to investigate the potential ecotoxicity of emerging industrial and agricultural chemicals. In collaboration with the Department of Chemistry, the Ecotoxicology Research Laboratory is part of a project using mushroom mycelia and biodegradable polymers to improve the quality of polluted water. Moreover, the lab's interest in developing new test methods is leading to a renewed interest in behavioural ecotoxicology, with active plans to use invertebrate geotaxis to propose innovative bioassays in ecotoxicology.

Prof Patricks Voua Otomo, Head of the Ecotoxicology Research Laboratory, has highlighted that systemic failures, dilapidated infrastructure, and water quality challenges pose significant risks to public health and the environment. Water systems are connected, and one of the greatest challenges is poorly treated wastewater systems and highly polluted rivers. In particular regions, the quality of drinking water is not good, posing risks for disease outbreaks, such as cholera.

MOLECULAR DIAGNOSTICS, VACCINES, AND TREATMENTS

The Department of Microbiology and Biochemistry provides valuable molecular diagnostics expertise to the One Health focus. Despite only a minority of microbes being pathogenic, they have a significant impact on human health and economic activities involving animals. Research in this theme aims to understand pathogenic microbes and the biochemistry of certain non-infectious diseases to enhance treatment options and improve quality of life.



Prof Trudi O'Neill.

Prof Trudi O'Neill's Molecular Virology Group has continued to study the diversity of rotavirus strains, focusing on the whole genome constellations of human field strains from Mozambique. In line with a One Health approach, their research has been expanded to include various animal strains, with a surveillance study on the incidence of bovine rotavirus in five locations – two in the Western Cape and three in the Free State.

Additionally, the group is pursuing two strategies for developing a rotavirus vaccine: A fully replication-deficient vaccine using recombinant rotavirus proteins produced in yeast or bacteria, and the development of rotavirus reassortants using rotavirus reverse genetics. As part of their search for a potential broad-spectrum antiviral, the group is also examining the role of lipids in rotavirus replication. This research, performed in collaboration with Prof Carlien Pohl-Albertyn, was expanded to also include potential polymicrobial interactions between the opportunistic yeast pathogen, *Candida albicans*, and rotavirus.

Dr Carmien Tolmie leads the Structure-Based Drug Discovery Group, which uses structural biology methods to develop novel therapies to treat infectious diseases. A protein in a pathogen is rationally identified as a possible drug target, and the three-dimensional structure is determined using X-ray crystallography.



Dr Carmien Tolmie.

The protein structure is used to guide further drug development efforts. The first of these projects focuses on the development of novel antifungal drugs against enzymes of

the ergosterol biosynthesis pathway. Since 2023, delta-24 sterol methyltransferase has been studied as a target, from the pathogens *Candida albicans*, *Candida auris*, *Cryptococcus neoformans* and *Aspergillus fumigatusIn*.

The Pathogenic Yeast Research Group currently consists of three academics – ***Prof Pohl-Albertyn,*** who holds the ***SARChI Research Chair in Pathogenic Yeasts***, Prof Koos Albertyn, and Prof Olihile Sebolai. The group focuses on molecular virulence mechanisms and bioactive lipids' role in pathogenic yeasts, specifically *Cryptococcus neoformans* and several *Candida* species. They are also interested in the virulence of polymicrobial infections consisting of *Candida spp*. and the bacterium *Pseudomonas aeruginosa*, as well as viruses. Recent highlights include the findings that fungal co-infection can have a direct impact on the activation of SARS-CoV-2, as well as the discovery of antibiofilm activity of a novel group of compounds, tested in collaboration with the University of Kent.

The research of the Antimicrobial Peptides and Probiotic Bacteria Group, led by ***Dr Winschau van Zyl***, employs *in silico* genome mining strategies and synthetic and molecular biology techniques to discover, characterise, and produce novel and more effective antimicrobial peptides and probiotics with potential medical application. Antimicrobial resistance of both human and animal pathogenic microbes poses a global health threat to human well-being.

Probiotic lactic acid bacteria and their antimicrobial peptides have considerable potential as alternatives to antibiotics, both in prophylactic and therapeutic applications. Lanthipeptides are a rapidly expanding family of natural compounds with diverse biological functions, which include antibacterial, antiviral, and anticancer activities. Current research activities include the development of heterologous protein expression systems to refine the expression of post-translationally modified cationic lanthipeptides and the use of next-generation sequencing data for the discovery of novel peptides that may not be obtained natively. Researchers in the Veterinary Biotechnology Research Group have worked on the development of subunit vaccines against *Avibacterium paragallinarum* and SARS-CoV-2. They are also using the full genome sequence of *A. paragallinarum* to identify novel targets for subunit vaccine production.

Work continued on phage display libraries for the development of antibody fragments and antiviral peptides to neutralise Newcastle disease virus. As part of their research on resistance to disinfectants, the group sequenced the genome of a highly resistant bacterial strain and found genomic islands that contain a wide range of genes resistant to disinfectants, antibiotics, and heavy metals. This work opens the door to a very interesting new field investigating the link between disinfectant and antibiotic resistance. The medicinal effects of mushrooms on human physical health range, inter alia, from anti-inflammatory, antioxidant, immune-modulating, anti-cancer, and energy-promoting to more specific properties such as anti-diabetic, contributing to the health of organs such as the liver and heart.

Another vast and well-known field is the anti-microbial properties of these fungi. Together with the numerous antibiotic, anti-fungal, and antiviral compounds known to be

produced by medicinal mushrooms – which also have such properties – their immune-modulating effects make for particularly powerful combinations to combat microbial diseases.

POCKET GUIDE



MARIEKA GRYZENHOUT

Medicinal mushrooms are mainly divided into two groups, namely functional mushrooms that have general medicinal and health-promoting properties, and psycho-active mushrooms with effects on the brain.

The UFS has established itself over the years as the leading university for testing the bioactive properties of medicinal and psychoactive mushrooms and was the first university to obtain a license to work with psilocybin and psilocin, the so-called 'magic mushroom' compounds.

The team, led by ***Prof Marieka Gryzenhout*** from the Department of Genetics, has close engagement with industry to test and conduct research to improve their products, and serves the entire value chain of the market, from fungal strain discovery and development to cultivation questions, to research and development of products, and ultimate *in vitro* and *in vivo* testing. Through her research, Prof Gryzenhout has developed a strong cadre of citizen scientists. Species of these known medicinal fungi occur in South Africa, and with the aid of a citizen mycologist, they are constantly discovering uniquely South African uses of mushrooms by our people.

These discoveries have the potential to develop uniquely South African solutions, not only for health problems in general, but also for mental health. Such solutions may not only be available commercially, but also through the indigenous knowledge systems of our country. This means that solutions to mental and physical health problems of our largely poor population do not need to depend only on costly drugs.



Prof Marieka Gryzenhout.

CHILD HEALTH AND DEVELOPMENT

Women and children in South Africa remain vulnerable and continue to face substantial health disparities and social injustice. The Free State maintains the highest maternal and child mortality rates in South Africa, with profound socio-economic implications. Children, particularly those in vulnerable communities, face significant challenges, including malnutrition, preventable diseases, and lack of access to early childhood development programmes.

MATERNAL AND CHILD HEALTH

The work done by ***Prof Corinna Walsh*** and colleagues in the Department of Nutrition and Dietetics has contributed significantly to a better understanding of maternal and child health in resource-limited settings. Refer to the next chapter on Feeding a hungry nation (Child food poverty) for more detail. In support of their research on maternal and child health outcomes, the PEA POD infant Body Composition System was acquired in 2024.

View the full video about the PEA POD® initiative.

The ***PEA POD Infant Body Composition System*** is an infant-sized air displacement plethysmography system.

Originally housed in the university's Clinical Skills Unit as part of a multidisciplinary collaboration across, inter alia, Paediatrics and Child Health, Obstetrics and Gynaecology, Radiography, Nutrition and Dietetics, it was moved to the Universitas Academic Hospital later in 2024 and officially launched as the 'Research Room' in 2025.

CHILDREN'S MENTAL HEALTH



Prof Lochner Marais.

Part of Prof Lochner Marais' research in Development Studies at the Centre for Development Support (CDS) on children's mental health, examines the intersection between the social context, community environments, and child well-being, with a particular focus on vulnerable and marginalised populations in South Africa. His work focuses on how socio-economic and spatial inequalities, family circumstances, and exposure to community-level stressors shape children's mental health outcomes, resilience, and developmental trajectories.

Grounded in an interdisciplinary perspective that draws on public health, sociology, and urban studies, his work contributes to a deeper understanding of the social determinants of mental health in childhood. There is a specific focus on factors such as poverty, housing conditions, parental employment instability, and community safety that influence emotional and behavioural health among children. Through empirical studies, the research shows that children's mental health cannot be separated from broader patterns of social exclusion, urban marginality, and historical inequality. An important strand of his research focuses on community-based and school-based interventions that aim to support children's mental health and well-being. His work also engages critically with the implementation and sustainability of mental health initiatives in resource-constrained settings, highlighting the importance of integrating mental health promotion into broader community development and policy frameworks.

EARLY CHILDHOOD DEVELOPMENT

Early childhood development (ECD) is an umbrella term that encapsulates processes of development from birth to nine years (pre-school to end of foundation phase of schooling). ECD is located on the UFS South Campus, as a flagship focus of the Faculty of Education. In 2022, the Hosken Consolidated Investments Foundation (HCIF) commissioned the Department of Childhood Education to evaluate the extent of implementation of ECD programmes in the Free State, as part of the HCIF strategy to create ECD mobile units and centres of excellence to give all children access to quality early learning from birth to four years. While this commissioned study is in its final phase, the results and findings from phases one and two were profound. ***Prof Chinedu Okeke*****,** Head of the Department of Childhood Education, and his colleagues Mahudi Mofokeng, Mmakgabo Selepe, Ndileleni Mudzielwana, Matseliso Mokhele-Makgalwa, Zukiswa Nhase, Seipati Baloyi-Mothibeli, Christian Ugwuanyi, and Thomas Akobi were involved in, inter alia, studies on how early childhood care and education (ECCE) practitioners leverage a variety of learning materials in resource-scarce communities; professional development needs as determinants of ECD educators' effectiveness; the professional development needs of ECCE practitioners in disadvantaged communities; engaging children in math-related play; transformative and high-quality play-based early learning in ECCE programmes in rural communities; understanding and implementing play as a learning pedagogy in early childhood mobile units; and the support parents provide for their children's learning in mobile ECCE contexts.





FEEDING A HUNGRY **NATION**

Sustained hunger is one of the realities of the 21st century. It is absolutely critical that food security, and all its socio-economic and environmental impacts, be at the top of our agenda. The South African agricultural sector faces a range of challenges, including climate change impacts, poor infrastructure, rising costs due to global price volatility, rural crime, and challenges in supporting emerging farmers – all affecting food security, investment, and profitability, demanding urgent coordinated efforts for stable growth and sustainability.

A country is food secure when everyone has access to a sufficient quantity of affordable and nutritious food. South Africa is considered a food secure state nationally; however, it is not a food-secure country at the household level. The country produces enough food to meet its overall needs, but millions of people lack access to adequate and nutritious food due to poverty, inequality, and high costs, making household food insecurity a major challenge. The country faces a 'triple burden of malnutrition,' which includes undernutrition, micronutrient deficiencies, and obesity. This is juxtaposed with high levels of food wastage in South Africa, with more than 243 000 tons of edible food ending up in landfills annually.

Researchers from a range of disciplines at the University of the Free State, working collaboratively and together with national and international partners, have responded impressively to the impending crisis and its challenges.

FOOD-RELATED RESEARCH CHAIRS

Eight research chairs at the university focus on addressing these issues. 2024 marked the ninth year of the ***SARChI Chair on Disease Resistance and Quality in Field Crops*** (led by ***Prof Maryke Labuschagne*** from the Department of Plant Sciences). As the name suggests, the chair focuses on developing field crops with enhanced resistance to diseases and improved quality characteristics to ensure global food security.

The research aims to provide data and practical solutions for the agricultural industry, ultimately contributing to a more sustainable and food-secure future. A primary goal is to achieve durable disease resistance in major cereal and field crops, which is a key challenge given that up to 40% of crop yields are lost to pests and diseases worldwide. Research includes identifying and incorporating resistance genes into new varieties. The improvement of crop quality and nutritional value is very important in African crops.

The chair investigates various factors influencing the quality of field crops, particularly wheat and maize, but also sorghum, Bambara groundnut, and regular groundnut. This involves studying gluten protein composition in wheat, the presence of resistant starch genes, and the enhancement of essential amino acids such as lysine and tryptophan in maize (quality protein maize, or QPM). Research also looks at the influence of abiotic stress conditions (e.g. drought, acid soil tolerance) on crop quality and yield potential. The programme utilises a variety of breeding techniques, including conventional methods, marker-assisted selection, and potentially advanced methods such as genome editing, to improve crops.

A significant part of the initiative is training and mentoring postgraduate students (MSc and PhD), including a specific drive to equip more women from African countries with advanced degrees in plant sciences and breeding. The first group of women who were recruited in 2022 registered in 2023, and included students from Namibia, Zimbabwe, Mozambique, and Kenya.

These students are, inter alia, working on projects to genetically improve nutritional value in maize, Bambara groundnut, and regular groundnut through different breeding techniques. They are using mutation breeding for crop improvement, where seeds are irradiated to create new genetic variation. Some are improving provitamin A in maize for Mozambique. Others are working on a different theme of disease-resistance breeding in wheat and fall armyworm resistance in sorghum.

From vitamin-A-rich maize to exploring the potential of underutilised crops such as cowpea, cassava, indigenous vegetables, and sorghum (known for its resilience and dual benefits as a source of protein and starch), the researchers associated with the chair are unlocking the power of plants to feed vulnerable populations.



Involved in establishing the ARC–DALRRD–UFS research chairs are, from left: Prof Paul Oberholster, Dean of the Faculty of Natural and Agricultural Sciences (NAS); Dr Glen Taylor, Senior Director of the Directorate Research Development; Prof Vasu Reddy, Deputy Vice-Chancellor: Research, Innovation and Postgraduate Studies; and Prof Johan van Niekerk, Vice-Dean for Agriculture in NAS.

The ***ARC-DALRRD-UFS Research Chairs*** initiative – a powerful collaboration between the Agricultural Research Council (ARC), the Department of Agriculture, Land Reform and Rural Development (DALRRD), and the UFS, is designed to address some of the most pressing challenges in agriculture, food security, and climate resilience in South Africa. Seven thematic research chairs have been established under two overarching centres of excellence: Climate Smart (Resilient) Agriculture and Broadening the Food Base for Diversification of the Food Basket. These chairs are supported by interdisciplinary teams, drawing on expertise from across the UFS, the ARC, and national and international partners. Together, the ARC-UFS research chairs are building a future-facing, sustainable agricultural research ecosystem. Through their collaborative research outputs, policy engagement, and robust postgraduate training programmes, these chairs not only generate new knowledge but also empower a new generation of scientists, practitioners, and rural entrepreneurs. They reflect a national commitment to transforming food systems through climate resilience, innovation, and inclusive development.



Prof Linus Franke.

Prof Linus Franke from the UFS Department of Soil, Crop and Climate Sciences leads the chair on Climate Change Impacts and Mitigation in Agriculture. It adopts a systems-based, interdisciplinary approach to understanding the impact of climate change on agriculture and to developing viable adaptation and mitigation strategies. The chair aims to quantify and reduce the carbon footprint of agricultural activities, enhance carbon sequestration through improved land use practices, and contribute to policy development by generating empirical data and realistic models.

A significant component of this chair is capacity building, with a cohort of PhD and MSc students engaged in projects ranging from carbon credit systems to rangeland soil carbon dynamics, many of whom are supported through international mobility programmes such as the UFS-coordinated CaReFoAfrica. Projects such as the EU-funded MASSTER (Managing [South] Africa and Senegal Sustainability Targets through Economic Diversification of Rural areas) broaden the scope of the chair by integrating economic diversification and sustainable land management in mountain regions.



Dr Alba du Toit.

Under the leadership of ***Dr Alba du Toit*** from the Department of Sustainable Food Systems and Development, the Research Chair on Innovative Agro-processing for Climate-smart Food Systems reimagines local food systems through the application of consumer-led and culturally sensitive agro-processing technologies, particularly nixtamalisation, to improve the nutritional value and marketability of staple and underutilised crops such as maize, sorghum, cowpea, and *spekboom*. The chair supports product development, recipe design, and community-based trials to assess the adoption of new technologies, with a strong emphasis on empowering rural women and smallholder farmers. Several postgraduate students and postdoctoral fellows are involved in research projects, ranging from maize and sorghum processing to the valorisation of indigenous crops such as Bambara groundnuts and cowpea.



Prof Arno Hugo.

Prof Arno Hugo from the Department of Animal Science leads the Research Chair on Sustainable Livestock Production. This chair tackles the environmental footprint of the livestock sector while improving productivity, animal welfare, and food safety. By integrating genetics, feed management, and water-use efficiency across the value chain, the chair seeks to make livestock production more sustainable and economically viable. Numerous research projects are underway, exploring topics such as the impact of different diets on meat quality, the use of natural preservatives, and the conservation of wildlife species such as giraffes. The chair has produced multiple scientific publications and is deeply engaged with industry stakeholders, including the Red Meat Producers Organisation and the South African Poultry Association.



Prof Maryke Labuschagne.

Prof Labuschagne from the Department of Plant Sciences also leads the chair which focuses on Breeding of Climate-resilient Vegetables and Grains. The chair aims to strengthen the genetic base of both staple and neglected crops, such as maize, sorghum, cowpea, pigeon pea, cassava, and indigenous vegetables such as amaranth.

Through extensive collaboration with ARC scientists and plant breeders, the chair supports a broad portfolio of postgraduate research, covering genome-wide association studies, disease resistance screening, and nutritional profiling.

The diversity of projects under this chair reflects a strong commitment to crop diversification, biofortification, and food system resilience in the face of climate change.

The Research Chair on Communication for Innovation (which aims to explore how knowledge generated through research can be effectively communicated to different stakeholders to drive innovation), and the Research Chair on Impact Assessment of Climate-smart Interventions (which is dedicated to evaluating the effectiveness and scalability of climate-smart agricultural practices), are in the early stages of development. The latter will play a critical role in generating evidence-based policy recommendations and training stakeholders in impact assessment techniques.

The Research Chair on Agricultural Risk Financing is a newer initiative launched early in 2025. This chair aims to build a knowledge base around climate finance, green investment, and agricultural risk management, with research themes spanning banking sustainability, climate fintech, and multi-stakeholder engagement. The chair also develops executive education content to enhance financial inclusion and regenerative agriculture practices.

MORE FOOD-RELATED RESEARCH

In addition, a number of researchers across various disciplines have been involved in food-related research. The research of ***Prof Yonas Bahta***, Associate Professor in the Department of Agricultural Economics, focuses on the broader topic of resilience to climate change and its implications for food security and agricultural trade, specifically examining agricultural drought, food policy, and international trade.

In a recently completed study, he investigated the resilience of smallholder livestock farmers in agricultural drought.

Watch Prof Yonas Bahta's interview on Grootplaas.



Prof Yonas Bahta.

He believes that resilience – the ability to bounce back from adversity – is crucial, and that both the smallholder livestock sector (farmers) and the agrifood industry need to develop resilience to effectively cope with and recover from agricultural drought, macroeconomic stability (inflation), competitiveness, productivity, and other related factors. He found that only 9% of smallholder livestock farmers were resilient to agricultural drought. Farming households with access to credit, farmers who received assistance from the government (such as training and feed) during drought, and farmers who were part of a cooperative proved to be more resilient to agricultural drought. In terms of food security, he discovered that assets, social safety nets, and indicators of adaptive capacity had a positive influence on households' ability to withstand food insecurity.

Prof Wayne Truter's research portfolio centres on regenerative land-use systems for the rehabilitation of degraded agricultural and mined landscapes, integrating soil, vegetation, water, and livestock components into circular, climate-resilient production systems. His 26 years of research have refined the soil–vegetation–organics–livestock continuum, demonstrating how carbon, nutrient, and water cycles can be rebuilt to support long-term socio-ecological recovery.



CHILD FOOD POVERTY

A recent UNICEF report revealed that South Africa is one of 20 countries that account for 65% of all children living in severe child food poverty globally. Of particular concern is that 23% of children in South Africa are classified in that category and are at risk of life-threatening malnutrition and related health complications.



Prof Corinna Walsh.

Between 2022 and 2024, the research led by Prof Walsh from the Department of Nutrition and Dietetics centred on food and nutrition safety across the life course, with a particular focus on vulnerable community groups, such as maternal and child health in resource-limited settings. Through the ***Nutritional status of Expectant Mothers and their newborn Infants (NuEMI) study***, their work has generated novel evidence on micronutrient adequacy, dietary quality, and food security among pregnant women in the Free State. Findings have highlighted borderline iodine and iron status, as well as strong links between socio-demographic factors, stress, and pregnancy outcomes. This body of work has contributed to the development and validation of the South African Diet Quality Index for Pregnancy, a tool that supports context-specific dietary assessment and policy alignment with national maternal health priorities.

The research team conducted collaborative research in Lesotho, which explored the nutritional status of the community-dwelling elderly in Lesotho, and women's empowerment through proper education. Together, these studies highlight the importance of targeted, culturally relevant nutrition education in enhancing food security, promoting dietary adequacy, and empowering women and older adults in low-resource settings. Prof Walsh's recent international collaborations within the Improving Early Nutrition and Health in South Africa (ImpENSA) project have focused on strengthening food and nutrition safety through enhanced training of healthcare professionals during the critical first 1 000 days of life. The outputs from this study illustrate how context-appropriate, evidence-based training interventions can empower frontline health workers, bridge gaps between policy and practice, and ultimately improve the nutritional well-being of mothers and young children in South Africa.





LOOKING **TO A GREENER** FUTURE

Going green means adopting environmentally friendly, sustainable habits to reduce pollution, waste, and energy consumption, aiming to protect natural resources for future generations. It involves conscious, often gradual lifestyle changes such as recycling, using eco-friendly products, conserving energy, and reducing carbon footprints. Becoming green faces major hurdles, including high upfront costs for technology, deeply ingrained unsustainable habits, and lack of awareness.

GREEN CONCRETE

The Green Concrete Research Group in Engineering Sciences is at the forefront of sustainable construction materials research, addressing global challenges of resource scarcity, environmental pollution, and carbon emissions. Since 2023, group has focused on advancing innovative solutions in the domains of concrete recycling, geopolymer technology, 3D printing of concrete, and bio-based ecological applications. These projects bring together interdisciplinary teams of engineers, chemists, material scientists, and international collaborators, aiming to create next-generation sustainable binders and smart material systems.

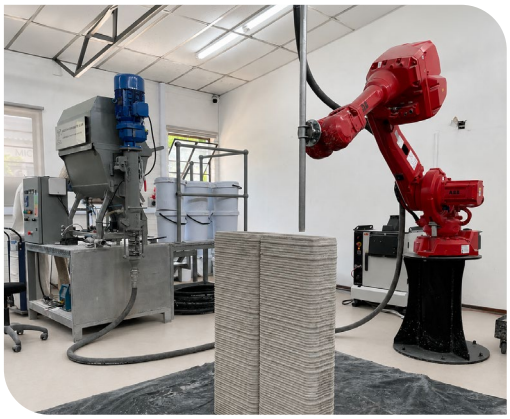


Dr Hossein Naghizadeh.

The flagship concrete recycling project investigates cutting-edge methods for developing recyclable concrete materials, with the overarching aim of reducing environmental burdens linked to Portland cement production. The research led by ***Dr Hossein Naghizadeh*** explores alternatives based on fly ash, waste concrete powder, and AAC block residues, offering pathways towards a fully recyclable concrete system. The project emphasises circularity, designing binders that can be reactivated, reused, and recycled without generating secondary waste streams. A unique property of fly ash-based geopolymer binder was discovered, enabling a novel re-activation method that allows complete recycling of concrete with zero waste. This innovation represents a paradigm shift in sustainable construction – the method is currently being filed as a patent at the UFS, protecting valuable intellectual property. In another project undertaken in collaboration with the Department of Chemistry, a new green cement formulation was successfully developed using aerated autoclaved concrete (AAC) block waste.

This binder demonstrates excellent reactivity and reduced carbon footprint and is also being prepared for patent filing. An extensive research programme on geopolymer concrete explores the formulation of geopolymer binders entirely from waste resources, including fly ash, ferrochrome slag, rice husk ash, coconut fibres, and termite soils. The project leverages waste valorisation to develop eco-friendly binders that not only replace Portland cement but also reduce the environmental footprint of waste disposal.

A strong network of collaboration exists between the UFS, Nelson Mandela University (NMU), and international partners in Africa, Asia, and Europe, creating a rich platform for innovation. A major achievement was the successful development of a novel one-part geopolymer binder, requiring only on-site water addition, simplifying application and broadening industrial uptake. This innovation is being filed as a joint patent between the UFS and NMU. A new accelerator was formulated to enhance setting and strength development in ambient-cured fly ash geopolymers, addressing one of the main barriers for large-scale industrial adoption. This product is being patented by the UFS.



The Concrete 3D printer.

The Concrete 3D printing project represents a new frontier in construction innovation, amalgamating advanced material design with robotics and digital manufacturing. In collaboration with the University of Johannesburg, postgraduate students and researchers are developing smart concrete 3D printing technologies. The project integrates civil, mechanical, and electrical engineering and material science expertise to design tailored binders, extruders, and robotic systems capable of printing customised structures.

Novel printable 3D-printed artificial reefs were developed for the wastewater treatment process. The 3D printing technology is expected to significantly advance the Algae Plant wastewater treatment project at the UFS, where 3D-printed artificial reefs will be utilised to improve water treatment and ecological resilience.

Read more about the 3D printing project here.

NATURE-BASED SOLUTIONS

Nature-based solutions also play a vital role in realising the Kunming-Montreal Global Biodiversity Framework (GBF), which was adopted during the United Nations Biodiversity Conference (COP15) in Montreal, Canada, on 19 December 2022. The GBF sets global targets for 2030 that aim to effectively conserve and manage at least 30% of the world's lands, inland waters, coastal areas, and oceans, prioritise ecologically representative and well-connected systems of protected areas, restore at least 30% of degraded ecosystems, reduce the loss of areas of high biodiversity importance, cut global food waste in half, and significantly reduce over-consumption and waste generation.

The UFS is involved in researching a wide variety of nature-based solutions, including methods like phycoremediation, phytoremediation, as well as microbial bioremediation to address concerns relating to water security and water pollution. Led by Prof Paul Oberholster, Dean of the Faculty of Natural and Agricultural Sciences and researcher in environmental management, researchers from the Centre for Environmental Management have pioneered technology using phycoremediation to treat acid mine drainage and domestic sewage, offering low-cost, sustainable solutions that recycle nutrients and reduce reliance on energy-intensive methods.

Key projects involve using specific microalgae strains (such as *Chlorella*) in pilot plants and large-scale systems to remove pollutants (nitrogen, phosphorus, etc.), sequester CO_2, and potentially create valuable byproducts such as biofuels, aligning with SDG 6 for clean water. This phycoremediation technology for domestic wastewater, developed in collaboration with the Council for Scientific and Industrial Research (CSIR) and the African Development Bank, is suitable for small to medium rural plants.

Prof Paul Oberholster.





Prof Julia Mofokeng seeks to improve water purification systems.

It does not use electricity or any dangerous chemicals and can be used on the existing infrastructure. The technology has already been rolled out in the Western Cape, Limpopo, and Malawi.

The algae plant established on the western part of the Bloemfontein Campus in 2024 has the potential for research that will ultimately position the UFS as a leader on the African continent. Instead of using algae raceways – the oldest system for the mass cultivation of algae – the plan involves installing 20 photobioreactors to cultivate the algae, operating off the grid. Additionally, a centrifuge will be implemented to separate the algae from the water.

Through her research, ***Prof Julia Mofokeng*** from the Department of Chemistry on the Qwaqwa Campus seeks to improve water purification systems through the development of fully biodegradable polymers/composites, thereby reducing the global challenge of plastic waste and water pollution while improving access to fresh water in our water-scarce country.

In her research, she prepares and characterises completely biodegradable polymers, their blends as well as the composites/nanocomposites, by integrating carbonaceous materials, natural fibres, and inorganic nanofillers to enhance the morphology, thermal, mechanical, and barrier properties of these materials. The research aims to provide sustainable alternatives to conventional petroleum-based plastics/polymers for short shelf-life/disposable as well as water-purification applications. Her team is also exploring how these materials can be used to remove heavy metals and other contaminants from water bodies, potentially providing a dual solution to pollution and water quality issues. This aligns with several United Nations Sustainable Development Goals, including Good Health and Well-Being (SDG 3), Clean Water and Sanitation (SDG 6), and Life Below Water (SDG 14).

The Centre for Mineral Biogeochemistry (CMBG) was established through the merger of the former UFS SAENSE Platform with the Mineral Node of the Biogeochemistry Research Infrastructure Platform (BIOGRIP). The CMBG focuses on advancing scientific understanding of intricate connections between water, soil, and life itself to address environmental challenges. Driven by the belief that innovation and discovery can transform our world, the research explores these complex relationships to develop innovative strategies for ecosystem restoration, resource management, and environmental sustainability. With this as background, the CMBG focuses, inter alia, on ecological engineering, research related to nature-based solutions, and land rehabilitation – all with a distinctly 'green-friendly' ethos.

Dr Schoeman's research in ecological engineering spans over two main areas: conventional and extreme ecological engineering. On the conventional side, she is focusing on projects such as designing constructed wetlands to treat water naturally, implementing urban greening initiatives to cool cities and manage stormwater, and regenerating various habitats to strengthen biodiversity. In terms of extreme ecological engineering, she focuses on developing innovative solutions for ecosystems that have been severely impacted by disasters such as industrial accidents or natural calamities.

View this video clip about Dr Yolandi Schoeman here.



Dr Yolandi Schoeman.



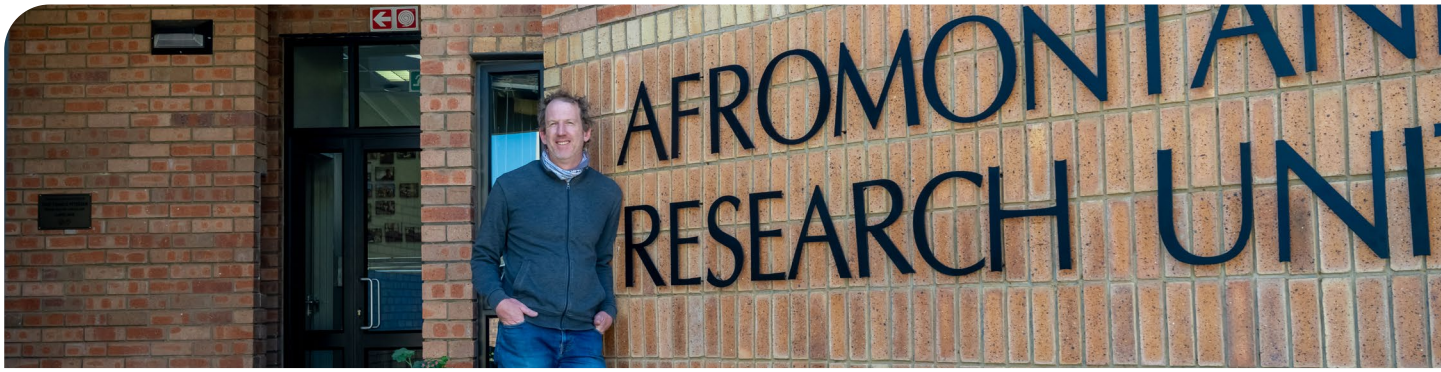


RESPECTING OUR LANDSCAPES

Landscapes represent the visible features of land – including mountains, water, and vegetation – as they integrate with natural or human-made elements to form a scenic, often aesthetic, view. These areas reflect a synthesis of natural landforms and cultural influences. The emphasis on biodiversity conservation since the signing of the 1992 Convention on Biological Diversity has focused our attention on its importance, but we need to continue to inspire people to take these concepts seriously and to link them to sustainable futures. We need to recognise the agency and non-human value of landscapes. A diverse group of researchers and postgraduate students at the UFS across various disciplines have brought these issues to the forefront over the past five years.

OUR MOUNTAINS

Southern African mountains are among the least understood socio-ecological systems on earth, yet provide ecosystem services that are essential for economic, social, and political stability in the region. Since it was established in 2015, the Afromontane Research Unit (ARU) has developed into South Africa's leader in mountain research. The unit is situated on the Qwaqwa Campus at the base of the majestic Maloti-Drakensberg, with the surrounding mountains providing a constant reminder and inspiration for research in these vulnerable landscapes.



Prof Ralph Clark.

The ARU's vision is to become a continental leader in African mountain research, with an immediate focus on the sustainable development of the Maloti-Drakensberg. The ARU's mission is to facilitate the development and capacity-building of a high-excellence African-based mountain research 'community of practice' that informs global mountain research theory and practice and contributes to mountain-related policy and governance from an African perspective, thus balancing a predominance of mountain research driven from the Global North and the Northern Hemisphere.

With research affiliates throughout UFS faculties and a wide variety of domestic and international partnerships, the ARU contributes intellectually and practically to the sustainable development discourse of Southern African mountains. A particular focus is placed on the Maloti-Drakensberg as a unique social-ecological system in the region and the rest of the continent. Researchers in this unit focus on multi- and transdisciplinary scientific approaches to the challenges faced by montane communities. The ARU is therefore strongly attuned to the global research focus on complex systems approaches, as it acknowledges that the Sustainable Development Goals cannot be reached by a 'business as usual' approach. The unit has a significant impact on the research climate on the University of the Free State's rural Qwaqwa Campus. It thus actively engages in and promotes research on Southern African mountains in order to encourage a stronger science-policy-practice interface.

View this video about the ARU here.

LTSER PLATFORMS

Long-term socio-ecological research (LTSER) platforms are place-based transdisciplinary research infrastructures for knowledge sharing and collaboration. LTSERs provide platforms for learning about and producing solutions to sustainability challenges that arise in susceptible areas.

The Mont-aux Sources LTSER (MaS-LTSER) platform in the northern Maloti-Drakensberg region focuses on interaction with relevant stakeholders, competent authorities, and researchers to find sustainable solutions to socio-ecological problems in the area.

Degradation is occurring in the alpine wetlands of this area, and some have already become severely degraded. Wetland degradation can lead to the loss of ecosystem services as well as the livelihoods of locals; therefore, the LTSER platform strives to work collaboratively with interested and affected parties to protect, restore, and maintain the environment.

RANGE EXPANSION

The ARU was an integral and leading partner in RangeX (which ended in 2024) – a multi-disciplinary, replicated field and laboratory experiment conducted in climatically and socio-ecologically contrasting regions that seeks to better understand these range shifts in mountain systems.

The project consortium involved partners from Chile, Denmark, France, Germany, Norway, South Africa, Sweden and Switzerland. Prof Ralph Clark, Director of the ARU, was the lead researcher from South Africa.



The RangeX multidisciplinary field and laboratory experiment.

RangeX seeks to better understand the processes and impacts of plants that are expanding their ranges following climate warming, and to use this knowledge to inform the development of policy regarding range-expanding plant species. The research focused on mountains, which are of crucial conservation value as hotspots of biodiversity, refugia for biota threatened by climate warming, and as key global sources of water, food, and livelihoods. However, mountains are experiencing above-average rates of warming and increasing pressure from invasive species and development, making them priority areas for sustainability research.

Range expansions, survival and persistence of both plants and animals – particularly in the face of climate change – are often dependent on plant-animal interactions (e.g. pollination and dispersal). Understanding how elevation, climate warming, and dispersal strategies drive both plant (native and invasive species) and pollinator responses is key to biodiversity management and climate-change mitigation strategies.

PLANTS

Recent pollination studies, led by ***Prof Sandy-Lynn Steenhuisen*** in the Maloti-Drakensberg, have revealed unique pollination systems and vertical dispersal strategies in highly invasive Rosaceae species.

The internationally collaborative RangeX project utilised camera traps to assess the impact of plant-pollinator interactions on the range expansion of plant species across elevations and under simulated warming treatments.



Prof Sandy-Lynn Steenhuisen.

View this video about Prof Sandy-Lynn Steenhuisen here.

Prof Clark led the research team that is investigating the floristics and biogeography of the northern and north-eastern Qwaqwa Malotis – one of the least well-studied areas in the Maloti-Drakensberg system. The project targeted the ARU alpine lease area and the Namahadi cutback as focal points for an intensive botanical survey between 2023 and 2025. Additional sampling was undertaken westwards towards Monontsha in the Kgotjwane catchment. The main aims were to determine the botanical diversity of the Qwaqwa Malotis; whether there are endemic species and species of conservation significance; and the floristic and biogeographical contribution of the Qwaqwa Malotis to the greater Maloti-Drakensberg.

Read about Prof Ralph Clark here.

ANIMALS

In January 2021, Prof Taylor set up the Mountain Bat Lab in the Department of Zoology and Entomology on the UFS Qwaqwa Campus. Working with a range of stakeholders, the Mountain Bat Lab aims to investigate the diversity of bats in the Eastern Free State, where two cryptic endemic montane species of bats are currently awaiting description. The role of bats as ecosystem service providers (through natural control of insect pests in apple orchards) and as ecological indicators of land use change and climate change (through transects along elevational and land use gradients) are also investigated. The research involves engaged community participation and interdisciplinary aspects, engaging scholars from four schools in Phuthaditjhaba and six apple farmers to probe and improve their perceptions about bats (and nature generally) and the positive role they play in the environment. The Mountain Bat Lab is also leading a multistakeholder and interdisciplinary project on the biodiversity and ecological restoration of the underexplored Witsieshoek Community Conservation Area (CCA) in close collaboration with the managers of Witsieshoek Mountain Lodge (Transfrontier Parks Destinations), the Batlokoa Royal Council who owns the land, the Maloti-Drakensberg Transfrontier Conservation Area (MD-TFCA), and Ezemvelo KZN Wildlife. The lab is partnering closely with an international expert on rewilding, Dr Kyran Kunkel from the American Prairie Reserve and the University of Montana.

Read more about Prof Peter Taylor here.

QWAQWA MALOTI BIOBLITZ AND REWILDING PROJECT



As part of the Qwaqwa Maloti Bioblitz and Rewilding Project – headed by Prof Taylor – plants, invertebrates, and vertebrates were surveyed during five expeditions to the Witsieshoek CCA between October 2021 and March 2023. Building on this foundation, the multidisciplinary team from the UFS (ARU, Departments of Zoology and Entomology, Plant Sciences, Geography, and Agriculture) and partners from other institutions in Southern Africa (University of Eswatini, Agricultural Research Council, University of KwaZulu-Natal, University of Venda, Rhodes University, Ezemvelo KZN Wildlife, Albany Museum, and National Museum Bloemfontein) have established a multi-taxon and multidisciplinary biodiversity and ecosystem health (soils, rangeland quality, ecosystem services) monitoring programme in the Qwaqwa Malotis. Research is being conducted over an elevational gradient of 1 800m to 3 100m, centred in the Witsieshoek CCA, using adjacent protected areas (Royal Natal National Park and Golden Gate Highlands National Park) as benchmarks representing relatively intact ecosystems. Witsieshoek CCA has enormous strategic importance – spanning the borders of Lesotho, the Free State, and KwaZulu-Natal – as a buffer zone for the Drakensberg UNESCO World Heritage Site, part of the Northern Drakensberg Expanded Freshwater and Terrestrial Environmental Observation Network (EFTEON) landscape, as well as part of the Maloti-Drakensberg Transfrontier Conservation Area (MDTFCA). Results suggest that new species of plants and animals remain to be discovered in this montane-alpine environment, which so far includes a new horseshoe bat species and two new grasshopper species.

View the video on the Bioblitz (2023) here.



SOILS AND GEOMORPHOLOGY

Research is also being conducted on the relationship between soil morphology and soil hydrology. It can mostly be applied to hydropedology, wetland delineation, urban development, mining environmental impact assessments (EIA), irrigation scheduling, and soil classification. Recently, soil organic carbon (SOC) studies have proven to be vital in the fight against climate change. However, in South Africa, most studies focus on regional or national scale models, thus leaving out small local or catchment scale quantification and mapping.

Therefore, the aim of this study, led by ***Prof Johan van Tol***, from the Department of Soil, Crop and Climate Sciences, was to quantify and map the soil organic carbon stocks of an alpine region in the Maloti-Drakensberg to see to what extent a model can extrapolate. The two main digital soil mapping (DSM) approaches selected were machine learning and expert knowledge. The models selected included SoLIM sample-based (SB) and rule-based (RB), random forest (RF), regression Kriging with cubist (RK-CB), LASSO, and universal Kriging (UK). All these models were calibrated only in the Tugela catchment, and afterwards, the models were extrapolated without re-calibration into nearby catchments to assess if they can extrapolate. The Drakensberg escarpment consists of a series of flood basalts, reaching up to a height of 3 482 m.a.s.l., roughly 1 000 m above the underlying Karoo Supergroup sandstones. This landscape is part of an impressive passive margin that formed during the breakup of Gondwana between 180 and 130 million years ago. After the formation of the Drakensberg basalts, a series of uplift events and subsequent erosion led to the birth of the 1 000 m rise of the escarpment in KwaZulu-Natal and Lesotho. However, its evolution, the uplift itself, and the timing of this uplift after the formation of the basalts are still being argued, making it a unique continental passive margin that has not been studied and understood extensively. A project led by ***Dr Liezel Rudolph*** is reviewing studies done on the evolution of the Drakensberg escarpment, including dating techniques used to identify denudation rates in order to provide a comprehensive basis for the development of contemporary cosmogenic nuclide research in the area.

HUMAN–MOUNTAIN RELATIONSHIPS



Dr Melissa Hansen.

The ARU has embraced the integration of social sciences and humanities into the study of mountains – working closely with communities and other stakeholders. Led by ***Dr Melissa Hansen***, a continuing project on human-mountain relationships in the MDTFCA interrogated processes of spatial production in the area, which contains a UNESCO World Heritage Site, and spans areas in both South Africa and Lesotho.

The socio-political, economic, cultural, and ecological dynamics of the area are immensely complex and historically laden. Conflict between economic and human development – and the maintenance of ecological integrity – is common. Challenges related to cross-border crime, such as stock theft, land degradation and unsustainable land use, cultural and heritage management, and transboundary cooperation in natural resource governance, are significant. With inspiration from Henri Lefebvre's theory on the production of space (Lefebvre 1992), the study adopted a constructivist case study methodology, with qualitative data construction and analysis.

Together with researchers from the ARU, the Global Mountain Safeguard Research (GLOMOS) has been researching the integration of social sciences and humanities concepts and methods in long-term monitoring in mountains. GLOMOS carried out 11 expert interviews with managers of mountain LT(S)ER sites to understand the practical and theoretical barriers and opportunities for such disciplinary integration. The results of this research can be used to inform the design of the socioeconomic aspect of the MaS-LTSER, as well as guide the related inter- and transdisciplinary research processes.

Taking the concept of social learning with herders further, ***Solomon Zondo's*** research focused on the response of transhumance of livestock-keeping in the Maloti-Drakensberg.

RESEARCH AND WEATHER STATIONS

The Witsieshoek-ARU Alpine Research Base (28o45'17"S 28o52'00"E) currently comprises two resurrected buildings of the three original Namahadi Police Border Post buildings, situated at 3 069 m – at the head of the Namahadi Pass – in the Free State (Qwaqwa Maloti) component of the Maloti-Drakensberg. The base is the highest-elevation research facility in Africa, the highest tourist mountain hut in Southern Africa, and the 21st highest mountain hut in Africa. The reconstruction of the base was completed in 2023.

Read more about the history of the Alpine Research Base.

In 2021, the Appalachian State University (ASU) and the UFS were awarded a grant from the United States Embassy for the '***Mountain to Mountain***' project (2021-2023), which included, inter alia, the installation

Alpine Research Base in the Maloti–Drakensberg.





One of the weather stations in the Mountain to Mountain project.

of five weather (meteorological) stations – one on the Qwaqwa Campus, and four in an elevation transect in the northern Maloti-Drakensberg. The weather stations were installed between 2022 and 2023 and cover an elevation difference of 1,7 vertical kilometres – the only such elevation array we are aware of in Southern Africa. This array also includes the only functioning weather station in the alpine zone in South Africa.

In June and July 2024, the African Mountain Research Foundation (AMRF) sponsored a full calibration and service of the five stations, as well as the creation of a live feed portal for each station. This was done by Prof Alistair Clulow from the University of KwaZulu-Natal, with the assistance of Zandile Mncube from the UFS Department of Geography.

The weather stations form part of the ARU's MaS-LTSER instrument array and will also form part of the Northern Maloti-Drakensberg EFTEON (a South African Environmental Observation Network [SAEON] research infrastructure). The weather stations have already proven incredibly valuable in providing novel weather data not previously available. For instance, the Sentinel Car Park station logged winds of 157 km/h during a cold front in July 2024, indicating that our mid-latitude cyclones ('cold fronts') have mountain winds as strong as Category 2 hurricanes. A fire danger index will also soon be added to the live feed for use by the North-Eastern Free State Fire Protection Association.

The stations also provide essential live data for the Witsieshoek Mountain Lodge in terms of risk management around mountain recreation, and we hope that the data will be able to feed into the South African Weather Service warnings and general climate modelling and forecasting in the region.

Read about the mountain researchers here.

BEYOND OUR BORDERS

The ARU is also involved in research initiatives beyond the borders of South Africa. These include:



MANICA HIGHLANDS INITIATIVE

The ***Manica Highlands Initiative*** (MHI) was founded in 2011 by Prof Clark (then a postdoctoral research fellow at Rhodes University) as a network to encourage research and interventions for sustainability in the Manica Highlands. The Manica Highlands is a linear (north-south) transboundary mountain system some 8 500 km^2 in extent, shared between Zimbabwe and Mozambique in South-Central Africa.

The mountains are characterised by mosaics of moist evergreen forests, miombo woodlands, and high moorlands. Various land uses beginning in prehistoric times have left a complex legacy of human-environment interactions that continues today. In November 2023, the coordination of the MHI was transferred to the care of regional expert Dr Anthony Mapaura, currently a postdoctoral research fellow with the ARU, with secretariat assistance provided by the African Mountain Research Foundation.

Recent research has included the first comprehensive enumeration of plant endemism in the Manica Highlands, and invasive species research and management in the Manica Highlands, building on the 'R4D' application and coordinated by the Centre for Biological Control (Rhodes University) in partnership with Zimbabwean agencies.

MALAGASY MOUNTAIN PROGRAMME

Madagascar's high-elevation systems (>2 000 m) are scattered massifs along the length of the Malagasy Central Highlands. Many of these systems are poorly researched, or research is now very outdated. Consequently, these massifs are some of the least well-researched components of this island. A collaboration between the ARU, Association Vahatra, and the University of Antananarivo seeks to better profile and understand these Malagasy mountains in terms of global change challenges.

This forms part of the ARU's mission to encourage the development of a vibrant Southern African community of practice for mountain research, policy, and practice. The Malagasy Mountain Programme encourages single-disciplinary to multidisciplinary and transdisciplinary approaches under a social-ecological systems paradigm. Topics include biodiversity (re-)exploration and

enumeration, taxonomy, biogeography, fire ecology, non-native invasive species, climate studies, social sciences, and governance.

INTERDISCIPLINARY RESEARCH BEYOND THE ARU

Within the theme of 'respecting our landscapes', there is a developing interest in research on mountains and landscapes that is not directly aligned with the ARU.



Prof Mogomme Masoga.

The 2024 article by the Dean of The Humanities, ***Prof Mogomme Masoga***, in the *Pharos Journal of Theology* ('The Pragmatism of Practical Theology in the Conservation of the Natural Habitat: An Ecotheology Perspective'), examines how practical theology can address environmental crises through a focus on action-orientated conservation, highlighting the intersection of faith, ecology, and community-based, sustainable, and ethical practices in protecting natural habitats. ***Dr Calvin Ullrich***, the Director of the recently formed Centre for Interdisciplinary Research in Religion, Community, and Ecologies, has situated some of his research at the intersections of philosophies of embodiment, affect theory, and theological systematics. A central achievement of this research has been the development of a philosophy of trauma – trauma understood not only in terms of pathology but as ontologically constitutive for human life. Consequently, Dr Ullrich has sought to integrate this philosophical development with ecological studies (eco-phenomenology) to explore the implications of a 'generalisable trauma', which is shared in solidarity between both the human and non-human. Eco-phenomenology is a philosophical approach that merges phenomenology (the study of lived experience and consciousness) with ecology (the study of organisms and their environments). It focuses on the direct, sensory, and bodily experience of being in nature. Rather than treating the environment as an abstract, objective resource to be measured or exploited, eco-phenomenology emphasises our intimate, reciprocal connection with the world. Mountains and the landscapes associated with them have been significant cultural and spiritual heritage sites for thousands of years.



Dr Shirley du Plooy.

The anthropological fieldwork of ***Dr Shirley du Plooy*** from the Department of Anthropology, who has worked primarily

with Sesotho-speaking communities in the Eastern Free State and Lesotho, falls within the intersecting ambits of pilgrimaging, health and traditional health, rites of passage, and emerging adulthood. Her theoretical contributions emphasise the entangled and enmeshed ways of knowing and being in more-than-human worlds. Her recent research focused on four sacred sites – Mantsopa, Mautse, Motouleng, and Wetsie's Cave – all situated in the Mohokare River Valley, which forms part of the present northeastern Free State and borders on Lesotho's western boundary. She reflects on the landscape itself as a spiritual entity in relationship with the people called to reside and visit these sites over thousands of years.



PRECIOUS WATER RESOURCES

Water is a vital, scarce resource in South Africa, essential for economic growth, human survival, and ecological sustainability. As the 30th driest country globally, South Africa relies on water for agriculture, mining, and energy production, with demand expected to exceed supply. It is crucial for maintaining health, reducing poverty, and ensuring food security. About 70% of the GDP is supported by water from major river systems. South Africa faces significant water stress, necessitating conservation, infrastructure maintenance, and the development of alternative sources such as groundwater and desalination.

Twenty-two (22) critical strategic water source areas provide a large portion of the nation's water, requiring protection to ensure long-term, sustainable supply. With demand projected to soon exceed supply, managing water resources is critical for South Africa's future. For more than 30 years, the Centre for Environmental Management (CEM) has led innovative research and training in water resource management. Using ecological engineering, a discipline that seeks not only to protect but also to regenerate and enhance natural ecosystems through the integration of human ingenuity and the inherent wisdom of nature, Prof Oberholster, previous Director of the CEM has undertaken impactful research at the nexus between science, sustainability, and ecological stewardship.

In collaboration with the Council for Scientific and Industrial Research (CSIR) and local communities, he spearheaded the 'Alternative low-cost solution to rural sewage wastewater treatment by using phycoremediation'.

Read more about phycoremediation at the UFS.

This initiative aims to mitigate health risks associated with wastewater treatment works (WWTWs) and foster poverty reduction through technological innovation. In a related study investigating nature-based solutions to treat domestic wastewater, Prof Oberholster demonstrated how the successful implementation of the algae-based wastewater treatment pond system (WSP) could assist in improving WWTWs, especially in rural areas of South Africa and the rest of the continent.

The scope of Prof Oberholster's work extends beyond wastewater treatment. As the principal investigator for a project financed by the Global Environment Facility (GEF) through the African Development Bank and African Climate Technology Centre (ACTC), he explored the potential of phycoremediation as a climate adaptation strategy. This project, spanning Botswana, Malawi, and South Africa, demonstrated how effectively managing wastewater treatment plants could significantly reduce the proliferation of harmful nutrients and pathogens exacerbated by climate change.

Prof Oberholster and ***Dr Nicolette Vermaak*** have both been involved in a research collaboration between the Geological Survey of Denmark and Greenland (GEUS), the University of the Western Cape, the South African Department of Water and Sanitation, and Ramboll in Denmark, which focuses on the Langebaan Road aquifer and Atlantis aquifer field sites. The Managed Aquifer Recharge in Southern Africa (MARSA) project aims to develop managed aquifer recharge (MAR) technologies that allow for a broader span of water resources to be used for MAR, including stormwater, river water, saline water, and even reclaimed water (treated wastewater).

Due to the current and prolonged energy crisis in South Africa, the requirement for new energy sources has gained momentum with the government considering unconventional oil and gas (UOG) development in the Karoo. However, as with other countries, South Africa is experiencing increased water stress due to the effects of climate change and high demand for water for human and economic needs. This has led to greater reliance on available groundwater. It is thus important that this vital resource is protected by developing appropriate measures informed by science. UOG extraction, often involving hydraulic fracturing, is extremely water-intensive and comes with significant risk to the environment, specifically as it can contaminate both surface water and groundwater during spillages and during the fracking process itself.





Dr Surina Esterhuyse.

The research, led by ***Dr Surina Esterhuyse***, a researcher at the CEM, focuses on understanding the UOG extraction technology and its environmental and socio-economic effects. The research has provided advice to governments and regulatory bodies on how to effectively monitor and manage these technologies, and how to regulate the extraction activities, both in South Africa and internationally.

Recent climate projections for the Southern African region strongly indicate that the occurrence of rainfall extremes and prolonged drought periods may increase in the near future. Such extreme events pose a severe threat to water resources, food security, public health, infrastructure, biological diversity, and ecological systems in the region. Changes to the temporal dynamics of flow regimes in rivers as a result of these projected changes could hold important consequences for both humans and riverine biota. Being an essential source of fresh water, mountains are considered the 'water towers' of the world. The Maloti-Drakensberg is a critical water resource area in Southern Africa, serving as the headwaters for several major rivers, including the Orange (Senqu), Tugela (Thukela), Caledon, Vaal, Mzimvubu, Mthatha, and uMgeni. It is therefore no surprise that much of the UFS' water-related research is based in these parts.

A fundamental requirement for thorough water management is a water quality assessment. Human activities often lead to negative impacts on water quality due to pollution. One of the hallmarks of the Anthropocene has been, among others, the degradation of aquatic ecosystems due to pollution. In the Qwaqwa region, communities must often rely on natural water resources of dubious quality. These communities are, therefore, extremely vulnerable to water insecurity because of a combination of factors such as climate change, obsolete water infrastructure, ageing and underperforming wastewater treatment plants, and the widespread degradation of local river systems.



Dr Marinda Avenant.

In 2022 and 2023, a team led by ***Dr Marinda Avenant*** from the CEM, together with collaborators from the Department of Zoology and Entomology on the Qwaqwa

Campus, the Technical University Dresden, and the Cape Peninsula University of Technology, conducted sampling campaigns in four headwater streams in Qwaqwa to assess the water quality under high (summer) and low (winter) flow conditions. The results indicate that even though anthropogenic impacts increase from upstream to downstream, none of the sampling sites are without concern, stressing the urgent need for measures to increase the water quality of these headwater streams in the region.

It is these challenges that inform ***Prof Otomo's*** research, which focuses on the drivers of river pollution in the Qwaqwa region, the mitigation/remediation of their effects, and the development of simple and quick methods to assess water quality. To mitigate the deleterious effects of sewage sludge-induced pollution on terrestrial and aquatic ecosystems, Prof Otomo has conducted research on the benefits of biochar amendment of sewage sludge as an alternative management strategy. He has also shown that biochar amendment of the locally produced sludge before open-air storage could decrease toxic effects on terrestrial invertebrates such as oligochaetes. In an attempt to reclaim the quality of contaminated water, continuing research in Prof Otomo's laboratory involves the use of 'mycofiltration' – the use of fungal mycelia for the purpose of water filtration. This relatively untapped eco-friendly technology is attracting more attention, yet its real merits are only now being established and documented scientifically. Using freshwater snails, Prof Otomo's research team has successfully shown that mycofiltration significantly reduces the toxicity of water samples contaminated with inorganic and organic toxicants.

Read the full article on the subject here.

Finally, through the study of both the escape behaviour of earthworms in semi-aquatic environments and the unique behaviours of mosquito larvae, Prof Otomo has released two novel and affordable methods suitable for the quick assessment of water quality. These methods are simple enough to be used by both professionals and novices.

The Phutaditjhaba region is exploring multiple ways to boost the economy. One approach could be commercial plantation forestry, which has proven successful in other mountainous areas for economic development.

The Eastern Free State is currently unknown for forestry but could be a viable option due to water availability, with only altitude being the main concern. Situated in the Maloti-Drakensberg, Phuthaditjhaba falls within one of South Africa's strategic water resource areas characterised by high natural runoff.



While this region's abundant water resources may suggest potential for commercial forestry, the conversion of natural mountain grasslands to pine forest plantations could lead to negative consequences such as reduced water availability downstream. The environmental impacts of altering land use and land cover, particularly in this catchment, could be severe given the hydrological disruptions associated with commercial plantations.

A PhD student, Colby Weiss, has studied and modelled the impacts of forestry on catchment hydrology in this region. The model scenario compared the current state of the hydrology to the proposed change of grassland and shrubland to commercial plantation forestry. Results for the catchment showed a 40-60% reduction in runoff, lateral flow, and groundwater recharge. Reductions in streamflow were up to 80%, as change in streamflow is spatially dependent. All of this could impact the natural environment within the catchment and water availability downstream. Overall, the study offered valuable insights into the potential environmental repercussions of introducing commercial plantation forestry in the region and its downstream catchments.

The Institute for Groundwater Studies (IGS) is the only institute in South Africa dedicated to geohydrology. Founded in 1974 by Prof FDI Hodgson, the IGS is the oldest institute on the UFS Bloemfontein Campus and has produced more than 1 000 postgraduate students. The institute conducts contract research on a wide variety of water-related topics of special interest, with important contributions to the mining and industrial sectors in terms of water management, minimisation of pollution, as well as understanding the nature and behaviour of South Africa's aquifers. ***Dr Anton Lukas***, postdoctoral fellow, investigated mining activities that threaten transboundary aquifer systems in the water-poor areas of the SADC region. ***Prof Francois Fourie*** and his (then) PhD student Kobus Haumann undertook research focusing on the use of a geophysical technique (two-dimensional electrical-resistivity tomography) in order to map groundwater-bearing zones in the subsurface.



Prof Modreck Gomo.

Prof Modreck Gomo specialises in hydro-geochemistry, aquifer pumping tests, and groundwater quality. The IGS water research laboratory has ISO 17025 accreditation from the South African National Accreditation System (SANAS) for all methods used in the IGS. With this accreditation, the IGS laboratory is setting itself apart from its competitors and will continue its contract research on water-related topics in the mining and industrial sectors.

THE CRITICAL ROLE OF WETLANDS

Wetlands are essential for storing and filtering water in a water-scarce country, improving water quality. They act as natural sponges, absorbing excess water during heavy rainfall, thus mitigating flood damage. These areas are crucial habitats for diverse aquatic insects, birds, fish, and mammals. Wetlands act as carbon sinks and help communities adapt to changing climate conditions. Despite their value, South African wetlands are threatened by drainage for agricultural use, urban expansion, and industrial development, pollution from sewage, waste, and agricultural fertiliser seepage, as well as mining activities and the removal of indigenous vegetation.



The alpine terrestrials of the Maloti-Drakensberg in Southern Africa play a crucial role in ecosystem functions and livelihoods, yet they face escalating degradation from various factors, including overgrazing and climate change.

A study led by Prof Van Tol has mapped degradation of alpine wetlands in the northern Maloti-Drakensberg using advanced digital soil mapping (DSM) techniques coupled with remote sensing. Gully density analysis revealed terrain attributes as dominant factors driving degradation, highlighting the need to consider catchment-specific susceptibility to erosion.

This challenges the traditional assumptions, which mainly attribute wetland degradation to external forces such as livestock overgrazing, ice rate activity, and climate change. The resulting sensitivity map could serve as a basis for integrated catchment management (ICM) projects, facilitating tailored conservation strategies. The highlands of Lesotho form part of the Great Escarpment of Southern Africa, with an elevation ranging from 2 000 to 3 482 m.a.s.l.

This mountainous landscape contains many wetlands which, although small in extent individually, together likely exceed thousands of hectares; some of these are peat-forming and are therefore mires. Earlier research described these wetlands as raised bogs based on high rainfall in the Maloti Mountains. More recent studies recognised the importance of groundwater as the driving force behind the hydrology of these mires.

A study undertaken by ***Dr Pieter-Louis Grundling*** and ***Tsepo Sekaleli***, associated with the CEM, reviewed the contradictory information and classification of these mires, explored the hydrology, chemical composition, and morphology of the mires and revised their subsequent characterisation. Results indicated that the Maloti Mountain mires – which are dependent on surface and groundwater flows and support highly productive vegetation comprising herbs and sedges – are fens rather than bogs.



Toka Mosikidi.

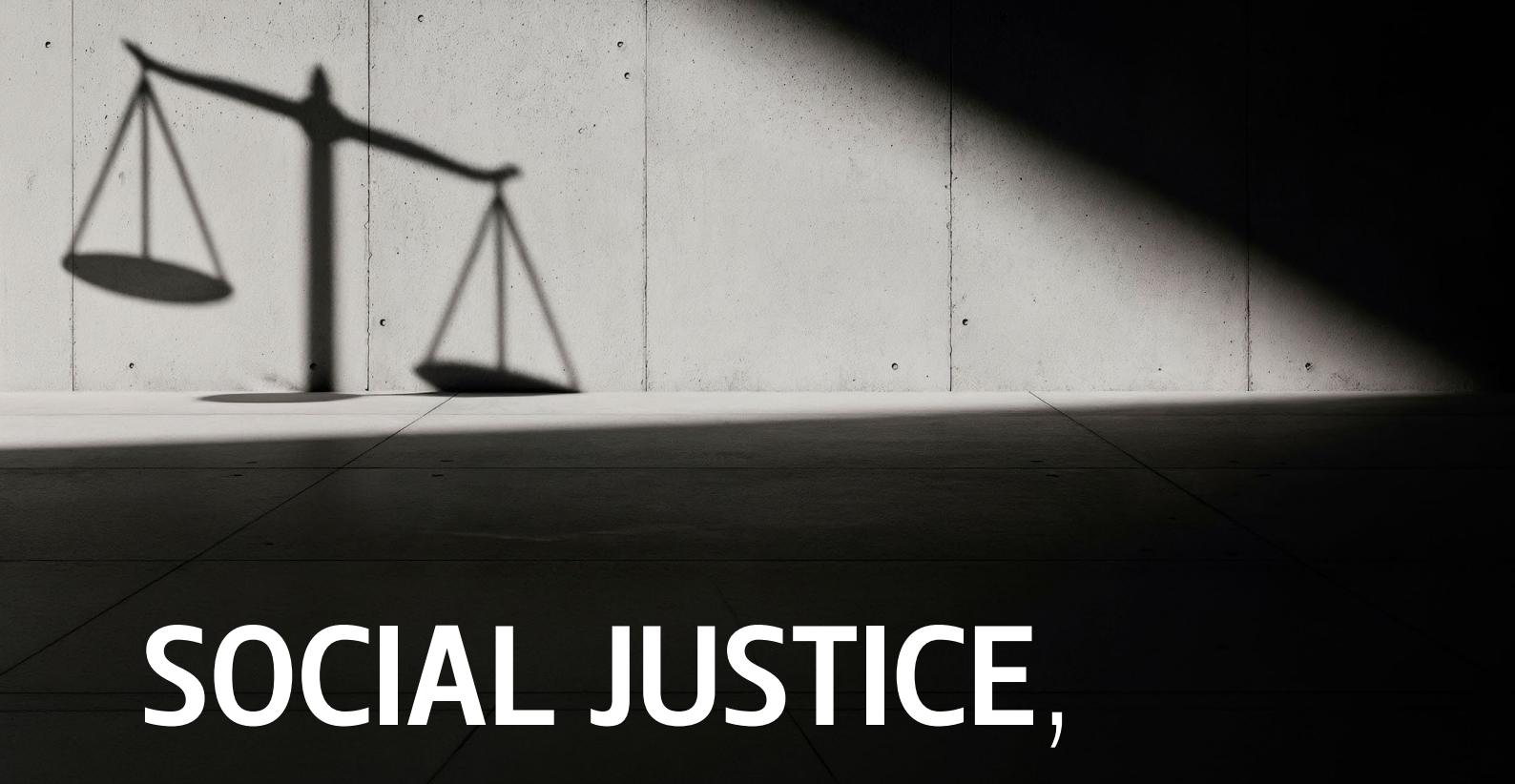
PhD student ***Toka Mosikidi*** has been conducting fieldwork in the wetlands, using acoustic recorders to capture the dawn chorus of local bird species.



Prof Aliza le Roux.

His research forms part of broader work in the Qwaqwa Campus Department of Zoology and Entomology under the guidance of ***Prof Aliza le Roux***. That broader perspective opened the door to a bigger question: what can birds' songs tell us about the wetlands they inhabit? Because birds are sensitive to their surroundings, changes in their songs can indicate problems in wetland ecosystems before they become visible. Birdsong can act as a proxy for wetland health – when there is less variety or intensity in their calls, it could mean that the environment is under stress from pollution, water changes, or habitat degradation.

Listen to the dawn chorus of the local birds here.



SOCIAL JUSTICE, SOCIAL DISRUPTION, AND **SOCIAL TRANSFORMATION**

There are many contemporary definitions of social justice, depending on the context. However, there is agreement that the issues include the principle of fair and equitable distribution of resources, opportunities, privileges, and responsibilities within a society, ensuring that everyone's fundamental human rights are respected, regardless of race, gender, disability, or background, by dismantling systemic barriers and promoting inclusion for all members to thrive. It focuses on correcting imbalances through policies and actions that guarantee equal access to necessities such as healthcare, education, and economic mobility, advocating for marginalised groups against oppression and discrimination.

SOCIETAL TRANSFORMATION THROUGH LAW

The Faculty of Law has demonstrated a strong focus on constitutional law as a tool for societal transformation. Research in this area explores the role of law in promoting justice, fairness, and equality, with particular attention to vulnerable and marginalised communities. This includes work on access to justice, legal empowerment, and the practical implementation of constitutional rights. The Free State Centre for Human Rights (FSCHR), based in the Faculty of Law, is a critical, interdisciplinary, and contextually engaged research, advocacy, and legal-practice institution, focusing its work on the relationship between human rights and transformation.



Prof Danie Brand.



Dr Annelie de Man.

In his research, the Director, ***Prof Danie Brand***, has generally focused on the relationship between rights, democracy, transformation, and impoverishment.

More recently, he has explored the background question of what – in the context of a constitution that requires the transformation of our system of law and of our society – the relationship between law/rights, democracy, and impoverishment entails. He considers this question primarily in the context of property law (more particularly in eviction law), configuring an understanding that the transformation of property law entails – in the first place and perhaps most importantly – a democratisation of that system of law.

Dr Annelie de Man's recent research explores how the principles of a human rights-based approach can/should be applied to ensure more sustainable and equitable development outcomes and how these principles can be applied as a means to combat corruption. She argues that, although African countries are rich in natural resources, very few of these resources reach the most vulnerable. This has a significant impact on the fulfilment of economic and social rights on the continent, as poverty is multidimensional and inextricably linked to human rights, in particular the right to development. Illicit financial flows (IFFs) compound these issues, as essential resources are diverted from development programmes.

GENDER

Research addressing gender-based violence, equality, and the rights of women and children has been a consistent strength of the Faculty of Law. ***Prof Tameshnie Deane***, Vice-Dean: Research and Postgraduate Studies, has been singularly focused on researching and publishing on gender-based violence (GBV), femicide, child justice, refugee rights, and the intersection of law and cultural practices, with a strong emphasis on policy reform and advocacy.



Prof Tameshnie Deane.

Her monograph, *Gender-Based Violence and Femicide in South Africa* (Springer, 2024), presents new perspectives on GBV in South Africa, arguing that violence against women is a manifestation of unequal gender relations and harmful manifestations of hegemonic masculinity, which are governed by patriarchal beliefs, institutions, and systems. Her efforts will contribute to advancing women's protection and achieving Goal 5 of the Sustainable Development Goals – i.e. Gender Equality.

Read an extract from her article here.

The Centre for Gender and Africa Studies (CGAS), as the name suggests, has a strong focus on gender-related issues. The centre is committed to the study of feminism, masculinities, and gendered identity dynamics in society and how these fields intersect in Africa. Their interdisciplinary research areas include studies on, inter alia, feminist security studies, gender, and peacebuilding; GBV and everyday assumptions of gender and sex-role expectations reproduced through social and cultural norms; and gender and community development, including the intersections between community, especially rural development, and rural education. In 2022, CGAS expanded its footprint with the opening of a new hub on the Qwaqwa Campus under the leadership of Dr Grey Magaiza, Senior Lecturer, Head of the Community Development Programme, and the Deputy Director for CGAS on the campus.

Read more about the opening of the new hub here.

Dr Juliet Kamwendo has researched how male victims experience GBV, highlighting socio-economic factors such as poverty, unemployment, and patriarchal norms as drivers, leading to underreporting due to toxic masculinity, shame, and fear of ridicule, with significant impacts on men's mental health,

family stability (divorce, abandonment), and their overall economic productivity, recommending awareness campaigns and policy changes to address these deep-rooted issues. She also spearheads efforts to integrate gender considerations into Africa's climate restoration agenda. Women – who are primarily responsible for household food security and water provision – bear the brunt of environmental degradation, leading to increased workloads, reduced income opportunities, and heightened vulnerability to climate-related disasters. Furthermore, the loss of forest cover and biodiversity exacerbates the challenges faced by women, particularly in rural areas where they depend heavily on natural resources for their livelihoods. ***Prof Heidi Hudson's*** current research interests concentrate on discursive and material gender deficits of liberal peacebuilding in the post-colony, as well as on posthuman feminism. Some of her research also focuses on the gendering of Africa's international relations and postcolonial/decolonial epistemic resistance.



Prof Heidi Hudson.

HIGHER EDUCATION AND SOCIAL JUSTICE

Higher education acts as a critical driver for social justice by promoting equity, redress, and inclusion, aiming to overcome historical inequalities through broader access and student success. It involves transforming curricula, fostering critical consciousness, and ensuring diverse representation among staff and students to create a more equitable society.

Prof Melanie Walker.



The Higher Education and Human Development (HEHD) Research Group is led by ***Prof Melanie Walker***, the ***SARChI Chair in Higher Education and Human Development***. This is a Tier 1 national research chair supported by the Department of Higher Education and Training (DHET) and by the National Research Foundation (NRF). The chair is concerned with advancing social justice and removing inequalities in and through higher education.

Their research investigates how higher education policies, processes, practices, and values contribute to our understanding of the conditions of possibility for human development, capabilities formation, and for redressable injustices in and through higher education. They consider how the reproductive effects of higher education can be interrupted across spaces of classroom, campus, and community in the direction of well-being, agency, and ecosocial justice. They are also interested in participatory approaches to research – such as digital storytelling and photovoice – for their potential to mobilise agency, a plurality of perspectives and knowledges, and to advance the repair of historical injustices. The research is aligned with the 2030 SDGs, espeically Goal 4 - Quality Education, linking their work to global development conversations.

In her article 'Young people's voices on social justice: a participatory storytelling and action learning approach', Prof Walker argues that, in working to transform our unequal society, we need to take diverse youth voices, including young people at university, into account regarding what matters to them. To enable their voices, the paper recounts a participatory storytelling research project with students. Using individual and collective digital storytelling, participants produced an archive of everyday stories, serving as a database to analyse social (in)justice issues and themes and co-create knowledge from the ground up, with their emergent ideas categorised in a social injustice map.

Prof Faith Mkwananzi is Senior Researcher with the HEHD Research group. Her research centres on higher education, mobility, and development in sub-Saharan Africa, including research on social justice, human migration, inclusion and exclusion in higher education.



Prof Faith Mkwananzi.

In her research on 'Mapping higher education beyond Agenda 2030: International students and digital learning in South Africa', Prof Mkwananzi used two universities as case studies – one urban and one rural – emphasising empirical, methodological, and theoretical aspects. Focusing on African international students, the project extends current research on student migration (within Africa) and the internationalisation of higher education. Interviews, focus groups, and a participatory video are used to explore digital (in)equalities. The capability approach is used to analyse the intersections between migration, higher education, technology, and sustainability. Ultimately, it is expected that the findings will contribute to SDG Goal 4 – Quality Education, and 9 – Resilient and Inclusive Technology Infrastructure, which relate to higher education beyond 2030.

In their paper 'Exploring an alternative access route to higher education in South Africa: A human development and social justice analysis' (2024), Prof Mkwananzi and Dr Carmen Martínez-Vargas combine ideas from the capability approach and social justice to understand what widening access may mean through a human development lens in contexts of historical injustice and inequality. It draws on university preparation programmes as a route to expand access and participation for students who might otherwise not have access to university. In doing so, it presents empirical and theoretical contributions to the multidimensionality of inequalities and how these influence higher education opportunities.

Together with co-researchers Brody, Cooke, Harvey, Hodgkinson, and Sori-Donlan, Prof Mkwananzi investigated how arts-based methods can promote youth voice and engagement in global development, arguing that engaging young people's diverse voices, ideas, and knowledge in matters that affect them is vital to enabling them to become active citizens, develop more inclusive societies, and ensure that development programmes remain accountable to the young people they aim to benefit.

Prof Mikateko Mathebula led the project 'Life after 'varsity' in South Africa: rural youth narratives on their post-university trajectories'. The project investigated the contribution that universities make to the transformation of rural communities by exploring and describing the post-university life trajectories of low-income youth from rural areas in South Africa. Rurality in the South African context reflects the broader history of colonialism and dispossession – a context that presents significant challenges for young people to access quality education, skills training, or formal employment as pathways to improving their lives. Understanding the aspirations, livelihood capabilities, employment opportunities, and daily lives of rural youth is important, because it is part of the key to achieving the 2030 Agenda for Sustainable Development – transforming rural communities. However, this transformation should go beyond modernisation approaches that lead to rural-to-urban migration or distort rural identity in sub-Saharan countries. Instead, it should focus on ways to improve rural conditions, increase the set of valued opportunities available to rural communities, and make rural lives more sustainable.

Read more about Prof Mikateko Mathebula here.



Prof Mikateko Mathebula.

RESTORATIVE JUSTICE AND GREEN VICTIMOLOGY

In the Department of Criminology, ***Prof Robert Peacock's*** research on the victimology of state crime reveals the hegemonic interconnectedness between western legal systems, punishment, and the historical, geopolitical, cultural, and economic dimensions of society. It calls for transcending narrow constitutional and legal frameworks in analysing conflict, harm, and access to justice.



Prof Robert Peacock.

This transformative vision of justice was further articulated in Prof Peacock's 2022 annual lecture for the *International Journal of Restorative Justice* in Donostia/San Sebastian, Spain, titled 'Restorative Justice and Access to Justice: Critical Reflections on the Global North–South Divide', delivered during the 17th World Society of Victimology Symposium. His contributions, reinforced by his Special Consultative, Observer, and Delegate status at the United Nations, advance a critical, decolonial, and emancipatory framework that reimagines justice not as retribution but as restoration – seeking social repair, reconciliation, and the dismantling of structural inequality as the foundation for lasting peace. Within the Anthropocene epoch, subsequent research by Prof Peacock positioned green victimology and restorative justice as an emancipatory framework that challenges the anthropocentric focus of mainstream victimology, which has largely overlooked the environmental dimensions of victimisation and is key to addressing the multifaceted and intersectional nature of environmental victimisation and access to justice.

The emerging field of green victimology was considered a useful lens to understand the complexities of victimisation resulting from environmental harm, particularly in the context of colonisation, Western development paradigms, and epistemic privilege, as well as enduring scientific colonialism. This discipline area presents the potential to expand traditional victimology by recognising that victims of environmental crimes are not limited to human beings but also include nonhuman entities, such as animals, plants, and ecosystems.



SMALL TOWNS AND SOCIAL DISRUPTION

Prof ***Marais's (CDS)*** research interests include housing policy, small cities and towns (mining and renewable towns and cities), and public health, focusing on children. In addition to concentrating on these themes separately, he also focuses on integrating them.

He prefers research that focuses on real-world problems in housing policy, mine-community relations, mine closure, and urban health. The main contribution of his work has been to improve the understanding of the social dimensions of mine closure, investigating how the decline and cessation of mining activity reshape communities, governance systems, and local economies. His work helps to understand the complex transition from mining-dependent economies to more diversified and sustainable futures, particularly within the South African and broader Global South contexts, and shows the path dependency in mining communities after the closure. A major strand of his work investigates post-mining governance – how institutions manage (or fail to manage) the social legacies of extraction. Inadequate planning and weak coordination among state, private, and community actors often exacerbate vulnerability and hinder effective transition. His single-authored book, *The Social Impacts of Mine Closure in South Africa: Housing Policy and Place Attachment* (2023) makes the point that mine closure debates and processes should include thinking about mobility and migration. His work highlights how mining processes create long-term dependencies. He was the first researcher to link mine closure and social disruption and to warn against dependencies on mining booms.

Recent books by Prof Lochner Marais.





BORDERS, BOUNDARIES, AND **IDENTITIES**

Borders and boundaries define limits, but borders are usually legal, political lines between countries. Boundaries are wider, encompassing borders but also include physical fences, regional, and abstract social or personal limits (e.g. property lines or cultural distinctions). These structures are often considered interchangeable but have distinct meanings. They also relate to the formation of identities and the formation and transformation of intra-societal boundaries.

GEOPOLITICAL CONSIDERATIONS

The movement of people has featured throughout human history, so substantial is the legacy of migration that the freedom of movement within and across borders was enshrined in Article 13 of the UN Universal Declaration of Human Rights in 1948. Economic opportunity, political instability, and environmental change are primary drivers of movement. Borders, migration, and identity are deeply intertwined, with borders acting not just as physical lines but as spaces that construct, challenge, and redefine personal and national identities. Borders are dynamic, social constructs that define 'self' and 'other', rather than mere geographical boundaries.

They are sites where national identity is actively negotiated and contested. Migrant identity is often constructed within specific local spaces (e.g., villages, neighbourhoods) rather than just through national belonging. Borders and migration are increasingly linked with global security, driven by conflict, economic disparities, and climate change, leading to heightened, often militarised, border control. With more than 40 million people displaced in Africa alone due to conflict, borders function as critical points for humanitarian crises, asylum, and immigration control.

Current borders should be managed efficiently, in a way that facilitates the movement of desirable goods and people, while preventing the movement of the contrary. Porous borders fuel xenophobia. The Faculty of The Humanities has supported a number of cross-cutting, interdisciplinary themes over the past few years. One of these was Border Studies, an interdisciplinary field that critically examines border and identity understandings found in political and everyday discourses.

Dr Munyaradzi Mushonga from the Centre for Gender and Africa Studies (CGAS) was the principal investigator of the collaborative project, titled 'The Border, the 'Bantustans' and the Rainbow Nation: A contradictory mix of discreteness and continuity in the oral histories of transnational communities in the borderlands of Lesotho/South Africa and the Joe Gqabi District (Eastern Cape)'.

Collaborators included ***Prof Chitja Twala***, former Vice-Dean of The Humanities and Department of History; ***Dr Magaiza***, CGAS, Qwaqwa Campus; and Dr John Aerni-Flessner, Michigan State University.



Prof Chitja Twala.

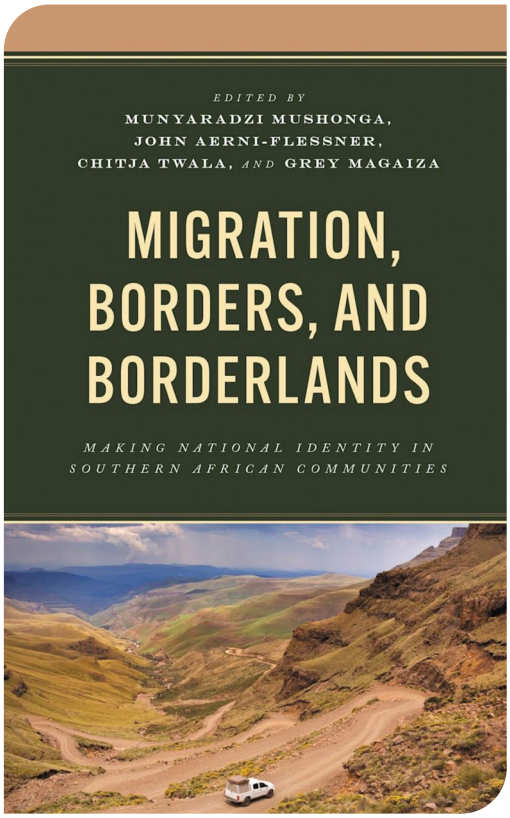
Over and above seed funding from the faculty, the project was supported by the National Institute for the Humanities and Social Sciences (NIHSS). The NIHSS Borderlands Project culminated in the publication of the book (based on original empirical research) *Migration, Borders, and Borderlands: Making National Identity in Southern African Communities,* edited by M Mushonga, J Aerni-Flessner, C Twala, and G Magaiza and published by Lexington Books in 2024. The book covers insights into topics relevant to Angola, Mozambique, Zambia, Zimbabwe, Malawi, and of course Lesotho.

One of the most poignant chapters was written by Dr Mushonga and ***Prof Stephanie Cawood***, both from CGAS, titled 'You Have to Pay with Your Body': The Precarity of Subaltern Basotho Migrant Women within the Lesotho-South Africa Border(land)s'. The chapter focuses on the gendered dynamics of African migration in Southern Africa in the twenty-first century, by bringing into sharper focus the subjectivities of Basotho migrant women within limited spaces such as borderlands – spaces that are on the one hand dangerous and on the other full of promise.

The chapter draws on both practical and conceptual implications for subaltern Basotho migrant women as they negotiate border-dwelling legal and extra-legal border crossings into and out of South Africa due to the difficult economic conditions of enclaved Lesotho. Undocumented Basotho women migrating to South Africa face extreme precarity, often subjected to sexual exploitation, bribery by border officials, and abuse by employers.

In the book *Migration, Borders, and Borderlands: Making National Identity in Southern African Communities*, a chapter titled 'Of Paqama Gates and Paqama Scouts: The Innerworkings of Regulated Illegal and Irregular Border Crossing between Lesotho and South Africa', Prof Twala and Dr Magaiza explain that despite the existence of a well-defined border demarcation, official border crossing points, and border officials tasked with regulating migration between Lesotho and South Africa, instances of illegal and irregular border crossing remain common. This has given rise to a flourishing market for illegal border crossing facilitators, commonly known as *paqama scouts*, who operate at illegal and unregulated border crossing points between the two countries.

They examine the roles of the *paqama scouts* to better explain, problematise, and understand illegal and irregular crossing, and the use of *paqama gates* to amplify cross-border economic interests. Along similar lines, Dr Magaiza and Dr Aerni-Flessner published a paper titled 'Basotho and Bantustans: Long-Term Impacts of Historical Borders on Borderlands Communities in Qwaqwa and Lesotho' in the *South African Historical Journal* (2024).



The paper examines the experiences of border residents, offering the historical, political, and economic context to life on the Lesotho-South African border, tracing the complicated ways these facets come to interface with ideas of ethnic origin and citizenship.

Read a summary on the subject here.

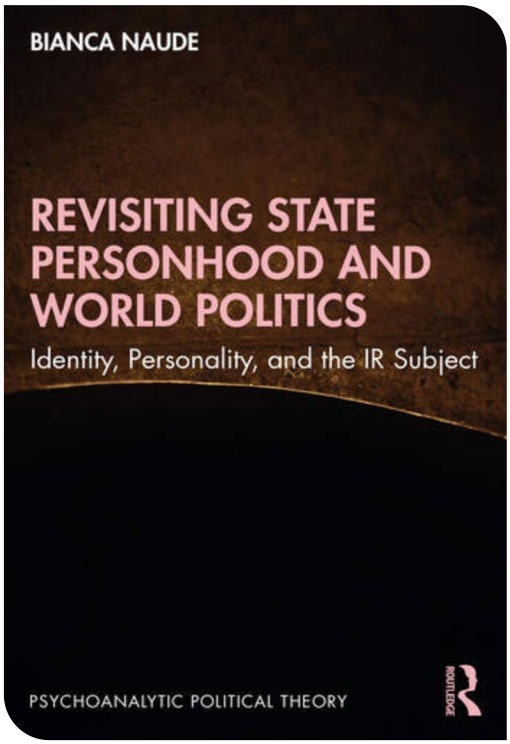




Dr Bianca Naude.

Dr Bianca Naude from the Department of Political Studies and Governance is an International Relations scholar whose research is transforming how borders, identity, and security are understood in a fractured but interdependent world. Where conventional scholarship sees these as fixed geopolitical facts, Dr Naude approaches them as living, fragile, and emotionally charged practices through which communities define themselves, and their relationships to others, in uncertain times. Her work challenges the social sciences to stop imagining people as self-contained, autonomous 'nodes' in an interest-driven social hierarchy, and to instead understand them as interdependent filaments woven into a shared social mesh. Through this reframing, she reveals how boundaries are not just drawn on maps, but made and remade through stories, emotions, and attachments. This paradigm shift has profound implications for how we think about conflict, belonging, and global order, as well as justice, responsibility, and accountability. Dr Naude's interdisciplinary research, which draws on psychoanalysis, ontological security studies, anthropology, and philosophy, seeks to position the Global South as a site of theory-building.

In doing this, she pushes international relations to confront the emotional and psychological infrastructures underpinning collective life, asking how we might imagine an ethical and mutually supportive alternative global order.



Published in the Routledge Psychoanalytic Political Theory Series, her 2022 monograph, *Revisiting State Personhood and World Politics: Identity, Personality and the IR Subject*, introduced psychoanalytic theory to questions of state identity and security, showing how seemingly schizophrenic foreign policy behaviour could be explained more carefully through theories of narcissistic injury and repair of self-esteem.

Her 2023 article 'COVID-19 Travel Bans and the Reactivation of Colonial Trauma in Africa' (also in *International Affairs*) offers a compelling account of how colonial narratives of African inferiority re-emerged

during the COVID-19 outbreak and how this informed policymaking around Omicron-related travel bans.

Dr Magaiza, together with ***Dr Brenda Muchabveyo*** and Dr Jerit Dube – all from CGAS on the Qwaqwa Campus – completed a project on the 'Livelihood Transitions in the Former Homelands of Qwaqwa and Transkei'. This systematic literature review examines the state of academic research on livelihood transitions in former homelands in South Africa, focusing on Qwaqwa and Transkei from 1994 to 2024. These homelands, created during apartheid, faced economic and social marginalisation that impacted livelihood portfolios. The review highlights trends in livelihood shifts from subsistence agriculture to diversified sources such as wage labour, service sector employment, entrepreneurship, and remittances. It explores the impact of migration, rural development, land reform, and infrastructure on livelihoods, along with gender dynamics, environmental pressures, and the role of education and healthcare.

South Africa attracts a diverse set of immigrants from neighbouring countries and the rest of the African continent. This has created socio-economic and xenophobic tensions between citizens and foreign migrants and accelerated the emergence of right-wing anti-immigrant movements. In their work, 'The Nexus between the Migration of Labour, Good Governance, and Sustainable Development in South Africa: A Critical Analysis Review' (2024) ***Siphelele Mahlaba***, from the Department of Sociology, ***Jerit Dube*** from CGAS, Daniel Mlambo from the Tshwane University of Technology, and Khangelani Moyo from the Department of Sociology, consider South Africa's history as an important migrant destination and analyse the nexus between labour migration and good governance as critical drivers of sustainable development. They highlight the importance of migration within the context of the United Nations and its agencies, as seen in the UN's 2030 Agenda for Sustainable Development, the Global Compact for Migration, and the Global Compact for Refugees. This political recognition of migration as a key issue at the global level has also materialised at South Africa's local, provincial, and national levels. To enable the discussion of this complex phenomenon, the paper relies on a robust and systematic analysis of existing literature on labour migration, good governance, and sustainable development.



Dr Khangelani Moyo's work focuses on migration in Southern Africa, migrant transnationalism, refugee and migrant integration, social cohesion, and African urbanism.

This work is relevant to policymakers, academic researchers, and society at large, by creating knowledge and correcting misconceptions regarding migration. In addition to his involvement in the above-mentioned work on labour migration, Dr Moyo and ***Dr Divane Nzima*** from the Department of Sociology undertook a study on return migration and reintegration, which have become points of discussion in the global migration studies literature. In their article 'Escaping the 'diaspora trap': A narrative of struggle and resilience by an unskilled Zimbabwean migrant in South Africa' (2023), they record their study of the experiences of this Zimbabwean migrant, exploring the agency with which he manages to circumvent structural constraints and diaspora entrapment, which has been the case for many Zimbabweans in South Africa. While existing evidence indicates that skilled migrants are more prone to fall into the 'diaspora trap', this study gives insight into the experiences of unskilled migrants and the tools at their disposal to escape the 'diaspora trap'.

Together with ***Dr Gracsious Maviza***, the same two researchers studied the effects of migration-induced male absence on the upbringing of children in selected communities of Zimbabwe. In their paper, 'Missing Masculinities': Transnational fathering experiences in migrant families, they argue that migration scholarship places more emphasis on the economic benefits of migration, such as remittances and imported innovation, but is largely silent on the emotional hardships it causes for the family, especially the children who are left behind.

IDENTITY

Identity is defined as a personality structure, which develops in the process of one's identification with values, plans, and social roles. Barriers to identity formation include individual, social, and systemic factors that disrupt the development of a stable sense of self. Key obstacles include role confusion, pressure to conform, fear of rejection, and lack of autonomy. Environmental factors such as traumatic events, poverty, and lack of mentorship also hinder this process. In particular, the transitioning to adulthood presents multiple and diverse challenges.

Prof Jared McDonald is Assistant Dean of The Humanities on the Qwaqwa Campus and an Associate Professor in the Department of History.

As a nineteenth-century historian, Prof McDonald's primary research interests are Khoesan loyalism, indigenous responses to British colonialism in Southern Africa, and the work of the London Missionary Society in the region.

His monograph *Khoesan and Imperial Citizenship in Nineteenth Century South Africa,* that was published by Routledge in 2023, explores the formative and expressive dynamics of Khoesan identity during a crucial period of incorporation as an underclass into Cape colonial society. The volume emphasises loyalism and subjecthood – posited as imperial citizenship – as foundational aspects of Khoesan resistance to the debilitating effects of settler colonialism.

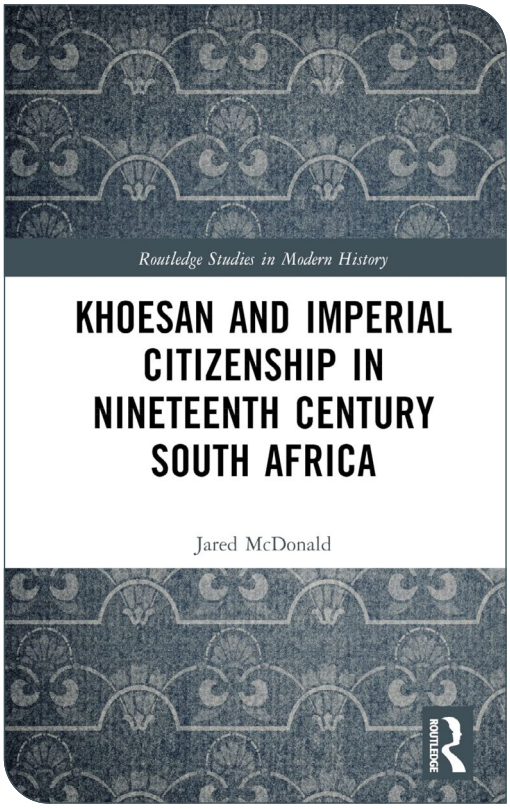


Prof Jared McDonald.

The work argues that Khoesan were active in the creation of their identity as imperial citizens and that expressions of loyalty to the British Crown were reflective of a political and civic consciousness that transcended their racially defined place in Cape colonial society. Following a chronological trajectory from the mid-1790s to the late 1850s, Prof McDonald examines the combined influences of colonial law, evangelical-humanitarianism, imperial commissions of inquiry, and the abolition of slavery as conduits for the notion of imperial citizenship.

As histories and legacies of colonialism come under increasing scrutiny, the history of the Khoesan during this period highlights the complex nature of power and its imposition, and the myriad, nuanced ways in which the oppressed react, resist, and engage. The interdisciplinary research programme titled 'Selves within Selves on a University Campus: The intersectionality of student identity development in a transitional society', was established in 2022. Various research projects were undertaken within this programme, including several exploring the perspectives of students with disabilities (A de Beer, L Naudé, and L Nel), as well as 'Identity transitions in first-generation students at a South African university' (L Naudé and D Breshears), 'Identity development in a group of South African adolescents' (L Naudé and EC van Damme), 'Longitudinal trajectories of identity formation and resilience development in adolescents living in under-resourced communities' (CM Shirima, L Naudé, and K Esterhuyse), 'Tattoos as an expression of narrative identity' (F Naudé and L Naudé), and 'The quest for a 'soft life' and the transition into adulthood: Views from South African emerging adult students' (L Naudé and M Esau).

Click here for more information on the research outputs.





Prof Lizelle Naude.

The group subsequently developed into the ***Identity Development and Exploration of Aspects of the Self (IDEaS) Interdisciplinary Hub*** for Identity Research coordinated by ***Prof Luzelle Naude*** from the Department of Psychology.

It focuses on how identities are formed, transformed, and integrated across the lifespan, specifically within African and Global South contexts. The hub aims to provide evidence-based insights for education, leadership, and social change.

A flagship initiative of the hub is the Africa Long Life Study (ALLS) – a large-scale, multi-country project conducted in partnership with the University of Zurich and colleagues from South Africa, Namibia, and Kenya.

By investigating identity, well-being, and markers of adulthood across diverse African contexts, ALLS is generating groundbreaking data that not only advances theory but also positions the University of the Free State as a leading institution for African-centred identity research.

IDENTITY, MIGRATION, ALIENATION, AND REMEDIATION PORTRAYED IN THE ARTS

Prof Adelheid von Maltitz-Frackiewicz is an interdisciplinary artist who specialises in sculptural installation, drawing, and land art. Her research questions emerge intimately from personal and intergenerational experiences of trauma and displacement, including her Polish grandfather's escape from Poland to South Africa during World War II. Through her drawings, sculptural installations, and land art interventions, her practice engages with the complexities and problematics of forced migration and belonging.



Prof Adelheid von Maltitz-Frackiewicz.

Her work explores the interconnectedness of site, ritual, and materiality, and considers how these concepts may contribute to processes of healing or constructive engagement with difficult and often traumatic experiences of loss and erasure. Much of the material used in Prof Von Maltitz-Frackiewicz's work is site-specific, either directly collected from places associated with trauma and loss or used in ways that reference such sites. These materials include earth collected near former German concentration camps in Poland, cremated animal bones, human teeth, human hair and skin, nail clippings, breastmilk, and lint.

Through the careful handling and ritualised transformation of these materials, the work reflects on memory, mourning, and the fragile processes through which histories are carried across time and place. Prof Von Maltitz-Frackiewicz's land art installation *Implants* (2022), installed at the NIROX Sculpture Park, revisits the land art genre at a time when land loss, redistribution, and the restitution of land rights remain highly sensitive issues in South Africa in the aftermath of colonialism and apartheid. The work seeks to point viewers towards recognising that we are all, in different ways, from elsewhere, and that experiences of displacement, whether generational or direct, form part of many personal and collective histories. Reconsiderations of the movement of people across borders, hospitality, and xenophobia remain particularly urgent within the South African context, given the country's history of apartheid and continuing social tensions. Within this broader global environment, Prof Von Maltitz-Frackiewicz explores the healing potential of translation in her artistic practice: the 'carrying across' of materials, memories, and meanings across thresholds, analogous to acts of funerary transfer and remembrance.

View Prof Adelheid von Maltitz-Frackiewicz's land art installation at NIROX Sculpture Park.

Prof Von Maltitz-Frackiewicz won the Absa L'Atelier Award in 2021, widely regarded as one of the most significant art competitions in Africa for artists under the age of 40.

The award culminated in a collaborative exhibition titled *Refuge: An Uncommon Home*, presented at the Absa Gallery from November 2022 until January 2023. The exhibition subsequently travelled in part to the Prince Vincent venue at the Absa branch during the Klein Karoo National Arts Festival in March 2023 and concluded with a final presentation at the Institute Museum of Ghana in July 2023. In 2024, Prof Von Maltitz-Frackiewicz received the Ampersand Foundation Fellowship, which included a month-long residency in New York City, further supporting the development of her research and artistic practice. In September 2024, she held a solo exhibition, *Uprooted*, at the Nirox Foundation (Sculpture Park) in Johannesburg.

Every bit of ***Prof Martin Rossouw's*** research in the Department of Art History and Image Studies ultimately stems from his interest in cinema's capacities for remediation, namely that film offers a means for the complex intermedial re-articulation of experience, knowledge, and cultural forms. The main centre of gravity around which this overarching theme in his research has been revolving is the field of film-philosophy, and in particular the 'film as philosophy' debate. Here, the main question enlarges upon film's capacity to incorporate and mediate philosophy: In what sense can films be said to 'do' or 'be' philosophy? What are the conditions that need to be met for a film to act as an argument, a thought experiment, or a medium of philosophical reflection and insight? And what might be the unique affordances of philosophy expressed by means of fiction film narratives, as opposed to written texts or philosophical lectures? His current research focuses on media transformations, broadly construed – not only transformations of and between media (the idea of 'film as philosophy', remediation, intermediality, etc.), but also ethics and transformation *through* media (specifically transformational ethics of film). His work on film philosophy and ethics reached a crescendo with the 2023 publication of *What Film is Good For: On the Values of Spectatorship*, by University of California Press, which won the US-based Popular Culture Association's annual prize for Best Edited Collection in Chicago in 2024. Co-edited with Prof Julian Hanich from the University of Groningen, the volume features 34 essays by some of the best-known film scholars worldwide. The volume's intervention in the field is to recover the arch question of film ethics. Thus, the book sets out to explore the rich varieties of values that may be attributed to cinema from one context to the next. And it should come as no surprise that Prof Rossouw's own chapter contribution to *What Film is Good For* brings us back to the topic of remediation. In a chapter titled 'Spiritual Exercises Before a Screen', he proposes that the values implied by watching philosophy on film screens often amount to a remediation of spiritual exercises, much like those associated with ancient Greco-Roman philosophy.

Prof Martin Rossouw.





MOVING FROM THE MARGINS

Our country has a long and contentious history of marginalisation in various forms. Marginalisation is a complex, multidimensional, and dynamic phenomenon. It is not merely a state of poverty, but a systemic process that pushes individuals or groups to the periphery of economic, social, political, and cultural life, denying them full participation in society. It is not a uniquely South African phenomenon, but universal, even ubiquitous; however, South Africa, as in any country, has its own unique context and complexities. The South African Constitution, particularly through Section 9 (Equality) and the Bill of Rights, explicitly prohibits discrimination and mandates measures to redress historical marginalisation. It promotes substantive equality, allowing for legislative action to protect or advance persons disadvantaged by unfair discrimination based on race, gender, disability, or social origin. A diverse group of researchers at the UFS have been working on recognition, empowerment, and restoration of various dimensions of marginalisation.

KNOWLEDGE SYSTEMS

Indigenous Knowledge Systems (IKS) university programmes in the Global South, particularly in South Africa, function as vital decolonising strategies by challenging Western-centric academic dominance and integrating local, indigenous knowledge into curricula. These programmes foster epistemic justice, promote sustainable development, and empower students by validating cultural identities, thereby transforming higher education from a colonial tool into a space for social justice.

The UFS is recognised as a national leader in pharmacology as well as research and development of endemic knowledge systems and traditional medicines, establishing one of the most advanced modern pharmacology Good Laboratory Practice (GLP)-accredited research and development laboratories in the country, and possibly in the region. Interdisciplinary and interfaculty research is undertaken in this study area, and we have an excellent track record of sound community engagement with relevant stakeholders.



Prof Motlalepula Matsabisa.

Prof Motlalepula Matsabisa is a leading authority on pharmacology and a passionate advocate for integrating indigenous knowledge systems into modern medicine. As Director of the Indigenous Knowledge Systems (IKS) Health Lead Programme at the UFS, he has built a robust platform for the research, development, and commercialisation of African traditional medicines. His work is characterised by a commitment to rigorous scientific methodology to validate the safety and efficacy of traditional remedies used for generations across Africa.

The research entails looking at the safety, efficacy, and quality of traditional medicines for select diseases such as diabetes, hypertension, cancer, malaria, and neurodegenerative diseases such as Alzheimer's disease. His research contributes to current government policies and initiatives. He works very closely with the National Department of Health (DoH), the Department of Science and Technology (DST), and the Department of Environmental Affairs (DEA), and he contributes to statutory bodies such as the South African Health Products Regulatory Authority (SAHPRA) in medicines regulation and the South African Traditional Health Practitioners Council (iTHPCSA). His leadership extends globally through influential roles at the World Health Organisation and as a key driver of South-South collaboration, particularly in establishing the BRICS Natural Medicines Institute.



Established in 2021, the African Medicines Innovations and Technologies Development (AMITD) platform is a proud initiative of the UFS DSI TIA Pharmacology Indigenous Knowledge Systems (IKS) platform. Their work encompasses the entire value chain of natural product research and development – from grassroots research innovations,



basic research, and drug discovery to the development, standardisation, clinical trials, and production of finished medicinal products. The research products include herbal extracts, concentrates, and isolated phytochemicals, formulations of dosage forms – all are carefully developed through rigorous clinical and regulatory processes to meet market approval standards.

Watch this video of Prof Motlalepula Matsabisa's work here.

In 'IKS and Gendered Ecologies: The Okavango Panhandle in Context' (2023), ***Christina Human*** from the Department of Zoology and Entomology, Prof Cawood from the Centre for Gender and Africa Studies (CGAS), together with ***Prof Liesl van As*** from the Department of Zoology and Entomology, examine how indigenous knowledge systems (IKS) and gender roles shape natural resource management in the Okavango Delta. It highlights that women in the panhandle hold distinct, essential, and often overlooked knowledge regarding ecological, agricultural, and domestic resource management, which is critical for community resilience.

The Free State Indigenous Knowledge Systems Documentation Centre (IKSDC) was established in April 2013. The IKSDC office is situated in the UFS CGAS.

The Free State IKSDC began its pilot project in Thaba 'Nchu, comprising 42 villages. In 2016/17, the IKSDC set out to expand its reach with the aim of bringing more communities in the Free State under the National Recordal System (NRS). Since 2024, the focus of the IKSDC in terms of documentation of indigenous knowledge has been in the Thabo Mofutsanyane District Municipality. Part of its mandate is to reach as many indigenous knowledge holders as possible. To fulfil this, the IKSDC held a consultation with the Dihlabeng local municipality to determine the viability of indigenous knowledge documentation and harvesting in Thabo Mofutsanyane District Municipality.

The outcome confirmed vast indigenous knowledge is held by many community members in the area. As a result, four communities were identified for documentation, namely Bethlehem, Clarens, and Qwaqwa. The IKSDC coordinator is Mike Nxumalo, and the indigenous knowledge recorders are Theso Mofokeng and Reabetswe Mokhaso. As special adviser to the IKSDC, Prof Cawood provides guidance in terms of the general direction of the project and strategic leadership. The call for the promotion of indigenous knowledge systems, decolonisation, and social justice has been a burning issue in Africa's quest for epistemic knowledge reclamation.

The Qwaqwa Campus has taken this call seriously, hosting the biennial Indigenous Knowledge Systems seminar themed 'Navigating Decoloniality and Indigenous Knowledge for Sustainable Development in Africa' in October 2023. The seminar encompassed critical discussions on the topical themes and their intersections with sustainable development in Africa, led by keynote speakers, Prof Josephine Ahikire from Makerere University in Uganda, and Dr Lwazi Lushaba from the University of Cape Town. Based within the Faculty of Theology and Religion, ***Prof Zorodzia Dube's*** research focuses on a deeper understanding of African indigenous knowledge, highlighting its importance and addressing misconceptions about its practices – particularly those related to herbs, healthcare, and traditional healing practices.

Through his research, he provides critical insights into African indigenous spirituality, challenging long-standing misconceptions about it while fostering a deeper appreciation of its value and relevance in contemporary society.

Read about the Indigenous Knowledge Systems seminar here.

GENDER AND SEXUALITY

The Centre for Gender and Africa Studies is an interdisciplinary research and postgraduate centre, first launched in November 2007 as the Centre for Africa Studies. In 2010, Gender Studies became associated with the centre, and by 2017, it was fully embedded in its operations. This prompted an official renaming in 2018 to the Centre for Gender and Africa Studies (CGAS) to properly reflect the role that both Africa and Gender Studies play in its intellectual and pedagogic activities and research agenda. As part of this agenda, they are committed to the study of feminism, masculinities, and gendered identity dynamics in society and how these fields intersect in Africa.

Prof Hudson from CGAS, together with Dr Diana Højlund Madsen of the Nordic Africa Institute in Sweden, aimed to remap the relationship between Global North and Global South spatial politics in relation to the Women, Peace and Security (WPS) agenda, by focusing on the Ugandan post-conflict setting. In their article, 'The Politics of Space and Relationality: Localisation and the Women, Peace and Security Agenda in Uganda', published in 2024 in the *Journal of Intervention and Statebuilding*, they argue that representational agentic spaces offer openings for subverting gendered and racialised dichotomies, as it is in these dynamic hybrid place-spaces where agency is generated through shared values of care and community across global-local WPS worlds.

'Counting women? Gendered sustainability and inclusivity for an ocean accounting framework' – the 2024 article by Dr Joleen Steyn-Kotze and ***Prof Narnia Bohler-Muller***, both CGAS research associates based at the Human Sciences Research Council, argues for integrating gender perspectives into the Ocean Accounts Framework to achieve sustainable ocean governance (SDG 5 and 14). It highlights

that women's critical roles in fisheries and coastal management are often overlooked, demanding better representation in, rather than just consideration by, policy and economic frameworks. The empowerment of women can be realised through a myriad of mechanisms, one of which is supporting women to achieve economic independence.

Based in the Faculty of Economic and Management Sciences, ***Prof Brownhilder Neneh's*** research centres on women and youth entrepreneurship, with special emphasis on how they successfully navigate the entrepreneurial pipeline (intention, start-up, own/manage, grow and exit). To provide evidence-based recommendations, her research also examines the unique challenges that women-owned businesses face, with a focus on work-family conflict (WFC), work-life balance, entrepreneurial outcomes such as growth, performance, and well-being, as well as the interplay between family and business domains.

Prof Neneh's research has explored the mechanism through which family support positively influences the performance of women-owned businesses. In her paper, 'Women at Work with the Help of Family: Leveraging Family Resources to Tackle Work-Family Conflict', she found that women used social (family and spousal support), financial (paid labour and services, smart home appliances), religious (religiosity, prayer, and congregational support), and educational/knowledge (advice and mentorship) resources to address parental and household responsibilities, psychosocial needs, and work-related tasks.

Inspired by her research on women entrepreneurs, she authored the book *Craft Your Win: A Women's Guide for Ideal Work-life Balance*, published in 2024 by Quickfox Publishing.



Prof Brownhilder Neneh.

The book is based on extensive interviews conducted with self-employed and employed working women, which revealed that achieving work-life balance is neither a one-size-fits-all journey nor a static goal. It requires continuous reflection, adaptation, and commitment. Women must leverage factors such as role salience, boundary management, life context, transitions, resources, and communication, and experiment with various approaches to craft their personalised and ideal work-life balance.



As a New Testament scholar, ***Dr Nina Müller-Van Velden*** focuses primarily on the ancient constructions of masculinity and femininity in the 1st-century Mediterranean context. She explores the Greco-Roman frameworks of embodiment, gender, and sexuality in relation to New Testament writings, as depicted through characterisation. By recognising the socio-cultural influences on gendered behaviour in these ancient settings, as presented in texts such as the New Testament writings, she enters into dialogue with contemporary Christian discourse on gender, sexuality, and religion – especially in South African settings. Utilising gender-critical, feminist-critical, and queer-critical approaches, she argues that essentialist frameworks of gender and sexuality are not 'timeless, divinely ordained truths' (as is often proposed in Christian religious contexts), but much rather particular ideological interpretative choices undergirded by patriarchy and heteronormativity. As such, she proposes that constructivist frameworks of gender and sexuality are a more responsible, life-giving approach to the interpretation of ancient texts and to contemporary discourses on gender and sexuality – an approach which serves the pursuit of justice, inclusivity, and reconciliation.

The article, 'When the Rainbow is Bittersweet: Reflections on Being Queer and Indian in Durban', by ***Prof Vasu Reddy,*** Deputy Vice-Chancellor: Research, Innovation, and Postgraduate Studies, and former colleagues, Prof Siona O'Connell and Dr Debjyoti Ghosh from the University of Pretoria, explores the lived experiences of LGBTQI+ individuals within the conservative Indian community in Durban, South Africa. The study highlights a 'double life' often led by LGBTQI+ individuals of Indian descent, who must navigate rigid, traditional, and sometimes homophobic norms within their communities, including severe violence against queer Indian bodies, yet notes that these experiences are often overlooked by broader struggles for equality. The authors challenge the notion of a uniform 'Indianness', pointing to the fissures and resistance against acknowledging queer identities within these spaces.

YOUTH

In the report on their study 'Pursuing higher education in contexts of socio-spatial exclusion: a scoping study of the educational trajectories of youth from an informal settlement in South Africa' (2023), Prof Mkwananzi and Prof Mathebula from the SARChI Chair in Higher Education Human Development Research Group make the point that rural-urban migration in South Africa has led to major urban cities being surrounded by a periphery of low-income residents living in informal 'shack' settlements with little or no access to basic services and limited opportunities to access higher education.





Their earlier research with marginalised migrant youth (Prof Mkwananzi) and rural and township youth (Prof Mathebula) demonstrated the complexity that arises when young people move within and across countries to attain higher education or better living conditions. There is therefore no doubt that higher education is difficult to access for youth from informal settlements.

However, little research has been conducted on the context-specific factors and dynamics that affect how youth from informal settlements access and/or progress in higher education. Furthermore, no specific policy has been developed by the South African Department of Higher Education and Training to address the needs of this constituency of youth. To determine whether this topic warrants specific attention in higher education policy and research, the project combined a scoping of the literature with an empirical exploration using photovoice with a group of 12 youth from an upgraded informal settlement in the Free State. Findings from the photo stories and literature review indicate that aspirations for higher education are not only influenced by contexts of social and spatial exclusion, but also by the youth's past and present experiences within and outside their home environments, forming a complex web that complicates their pursuit of higher education.

Prof Neneh's research on the youth entrepreneurship focused on understanding the factors that drive individuals to pursue entrepreneurial careers and how to translate this desire into action. It addresses the intention-behaviour gap and stresses the importance of role models and real entrepreneurial stories that youth can relate to. In her paper, 'Fear of Failure and Entrepreneurial Behaviour among University Students: Do Gender and Financial Resources Matter?', she recommends that self-awareness exercises be used by entrepreneurship educators to identify personal triggers for fear and to develop coping mechanisms, ultimately increasing the youths' chances of translating their entrepreneurial intentions into action.

LANGUAGE

The UFS is at the forefront of developing multilingual initiatives – underscored by solid research. The Academy for Multilingualism was established in 2021, flowing from the UFS Language Policy that expresses the university's commitment to multilingualism, with particular emphasis on Sesotho, Afrikaans, and isiZulu. The academy aims to promote these languages on institutional and social levels through various academic and community-based projects and initiatives.



The focus of their activities is to advance Sesotho and isiZulu as academic languages, incorporate multilingualism into learning and teaching, promote multilingualism as a social asset, and to improve English as a language of instruction. The academy works closely with the Centre for Teaching and Learning and the different language departments on all three campuses.

One of the Academy for Multilingualism's most promising focus areas is translanguaging – a pedagogical practice where students receive input in one language and produce output through the medium of another language, in order to maximise learning and promote full understanding of the subject matter.

The academy has undertaken substantial research with regard to the development and re-intellectualisation of Sesotho as an academic language for epistemological access, scholarship of research, and social cohesion. An innovative project bringing together subject specialists, Sesotho linguists, terminologists, and translators has done groundbreaking work to develop Sesotho terminology in the fields of accounting, mathematics, physics, social work, psychology, agriculture, health sciences, theology, and economics.

The first academic book report on empirical research in Sesotho, IsiZulu, Tshivenda, and Setswana (four languages) was published (by UKZN Press) and launched in 2024. The second book will showcase research reports written in Sesotho, IsiNdebele, IsiXhosa, IsiZulu, Xitsonga, Tshivenda, Setswana, and Sepedi (eight languages).

The UFS has also worked on the development of South African Sign Language (SASL) as an academic language by starting with a process of standardising and verifying SASL terminology for interpreters in various disciplines, in order to avoid confusion and ensure uniformity and quality learning and teaching for Deaf students.



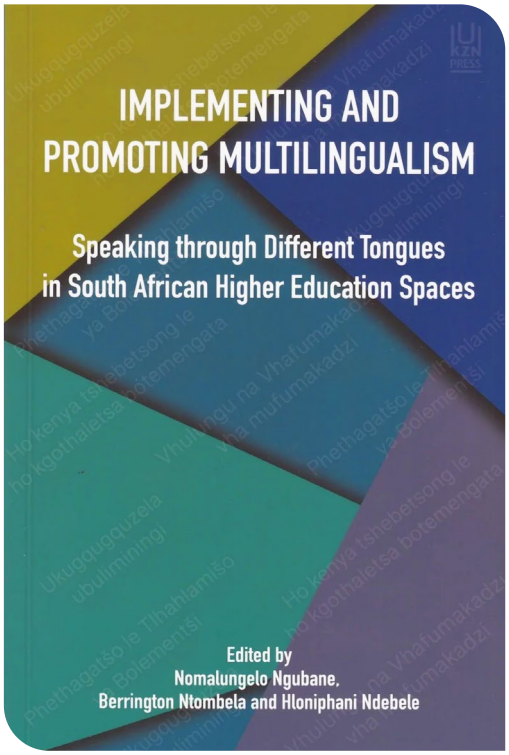
Dr Nomalungelo Ngubane.

In the words of ***Dr Nomalungelo Ngubane***, Director of the Academy for Multilingualism, "The biggest challenge of implementing multilingualism lies in its conception. Multilingualism should be conceived in terms of the equality of languages. Therefore, if true multilingualism is to be implemented, African languages must be used as languages of teaching and learning and not be treated as exotic languages only fit for the arts and cultural transactions."



Dr Hloniphani Ndebele.

The central theme behind the research of ***Dr Hloniphani Ndebele*** from the Department of African Languages is language management in South Africa's pluri-linguistic context, with a particular interest in developing and intellectualising indigenous African languages. He draws his research focus from a philosophical view of language as a powerful resource for transformation, social justice, and decolonisation. Three major thematic categories are evident in his research – language digitalisation, promotion of multilingualism and language development, and language and academic literacies. In the first thematic category, his research has contributed to debates on the role that African languages could play in the digital era and innovation in artificial intelligence. In this research theme, he argues that embedding African languages in digital technologies is critical for their continued existence and reduces the trend of their marginalisation. In addition, it fosters knowledge decolonisation and serves as a vital resource for redressing linguistic injustices. In the second thematic category, his research has focused on promoting African languages and multilingualism in the higher education sector. The debates on promoting African languages in high-status domains, such as higher education, are central to the discourses on educational transformation and decolonisation in the South African context and abroad. In the third thematic category, he investigated and sought to provide an understanding of the challenges students face in navigating the complex South African higher education environment characterised by an unfair linguistic milieu that endorses the dominance of English in a multilingual context. The research further provides insights on improving teaching practices, supporting student success, and addressing inequities in access to quality education in South Africa's multilingual context.



The highlight of his research during the period under review was the publication in 2024 of a book co-edited with Dr Ngubane and Prof Berrington Ntombela titled,

Implementing and Promoting Multilingualism: Speaking through Different Tongues in South African Higher Education Spaces, which demonstrates that South Africa is not only multilingual but can also function multilingually in every aspect. In this book, various topics and arguments are presented in a scholarly way, most of which come from empirical research.

Dr Martha Khosa from the Department of Languages in Education has focused her research on the development of early reading skills in marginalised African languages, with a particular emphasis on Xitsonga as a language of learning and teaching in the Foundation Phase. She is deeply interested in understanding how young learners acquire reading proficiency when taught in African languages that have historically been under-resourced and under-researched in education systems. Specifically, her work has examined the relationship among the sub-components of reading, such as phonological and phonemic awareness, letter–sound knowledge, oral reading fluency, and reading comprehension, and how these skills interact to influence literacy outcomes among Xitsonga-speaking learners. This research contributes to identifying the most critical predictors of reading success and helps inform teaching strategies and assessment tools that are sensitive to learners' linguistic and cultural contexts. In addition, she has explored comparative reading performance between learners who study Xitsonga as a home language and those who learn it as a second language. Surprisingly, her findings revealed that some learners who were taught Xitsonga as a second language outperformed those who learned it as a home language, highlighting important pedagogical and orthographic considerations for instruction in African languages.

MEMORIES PRESERVING HISTORY AND CULTURE

Oral history is the systematic collection of living people's testimonies, memories, and experiences regarding past events, typically recorded via audio or video interviews. As a research method, it preserves firsthand accounts of ordinary life and significant historical events, filling gaps in written records.





Prof Lekgotla Ramoupi.

Prof Lekgotla Ramoupi, Associate Professor and Mellon Inclusive Professoriate Fellow in the UFS Department of History, integrates decolonial pedagogy and creative learning methods into his teaching and research, using music, songs, film, graffiti, memory/heritage studies, and oral narratives to challenge Eurocentric interpretations of history, especially the history of the African continent. His research spans topics related to Africanisation, decolonisation, heritage transformation, cultural history, and liberation history.

Prof Ramoupi's recent research examines cultural practices and songs as forms of resistance during the anti-apartheid struggle, with a particular emphasis on Robben Island and the cultural life of political prisoners. His Mellon Inclusive Professoriate Fellowship (2023–2024) supported his research book project, '*The Centenary History of the SANNC/ANC Through Songs, Heritage, Arts, and Culture (1912–2012).*' His PhD thesis culminated in a book (published in 2025), *Cultural Resistance on Robben Island: Songs of Struggle and Liberation in South Africa (Izingoma Zomzabalazo Esiqithini!).*

For ***Prof Cilliers van den Berg*** from the Department of Afrikaans and Dutch, German and French, the methodology of his research is comparative in nature, in that its approach is to use the framework of German literature to explore specific motifs within the context of Afrikaans literature, or vice versa. Since his background is in memory studies, the focus of his research has for many years been on memory cultures, i.e. the dynamics of collective remembering, where 'collective' refers to societies, groups, or nationalities. Literature forms an important part of any memory culture, or collective remembering, and there are interesting structural similarities between the different ways in which German writers have responded to their difficult pasts (post-war literature, or the so-called 'Wendeliteratur' after the fall of the Berlin wall), and how Afrikaans writers have responded to a time of transition after Apartheid.

His research tries to compare these very different, but often structurally or thematically similar literatures with one another. Whereas there are many similar motifs in both literatures, there are also many differences, partly related to the fact that literature written in German is much 'bigger' in comparison to Afrikaans literature, if compared on a world stage. He tries to conceptualise the potential effects this might have on how these literatures have developed historically, and also how the boom of memory studies in the nineties might have played its part facilitating writing about the past.

OUTCASTS OF SOCIETY

Two researchers from the Department of Criminology have researched those widely regarded as the outcasts of society – living on the margins and unseen.



Dr Jean-Paul Pophaim.

Dr Jean-Paul Pophaim's research primarily focuses on vulnerable and marginalised victim groups, in particular on homelessness – its causes, lived experiences, and access to services and societal, governmental, and legislative responses. His research has included pathways to homelessness, the connection between early exposure to adversity, homelessness, and high-risk outcomes, as well as legislative responses to victimisation of the homeless.

Dr Ashwell Phillips' research advanced a focused and empirically grounded exploration of youth gang subcultures and occult-inspired gang formations in South Africa, with a particular emphasis on the Free State. Building on more than a decade of prior work, his research represents the culmination of his sustained investigation into criminogenic risk and protective factors, spiritual and symbolic dimensions of deviance, and the development of a new gang typology that incorporates African spiritual and occult belief systems into the study of gang identity. The findings revealed how occult and witchcraft practices such as the use of muti, ritual stabbings, and blood oaths function as mechanisms of power, protection, and cohesion within these groups. Rather than symbolic embellishments, these practices underpin gang hierarchy, social control, and recruitment. His research bridges the gap between mainstream criminology and African spiritual epistemologies, offering new conceptual tools for understanding spiritually informed violence and subcultural identity. The work contributes to several interdisciplinary fields, namely criminology, sociology, anthropology, and psychology, while aligning with the UFS' strategic goals on social justice, youth development, and community safety.



Dr Aswell Phillips.

RESEARCHERS

Moving from the margins also has implications for researchers themselves. In the strong move towards inter-, multi-, and transdisciplinary research, which has characterised research at the UFS over the past five years, researchers themselves have had to grapple with breaking down barriers between disciplines, learning new appreciations for other approaches to research, and indeed moving significantly from their 'comfort zones'.

One such researcher is Dr Anita Venter from the Centre for Development Support. Her research path traces an uncommon arc of creative evolution, from designing shelters that stand against climate and inequality, to shaping arts-based methods that rebuild meaning itself. Her intellectual journey – bridging art, sociology, development studies, and community activism – illustrates how built environments can become living classrooms for transformation. What began as a technical quest to solve South Africa's housing crisis through indigenous building technologies evolved into something far more elusive and philosophical.



Dr Anita Venter.



KEEPING OUR PEOPLE SAFE

The African Union's Agenda 2063 envisions "an integrated, prosperous and peaceful Africa". Peace and security involve more than maintaining stability and preventing conflict but also include addressing and managing risks related to climate change. Most displaced populations are from countries experiencing armed conflict; however, climate-related disasters (floods, droughts) are also increasing significantly.

WAR, CONFLICTS, AND CONFLICT RESOLUTION

According to the United Nations, continuing and new violent conflicts around the world are making it difficult to achieve global peace and security, as well as to attain peaceful and inclusive societies for sustainable development. In Africa, more than 45 million people are displaced – about 43% of the global total. Thirteen African countries are facing armed conflict; this is counter to the African Union's (AU) Agenda 2063 aspiration of 'Silencing the Guns in Africa' by 2023, which was deemed a necessary condition for Africa's development and prosperity.



Prof Hussein Solomon.

Prof Hussein Solomon is Senior Professor in the Centre for Gender and Africa Studies. His research interests include conflict and conflict resolution in Africa; South African foreign policy; international relations theory; religious fundamentalism; and population movements within the developing world. He is recognised as one of the world's top 100 terrorism experts by ScholarGPS, a body that ranks global academic excellence through publication, citations, and impact. Prof Solomon, a Sufi Muslim, said his colourful family tree, including a Jewish grandfather, contributed to his approach of promoting dialogue and interfaith tolerance rather than boycotts and hate.

His most recent books include *BRICS and Climate Change* (Palgrave Macmillan, 2024), *The Spectre of Islamic Terrorism: Comparative Insights* (Palgrave Macmillan, 2024), *Between Promise and Peril: African Security in the 21st Century* (with Sergey Kostelyanets, Africa Institute of the Russian Academy of Sciences, 2023), *African Security in the Anthropocene* (with Jude Cocodia, Springer, 2023), *The Future of War in Africa* (with Eeben Barlow, Amazon Kindle, 2023), and *Intersectionality and LGBTQI Rights: A Comparative Analysis of Iran, Turkey and Egypt* (with Simone Bekker, Nova Publishers, 2023).



Prof Lodewyk Sutton.

Prof Lodewyk Sutton, Head of the Department of Old and New Testament Studies, investigates how warfare language, bodily imagery, and spatial literary theories shape the Old Testament Psalms and related ancient Near Eastern literature. His work on warfare metaphors – e.g. the 'enemy made a footstool' motif – reads Psalm 110 against ancient Near Eastern war ideology to show how honour, shame, and

conquest inform theological claims about kingship and divine action. He links the language of war to ancient Near Eastern iconography and honour-shame social systems. Methodologically, he focuses on intertextual and extratextual readings, engaging iconography, ancient Near Eastern war metaphors, and socio-historical honour-shame cultures as lenses for reading the Hebrew text. In the text of the Book of Psalms, he mainly uses a canonical-critical perspective by treating the Psalms as shaped wholes ('shape and shaping of the Psalter'), where he situates war imagery not just in isolated lines but in the structure of the book. Two main lenses through which he reads warfare imagery are an anthropological bodily reading and spatial literary theories (narrative space, social space, and ancient Near Eastern spatial orientation) awareness. Though more pronounced in his bodily/spatial work, his war research also touches on how bodily metaphors (head, garments) and spatial institutions (throne, battlefield) reflect embodied conflict. Prof Sutton combines literary and historical approaches with a strong interest in embodied religion. In articles such as his spatial reading of Psalm 66, he mobilises body imagery and memory studies to argue that piety is practised in lived (third) space; bodily metaphors make communal recollection and liturgical movement intelligible, especially under disrupted conditions such as a pandemic.

Prof Sutton's warfare research shows that in the Psalter, war is not merely metaphorical decoration – it is the language through which divine-royal authority, communal honour, and spatial-bodily embodiment are articulated. His methodology is expressly interdisciplinary, marrying Hebrew textual critique with ancient war studies, social-scientific models, and canonical reading.

DISASTER RISK MANAGEMENT

The Disaster Management Training and Education Centre for Africa [DiMTEC] is an education, training, and research centre within the Faculty of Natural and Agricultural Sciences. Their work contributes towards knowledge generation and development, practical solutions, and community service in different areas, such as disaster risk assessment, disaster management planning, vulnerability assessment, environmental impact assessment, agricultural development planning, and ecosystem-based disaster risk reduction and climate change adaptation planning.

Prof Alice Ncube.



Prof Alice Ncube's research in DiMTEC has focused on advancing an integrated understanding of building resilience to hazards within the broader fields of disaster risk management (DRM) and disaster risk reduction (DRR). Rooted in the Southern African context but informed by global comparative frameworks, this body of work investigates how communities, governance

systems, and institutions adapt to diverse and compounding risks, ranging from floods and droughts to pandemics and climate change. Her research is guided by and contributes to the global and continental development agendas, particularly the United Nations Sustainable Development Goals and the African Union's Agenda 2063, bridging theory and practice by promoting participatory, transformative, and evidence-based resilience frameworks that strengthen institutional capacity, empower vulnerable populations, and align with both the Sendai Framework for DRR (2015–2030) and Agenda 2063's aspirations for resilience and sustainability.

The overarching aim of her research is to explore how participatory governance, climate adaptation, and social inclusion jointly enhance systemic resilience to hazards. A study within Bulawayo's informal settlements conceptualises participation as a capability that drives poverty reduction and strengthens resilience. In the article she co-authored with Dr Collins Muhame from DiMTEC and Prof Yonas Bahta from the Department of Agricultural Economics, titled 'Towards SDG-11: How social resilience affects urban settlement in South Africa?' (*Journal of Sustainability Research*, 2023), social resilience is connected to urban planning and SDG 11, emphasising inclusive cities as a foundation for sustainable DRR.

Research undertaken with Dr Sipho Mamba from the University of Eswatini and Prof Thabo Ndlovu from the National University of Science and Technology in Zimbabwe examines the intersection of climate adaptation and urban agriculture in Zimbabwe, revealing how post-COVID realities are reshaping urban policy and livelihood strategies. Complementing this, her study with Dr Stephen Nyaki and Prof Bahta, both from the Department of Agricultural Economics, introduces a gendered perspective on resilience, showing how migrant women in South Africa have adapted to the pandemic's socio-economic disruptions, advancing both Gender Equality (SDG 5) and social protection goals within Agenda 2063. A number of themes emerge from her research, including:

Psychosocial, Spiritual, and Health Dimensions

'Assessing the spiritual and mental health of KwaZulu-Natal flood disaster survivors' (*Jàmbá: Journal of Disaster Risk Studies*, 2023) by Dr Annalene van Straten and Prof Ncube revealed the importance of faith, mental health, and social support systems in post-flood recovery in KwaZulu-Natal. This theme was extended in the work by Van Straten, Heunis, Ncube, and Szarzynski (2024), 'Social work mental health and psychosocial support to vulnerable groups during COVID-19 in Mangaung Metropolitan Municipality' (in AL Shokane et al. (Eds.) *Social Work in the 21st Century*), which explored psychosocial and emotional resilience during the COVID-19 pandemic in Mangaung, highlighting the need for holistic approaches to DRM that integrate mental health and community cohesion.

Climate Change Adaptation and Governance

The work by Ncube, Mamba, and Ndlovu situates resilience within urban systems and adaptation governance. The findings advocate for policy coherence and multi-level integration in climate adaptation planning, which are critical to achieving SDG 13 (Climate Action) and Agenda 2063's environmental sustainability goals.

WASH Systems and Flood Hazard Resilience

Research by DiMTEC colleagues Mlamuleli Tshuma, Prof Johannes Belle, and Prof Ncube investigates water, sanitation, and hygiene (WASH) vulnerabilities in flood-prone areas of Zimbabwe. These studies highlight how inclusive infrastructure development and social equity can improve hazard preparedness and advance SDG 6 – Clean Water and Sanitation.

Global and Comparative Governance

Her work with Panchi Robles, Stef an Schneiderbauer, et al., titled 'The impact of COVID-19 and sustainability governance in three mountain regions of the world' (in *Safeguarding Mountain Social-Ecological Systems*) situates her research within global comparative governance discourses, analysing cross-regional sustainability governance in mountain regions. The study promotes South–South and global learning exchanges, reflecting Agenda 2063's vision of enhanced international cooperation and knowledge transfer for sustainable development.

JAGERSFONTEIN TAILINGS DAM

In the early morning hours of 11 September 2022, a tailings dam wall collapsed at the abandoned Jagersfontein diamond mine (established in the 1800s) in the Free State's Kopanong Local Municipality. The failure resulted in the sudden and uncontrolled release of more than 6 million m³ of liquid sludge, smothering nearly 200 nearby houses and approximately 1 600 ha of agricultural and grazing land. Following the dam burst, more than 400 people were affected, 51 houses were destroyed, and critical infrastructure was affected.



The UFS response was immediate, multifaceted, and brought together expertise from multiple disciplines – implementing the outcomes of years of collective research and affirming the university's goal of materialising theory into practical solutions, providing real solutions to real problems. The UFS' involvement focused heavily on environmental rehabilitation, engineering, and understanding the long-term impact on the Jagersfontein community. This people-driven solution included 12 postgraduate

students in Psychology and 14 students from the Department of Social Work, who assisted those affected under the guidance of their lecturers. This included providing trauma counselling for community members relocating from hotel accommodation back to the affected area. No fewer than 171 students volunteered to help rebuild the rural town in whatever way needed.

The UFS responded through academic analysis and expertise, specifically through the Centre for Environmental Management, with Prof Oberholster contributing to the assessment of environmental impacts and mitigation strategies, while the Centre for Development Support provided context on the disaster management processes involved.



Dr Mariana Erasmus.

The UFS Centre for Mineral Biogeochemistry (CMBG) also formed part of the team focusing on the potential damage caused to the soil. Working alongside the Department of Forestry, Fisheries and Environment (DFFE), ***Dr Glen Taylor***, Senior Director: Research Development, and ***Dr Mariana Erasmus***, Deputy Director of the CMBG, together with other speciality departments, investigated the aftermath and effects of the disaster.

Samples taken at the site were analysed to investigate the survival of micro-organisms below the sludge – an indicator of soil fertility – to provide insight into the degradation that has taken place, as well as the rehabilitation potential. Some of the biggest challenges from an environmental perspective were prioritising the further spreading of the non-toxic but physically challenging sludge and restoring the operations of the wastewater treatment works (WWTW).

Prof Marais, Head of the Centre for Development Support (CDS), conducted research related to the Jagersfontein tailings dam tragedy. One of the articles he completed was titled: 'The catastrophic failure of the Jagersfontein tailings dam: an industrial disaster 150 years in the making', published in the *International Journal of Disaster Risk Reduction*. This study provides a sociohistorical account of decisions made over a 150-year period regarding the Jagersfontein mine and the catastrophic failure of its tailings dam. The 150-year account of this disaster shows the analytic force of examining the history of the mine's development, the issues decision-makers faced at various points in time, the choices made, and the cumulative influence of these conditions on human vulnerability.

Data collected for the study also covered the nature and scale of trauma experienced by the affected community. In the process of working through the data, Dr Venter, Lecturer in the CDS, felt that the community had not said everything that needed to be said. For three to four months, she listened to the community's stories and identified a recurring theme – the people's desire to preserve memories through photos, many of which were lost in the disaster.

This listening process inspired Dr Venter – who is also an artist – to contribute creatively by facilitating the community-driven art exhibition. On 9 September 2024, the community of Jagersfontein came together for a regenerative public art event – *Jagersfontein Meraka, Pixels to Perspectives* – which consisted of an art exhibition and public gathering designed to promote healing and reflection through the power of visual storytelling. The participatory, arts-based approach of the *Pixels to Perspectives* event allowed the Jagersfontein community to take ownership of their narrative and process their trauma. Dr Venter explained that the art exhibition created a space for emotional release and connection, bringing the divided community together in a meaningful way. "Through the arts, people opened up much quicker than through traditional research methods."

The process became Dr Venter's case study, following a participatory action learning research methodology for community-based research, which – under the mentorship of ***Dr Karen Venter***, Head of Service Learning in the Directorate Community Engagement – will contribute to the Knowledge for Change (K4C) initiative. This initiative is run by the UNESCO Chair of Community-Based Research and Social Responsibility, based at the University of Victoria, Canada, and the PRIA in New Delhi, India.

Watch the digital stories from the community about the Jagersfontein tailings dam failure.





MAKING THE SYSTEM **WORK**

Research does not take place in a vacuum – the physical and social workplace has a profound influence. Everyone can contribute to the institution's research output and productivity, from research groups to infrastructure, facilities and platforms, from staff to administration and corporate services. Although the researchers addressing research questions are key, their efforts can be fostered and directed by the overarching strategy of the institute, interconnection with facilities and platforms, and strong and directed support of management and administration. Everybody is part of a bigger ecosystem, can make an impact, and should be empowered to contribute.

The foregoing chapters in this review have celebrated our successes and progress in research and innovation at the UFS during the period 2022 to 2024. While we fully acknowledge the many challenges that higher education faces, there is much to be proud of at the UFS. None of this would have been possible without good infrastructure, as well as the systems and processes that drive the research enterprise at the university.

ESTABLISHING A CREDIBLE RESEARCH ENVIRONMENT

The UFS has put considerable effort into developing a research-conducive environment and culture. This has been led by the ***Directorate Research Development (DRD)***, which plays a key role in driving and supporting research excellence and impact, as well as implementing the university's research strategy.



Dr Glen Taylor.

A milestone in this journey was the university's achievement of Platinum certification in the Good Financial Grant Practice (GFGP) Standard – an international benchmark for grant management developed by the African Academy of Sciences.

This certification, which covers more than 300 requirements in areas such as financial management, human resources, procurement, and governance, reflects the UFS' commitment to the highest standards of accountability and efficiency.

It also strengthens the university's position as a trusted leader in research funding and financial governance. Achieving Platinum status positions the UFS among a select group of institutions worldwide that have demonstrated the ability to manage research funding with precision, transparency, and integrity.

PREPARING THE NEXT GENERATION

Preparing the next generation of researchers always has to be front of mind at universities. This requires ensuring a strong pipeline of potential postgraduate students, as well as support for early-career researchers. Over the years, the UFS has strengthened a number of interventions to support this goal.



CENTRE FOR TEACHING AND LEARNING

As an academic support centre, the overarching role of the Centre for Teaching and Learning (CTL) is to support learning and teaching at the UFS. Although CTL is focused on undergraduate students, by promoting quality learning and teaching through innovative interventions that support student engagement and success, it plays a critical role in preparing students for possible postgraduate studies and research. CTL takes an evidence-based approach to creating contextualised initiatives through data analytics and technology. Preparing students for a fast-changing and technology-enhanced future requires continuous innovation in learning and teaching. It also requires universities to support students in finishing their degrees in minimum time, while they develop key graduate attributes that make them highly employable. Through research on, for example, minimum time to degrees, they create a strong feeder source for postgraduate enrolment by identifying students with the highest scores.

TRANSFORMATION OF THE PROFESSORIATE MENTORING PROGRAMME

The overall transformation of the professoriate focuses on fostering a representative, diverse, and skilled academic workforce, particularly through targeted mentoring of early-career scholars for senior positions. It addresses historical disparities, promotes equity, and aligns with demands for decolonised curricula and modernised, technology-driven pedagogical approaches, especially within African contexts.

It comprises four initiatives:

- The Staff Doctoral Programme (SDP)

Aimed at understanding the unique research development needs of early-career researchers to develop a tailor-made support strategy for the holistic support and development of emerging scholars completing their master's or doctoral qualifications.

The Emerging Scholar Accelerator Programme (ESAP)

Providing opportunities for emerging scholars who are deeply committed to advanced scholarship. It enables them to develop the competencies needed to make a significant impact in their disciplines.

The Future Professoriate Mentoring Programme

Implemented to support and mentor advanced emerging scholars on the cusp of promotion to senior academic positions. The goal of the programme is to grow a representative and critical mass of early-career academics with the attributes required to advance to professoriate levels.

The Women's Academic Advancement Programme

A new initiative launched in April 2024, aimed at ensuring that women academics at the university have equal opportunities for advancement. It will focus, among other things, on challenging long-standing systemic biases – both explicit and implicit – that have historically disadvantaged women in higher education. The envisaged outcome is to bring academic staff together to form mentoring or networking relationships to exchange ideas, enhance productivity, and promote professional growth. Furthermore, it was established to create a platform where participants can align their research focus with the changing direction and expectations of the UFS, encourage the initiation, development, and implementation of tangible research projects, and ultimately become research leaders. The programme includes the Women Influencing and Shaping Education (WISE) mentoring programme. This initiative focuses on mid-career academic women who already have a solid skill set and life experience and express the need to 'plough back' by influencing and shaping education, while increasing their research productivity, their impact, and leadership capacity. The aim is to create opportunities to achieve excellence in academic leadership.



Academics that participated in the Transformation of the Professoriate Mentoring Programme.



With Prof Martin Nyaga (left), the UFS NGS Unit provides genomics services to researchers.

FACILITIES AND PLATFORMS

The UFS has cutting-edge facilities and platforms to underpin the research enterprise and develop the next generation of high-quality researchers.

NEXT GENERATION SEQUENCING UNIT

The University of the Free State-Next Generation Sequencing (UFS-NGS) Unit is a business research facility in the Faculty of Health Sciences that provides genomics services to researchers. Over the years, the UFS-NGS Unit has generated thousands of whole genome/targeted sequences and metagenomic data sets of various pathogens, including rotaviruses and coronaviruses.

In 2024, it acquired the NextSeq 2000 platform – new state-of-the-art technology with a wide range of advantages. The NextSeq 2000 platform boasts increased capacity of up to 350 Gb and 550 Gb on the P3 and the recently released P4 flow cells, respectively, driven by unique chemistry and a variety of built-in applications. Its versatility caters for diverse research needs, including but not limited to agricultural and biomedical sciences, vaccine efficacy studies, human cancer research, and studies on transmittable diseases.

Its high-throughput sequencing capabilities enable researchers to delve deep into the genetic makeup of tumour samples and identify critical mutations and markers linked to cancer development. Its flexibility allows the university to cater for both state-funded research projects and private collaborations, positioning the institution as a hub for cutting-edge genomics research and innovation.

HIGH PERFORMANCE COMPUTING

The UFS is one of only a few universities in South Africa equipped with a High-Performance Computing (HPC) Unit. This advanced research technology gives researchers a competitive edge across disciplines, enabling them to address complex problems and run massive simulations far beyond the reach of standard computers. The unit supports more than 580 users from 60 departments in most faculties.

SIMULATION UNITS



Nursing students benefit from hands-on training in high-tech simulation laboratories like the SPACE.

The ***Clinical Simulation and Skills Unit*** in the School of Biomedical Sciences offers a dynamic, hands-on learning space where students train, using a full range of medical simulators. In this safe environment, students can practise procedures until they achieve confidence and competence, before applying their skills in real-world settings. Training is further enhanced by the Medtronic and UFS Cardiac Simulation Unit, where cardiothoracic surgery, cardiology, vascular surgery, and anaesthesiology teams refine their techniques using advanced virtual reality laparoscopic and endoscopic simulators. These tools give postgraduate students a realistic, risk-free introduction to complex procedures before entering the operating theatre.

The programme mimics aeronautical training with modules that address risk and human factors in surgery as well. Simulation models include bench models, virtual thoracic surgery, echocardiography, and the high-fidelity Califia system. The Califia system provides a complete operating room experience, with an actual team performing open-heart surgery under immersive simulation conditions. An entire surgical, anaesthetic, perfusion, and nursing team is involved.

The Califia system provides a high-fidelity, AI-enhanced, immersive experience in which the entire cardiac team can perform predefined procedures in a controlled, risk-free environment. This can be standardised to mimic specific operations or conducted in a chaotic, unforeseen way to develop team dynamics and personal crisis experience. It is envisioned that the programme will be incorporated into all cardiac surgery training programmes in the future. This is currently the only programme of its kind being developed at this level of sophistication in sub-Saharan Africa.

In the School of Nursing, the development of exceptional nurses goes beyond classroom learning and is grounded in real-life experience. Nursing students benefit from immersive hands-on training in high-tech simulation laboratories and skills units. These environments feature a mix of high-fidelity human patient simulators, low-fidelity mannequins, and trained standardised patients, enabling students to build technical skills, develop clinical reasoning, and provide compassionate care.

Watch this clip on the high-tech simulation laboratory.

BIOSAFETY LEVEL 3 PATHOGEN RESEARCH LABORATORY

At the heart of advanced infectious disease research is the ***UFS Biosafety Level 3 (BSL-3) Pathogen Research Laboratory***, a critical resource for researchers working on high-consequence pathogens. This advanced high-contaminant facility enables work on emerging, vector-borne, and zoonotic diseases, and is jointly used by leading researchers to support the university's One Health research agenda.

The BSL-3 facility operates under strict safety protocols, including negative air pressure, HEPA-filtered exhaust systems, and full protective equipment, ensuring the safe handling of high-risk agents. In addition to advancing cutting-edge science, the laboratory serves as a training platform that prepares the next generation of virologists, microbiologists, and One Health researchers.

Watch this video clip about the Biosafety laboratory.



Prof Felicity Burt.

CENTRE FOR MICROSCOPY



Profs Jannie Swarts, Danie Vermeulen and Koos Terblanche unveiled a sophisticated JEOL High Resolution Transmission Electron Microscope (HRTEM).

The Centre for Microscopy has some of the most advanced microscopy facilities in South Africa, including a JSM-7800F extreme-resolution analytical field emission SEM; Philips CM100 analytical transmission electron microscope (TEM); Nikon E-2000 confocal laser scanning microscope (CLSM); and Nikon AZ100 stereo microscope. The centre specialises in obtaining detailed structural data on a scale ranging from micro- to nanometres, employing advanced microscopy techniques such as scanning electron microscopy (SEM), transmission electron microscopy (TEM), and confocal laser scanning microscopy (CLSM). In addition, the centre is equipped with specialised specimen preparation equipment, including critical point dryers, sputter coaters, an ultramicrotome, and a focused ion beam (FIB). This range of equipment ensures that specimens are appropriately prepared for SEM and TEM.



The Boyden Observatory 1,5-m telescope.

Read more about the Centre for Microscopy's work here.

ASTROPHYSICS FACILITIES

The UFS is also the only institution in South Africa with exclusive access to an ***observatory*** and a ***digital planetarium*** in the form of the Two Observatories Project: Boyden Observatory and Science Centre and the Naval Hill Digital Planetarium (Old Lamont-Hussey Observatory). Available research equipment includes, inter alia, the 60-inch Boyden reflector telescope, a 16-inch Watcher robotic telescope, and a 14-inch Celestron Schmidt-Cassegrain telescope.

The Naval Hill Digital Planetarium.



INAUGURAL LECTURES

Each inaugural lecture marks a significant milestone in the academic journey of a professor, offering a platform to share their research vision and scholarly contributions with the wider university community. Between 2022 and 2024, the University of the Free State hosted a diverse series of inaugural lectures across faculties, reflecting the breadth of enquiry and innovation that defines our institution. From health sciences and law to the humanities and natural sciences, these lectures showcase pioneering work that addresses pressing societal challenges, advances disciplinary knowledge, and inspires future scholarship.

FACULTY	PROFESSORS	TITLE OF LECTURE	DATE
HEALTH SCIENCES Department of Pharmacology	Prof Motlalepula Matsabisa	Indigenous medical knowledge – what have we learnt and what can we achieve: solving past and present health issues	5 October 2022
NATURAL AND AGRICULTURAL SCIENCES Department of Soil, Crop and Climate Sciences	Prof Angelinus Franke	Contested science for sustainable agriculture	4 May 2022
NATURAL AND AGRICULTURAL SCIENCES Department of Microbiology and Biochemistry	Prof Dirk Opperman	Exploring, exploiting, and evolving life at the atomic level	6 March 2024
NATURAL AND AGRICULTURAL SCIENCES Department of Geography	Prof Geofrey Mukwada	The last days of plenty: an assessment of elevation-dependent warming in the Drakensberg mountain region between 1980 and 2018 and its potential implications for social-ecological systems in the region and downstream communities	**QWAQWA** 22 August 2022
NATURAL AND AGRICULTURAL SCIENCES Department of Microbiology and Biochemistry	Prof Trudi O'Neill	Rotavirus: new strategies to outsmart and ol foe	1 September 2022
THE HUMANITIES Department of English	Prof Irikidzayi Manase	The stories of our lives, being human, and the literary and cultural imaginings thereof – past, present, and future	8 September 2022
THE HUMANITIES Department of Psychology	Prof Paul Fouché	Understanding greatness: dissecting the eminent personality from a psychobiographical approach	1 June 2022

FACULTY	PROFESSORS	TITLE OF LECTURE	DATE
NATURAL AND AGRICULTURAL SCIENCES Department of Plant Sciences	Prof Liezel Herselman	The ongoing battle against destructive cereal killers	24 March 2022
ECONOMIC AND MANAGEMENT SCIENCES Department of Public Administration and Management	Prof Liezel Lues	Public service leaders: Samaritans or Levites?	31 May 2023
THE HUMANITIES Department of Psychology	Prof Luzelle Naudé	In search of self: emerging adults as actors, agents, and authors	14 September 2022
NATURAL AND AGRICULTURAL SCIENCES Department of Mathematics and Applied Mathematics	Prof Tomas Vetrik	Extreme graph theory	19 May 2022
NATURAL AND AGRICULTURAL SCIENCES Department of Physics	Prof Ted Kroon	What's the use of a rainbow?	11 August 2022
THE HUMANITIES Department of Psychology	Prof Stephen Walker	How ought counselling psychologists to think about assisted dying?	25 August 2022
NATURAL AND AGRICULTURAL SCIENCES Department of Zoology	Prof Liesl van As	Parasite conversation, should we care? Yebo	18 May 2023
HEALTH SCIENCES School of Biomedical Sciences	Prof Mathys Labuschagne	Clinical simulation: quo vadis	8 March 2023
NATURAL AND AGRICULTURAL SCIENCES Department of Zoology	Prof Aliza le Roux	Co-existing with curious creatures	**QWAQWA** 11 April 2024
NATURAL AND AGRICULTURAL SCIENCES Department of Plant Sciences	Prof Anofi Ashafa	Green solutions: the panacea to global disease burdens	**QWAQWA** 4 September 2024
LAW Department of Private Law	Prof Bradley Smith	Combating trust form abuse in the context of matrimonial property claims at divorce: two decades of judicial evolution in the supreme court of appeal	21 February 2024
ECONOMIC AND MANAGEMENT SCIENCES Department of Business Management	Prof Brownhilder Neneh	Thriving vs. surviving the entrepreneurial journey: a balancing act for youth and women	25 September 2024

FACULTY	PROFESSORS	TITLE OF LECTURE	DATE
NATURAL AND AGRICULTURAL SCIENCES Department of Zoology	Prof Frank Zachos	Of bat bombs and super moms – the wonderous and wondrously curious world of mammals	19 March 2024
NATURAL AND AGRICULTURAL SCIENCES Department of Architecture	Prof Jeremy Smith	Being finished is finished	27 August 2024
NATURAL AND AGRICULTURAL SCIENCES Department of Soil, Crop and Climate Sciences	Prof Johan van Tol	Every soil has a story to tell	17 October 2024
HEALTH SCIENCES Department of Haematology and Cell Biology	Prof Muriel Meiring	Thrombotic and haemostatic disorders: diagnosis and treatment	25 June 2024



Prof Brownhilder Neneh.



Prof Ted Kroon.



Prof Bradley Smith.



Prof Irikidzayi Manase.

LOOKING TO THE FUTURE

MESSAGE FROM **DR GLEN TAYLOR**, SENIOR DIRECTOR: RESEARCH DEVELOPMENT

The future of research at the University of the Free State will be shaped not only by the knowledge we produce, but also by our ability to translate that knowledge into meaningful and sustainable change. As we look towards the next phase of the university's development, our ambition is to build a research and innovation ecosystem that is globally connected, distinctly African, and responsive to the complex challenges facing society.

Our emerging thematic research agenda will provide a stronger framework for concentrating expertise, infrastructure, and investment around areas in which the UFS can achieve scholarly distinction and demonstrable impact. By encouraging collaboration across disciplines, faculties, and campuses, we can move beyond fragmented initiatives towards integrated programmes capable of addressing interconnected challenges such as food and water security, health and well-being, social justice, digital transformation, environmental sustainability, and inclusive economic development. Achieving this ambition requires us to strengthen the entire research value chain. This includes identifying and developing talent; expanding postgraduate and postdoctoral capacity; supporting researchers to secure competitive funding; maintaining rigorous ethical and governance standards; and creating clearer pathways from discovery to innovation, commercialisation, policy influence, and community benefit. Our increasingly integrated research management environment will enable us to use institutional data more intelligently, reduce administrative barriers, and provide researchers with coordinated support throughout the research life cycle.



Partnerships will remain central to our future. The UFS must continue to deepen collaboration with universities, science councils, government, industry, communities, and international funders. At the same time, we have an important role in strengthening research management and institutional capacity across Southern Africa. Our success should therefore be measured not only by rankings, publications, and grant income, but also by the capabilities we build, the opportunities we create, and the lasting difference our research makes.

The rapid development of artificial intelligence, advanced analytics, and emerging technologies will transform how research is conducted and shared. We must embrace these possibilities responsibly, ensuring that innovation remains grounded in academic integrity, ethical leadership, and human-centred values.

Looking to the future is ultimately an institutional commitment: to invest strategically, collaborate purposefully, and convert excellence into impact. By aligning our people, platforms, partnerships, and research strengths, the UFS can become an increasingly influential knowledge institution – one that advances the frontiers of scholarship while helping to shape a more resilient, equitable, and prosperous future for South Africa, Africa, and the world.

UNIVERSITY OF THE **FREE STATE**
UNIVERSITEIT VAN DIE **VRYSTAAT**
YUNIVESITHI YA **FREISTATA**



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UNIVERSITY OF THE FREE STATE

RESEARCH REVIEW

2022–2024