2022 RESEARCH & INNOVATION @UNISA

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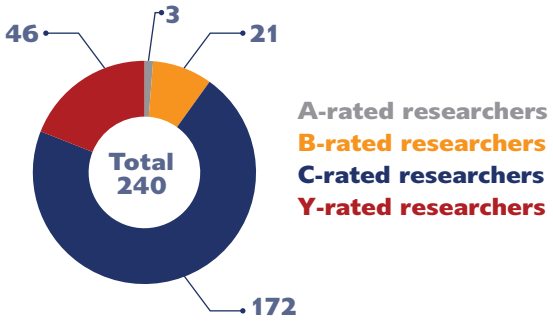
UNISA university of south africa

2022 IN FIGURES

NRF-RATED RESEARCHERS IN 2022

Figures as at June 2022



CENTRE FOR WORLD UNIVERSITY RANKINGS (CWUR) 2023

https://cwur.org/2023.php

11TH IN SOUTH AFRICA

1338TH GLOBALLY TOP 6.6%

ACADEMIC RANKING OF WORLD UNIVERSITIES RANKINGS (ARWU) 2023

https://www.shanghairanking.com

8TH IN SOUTH AFRICA

901-1000 WORLDWIDE

Unisa's best-ranked subject was Chemical Engineering **401-500 GLOBALLY**

TIMES HIGHER EDUCATION (THE) RANKINGS 2023

https://www.timeshighereducation.com/world-university-rankings

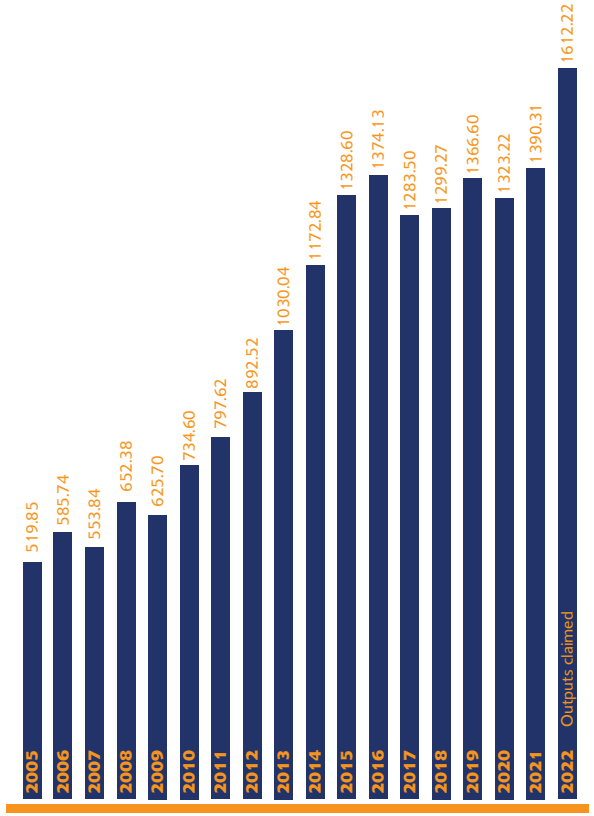
12TH IN SOUTH AFRICA

1001-1200 WORLDWIDE

THE IMPACT RANKINGS 2023

Overall: 7th in South Africa and 601-800 worldwide
SDG 4 (Quality Education): **4th in SA**, 201-300 Global
SDG 5 (Gender Equality): **4th in SA**, 101-200 Global
SDG 6 (Clean Water and Sanitation): **4th in SA**, 401-600 Global
SDG 7 (Affordable and Clean Energy): **2nd in SA**, 401-600 Global
SDG 17 (Partnerships for the Goals): **7th in SA**, 601-800 Global

DHET SUBSIDY FOR PUBLICATION OUTPUTS FROM 2005 – 2022



2022 IN FIGURES

08 ENDOWED RESEARCH CHAIRS

- Exxaro Chair in Climate and Sustainability Transitions
- Commonwealth of Learning Chair in Open Education Resources and Practices
- DST/NRF SARChI Research Chair in Social Policy
- DST/NRF SARChI Chair in Information and Communication Technology for Development
- UNITWIN/UNESCO/Unisa Chair in ODL
- UNESCO Co-Chair in Early Childhood Education, Care and Development
- UNESCO UNISA Africa Chair in Nanosciences and Nanotechnology
- DST/NRF SARChI Research Chair in Power Engineering and Smart Networks

07 DEDICATED INSTITUTES

- Institute for the Development of Energy for African Sustainability (IDEAS)
- Institute for Nanotechnology and Water Sustainability (iNanoWS)
- Institute for Corporate Citizenship
- Institute for Global Dialogue
- Institute for Open and Distance Learning
- Institute for Science and Technology Education
- Institute for Theology and Religion

01 UNISA RESEARCH CHAIR

- Chief Albert Luthuli Research Chair

01 BUREAU

- Bureau of Market Research

AWARDS

06 Chancellor's Awards for Research Excellence

01 Chancellor's Award for Innovation Excellence

03 Women in Research Awards for Excellence in Research

01 NSTF-South 32 Award, Engineering Research Capacity Development

03 Academics in top five of most-cited scientists in South Africa (research.com)

01 NRF Special Recognition Award

01 NRF Research Excellence Award

Zairi International Award for Research Impact

26 Members of the Academy of Science South Africa (ASSAf)

11 Members of the South African Young Academy of Science (SAYAS)

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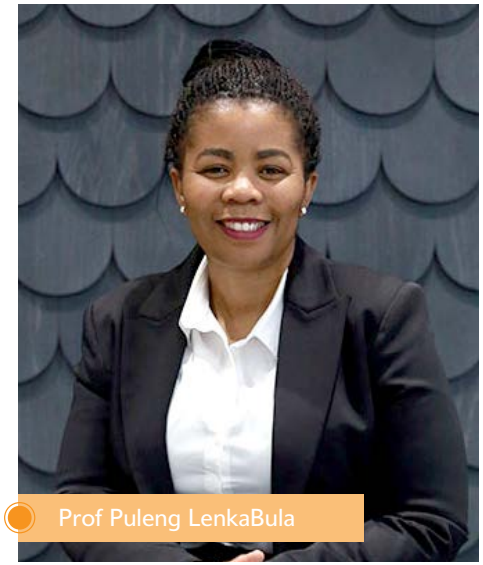
MESSAGES

"The SDGs are a key aspect in the university's journey towards being the African university in the service of humanity."

VICE-CHANCELLOR'S MESSAGE



Prof Puleng LenkaBula

It is an honour to report to the Unisa community and our external stakeholders on the university's research and innovation work for the period from 1 January to 31 December 2022. Reporting in this way is an important exercise in accountability and at the same time an opportunity for self-reflection so that we can engage in course correction, if need be.

When the results of an entire year's research and innovation are set out as they are in this report, it is possible to gain a panoramic view that, in the normal course of events, may not be visible. This can be helpful in discerning broad patterns and trends that can reveal whether Unisa's research and innovation endeavours are on the right track or whether the work or aspects of it need to be redirected or recalibrated.

On the whole, this report tells the story of a largely successful year for research and innovation at Unisa, while also revealing certain areas where more could be done or where attention is needed to avert areas that are currently of minor or moderate concern from becoming more pronounced.

One of the most important trends to note in this annual report is how focused Unisa's research community is on doing work that supports the attainment of the United Nations Sustainable Development Goals (SDGs). The SDGs are a key aspect in the university's journey towards being the African university in the service of humanity. Thus, we constantly monitor our progress in intensifying our emphasis on the SDGs and are eager to see whether this is reflected in external barometers such as global impact rankings.

In this regard, the university notes the results of the 2023 Times Higher Education (THE) Impact Rankings, which considered the impact performance in 2022 of 1406 universities. Unisa was placed in the 1001-1200 band and ranked 12th in South Africa.

Unisa, which is one of eight South African universities that entered these THE Impact Rankings officially participated in five SDGs, namely Quality of education (SDG 4), Gender equality (SDG 5), Clean water and sanitation (SDG 6), Affordable and clean energy (SDG 7) and Partnerships for the goals (SDG 17). We were delighted to have been ranked in the top quartile worldwide for Quality education and Gender equality.

As 2030 approaches as the target date for accomplishing the SDGs, the university is stepping up its focus on those goals where we believe we can make the greatest impact, especially in Clean water and sanitation and Affordable and clean energy. One need look no further than the novel research being done in these areas, as outlined in the SDG section of this report, to grasp how seriously we take our contribution to building a sustainable future for South Africa, the continent and the world.

Another far-reaching trend evident from this report is how collaboration – nationally and internationally – is becoming embedded in the research and innovation culture of Unisa. More and more, our researchers and innovators are seeking out fruitful partnerships and collaborations, such as the South African-Swedish partnership that has given rise to an evidence-based smartphone app for symptom management of children with cancer. Then there is the South African-Ghanaian project to design appropriate fiscal policies for the transition from non-renewable to renewable energy sources – another pressing African and global priority.

And, on the innovation front in 2022, we worked with universities in Rwanda, Switzerland, Tanzania and the United States of America in an international exchange programme that is opening the eyes and minds of students to exciting new perspectives on innovation and entrepreneurship. As formal job markets shrink, sustainable livelihoods will increasingly be sought in entrepreneurial opportunities and innovative directions.

The international collaborations involving Unisa researchers are also translating into increased research outputs, as we have seen in the tracking undertaken by SciVal, which analyses Scopus data. According to SciVal, Unisa's scholarly output through international collaborations climbed from 423 in 2018 to

VICE-CHANCELLOR'S MESSAGE

961 in 2022, an increase of well over 100%.

Meanwhile, after a decline in the proportion of Unisa staff with doctoral qualifications in two previous years, we have succeeded in turning the situation around and, in 2023, had 1 906 doctorally qualified academics. This compares with 1 065 in 2022, 1 066 in 2021 and 1 087 in 2020, representing a four-year high. Doctoral qualifications are essential for the university to maintain its track record as a major generator of master's and postdoctoral graduates capable of high-level research, as well as for Unisa to continue producing high levels of high-quality research.

An important mechanism in enabling our staff to attain doctoral qualifications, while broadening our pool of active researchers, is the new Researcher Development Academy formally launched in 2022 to prepare the next generation of researchers for the challenges of the future. Alongside the Academy, the university will continue to offer the extensive portfolio of research support programmes available to our researchers and innovators and participate in programmes such as the Department of Higher Education and Training's New Generation of Academics Programme (nGAP).

During the year, Unisa continued to pay close attention to transformation, referring both to the demographics of our research community and the nature of the research conducted. It is a source of great pride that the university is performing so well in the Africanisation and decolonisation of knowledge generation and content, as is evident on the pages of this report. Strides have also been taken in promoting the use of indigenous African languages in research and innovation, with outputs ranging from the development of a multilingual dictionary of proverbs to Unisa Press's production of a scholarly book in Tshivenda. Much more is expected from our drive to promote the use of indigenous languages in research and academia.

Overall, the year 2022 was a positive year for research and innovation at Unisa. I hope you find the Report insightful and empowering.

"It is a source of great pride that the university is performing so well in the Africanisation and decolonisation of knowledge generation and content."

VICE-CHANCELLOR'S MESSAGE

ISIZULU

Umlayezo weSekela-Shansela

Kuyilungelo ukubikela umphakathi wase-Unisa kanye nababambiqhaza bethu bangaphandle mayelana nomsebenzi wocwaningo kanye nokusungulwa kwenyuvesi kusukela mhlaziyi lu-1 kuMasingana kuya zingama-31 kuZibandlela wezi-2022. Ukubika ngale ndlela kuwumsebenzi obalulekile wokuziphendulela futhi ngesikhathi esifanayo kuyithuba lokuziphendulela ukuze uzicabangisise sibuye sikwazi ukuhlanganyela ekulungiseni indlela efanelekile, uma kudingeka.

Uma imiphumela yocwaningo lonyaka wonke kanye nokuqanjwa okusha kubekwe njengoba kunjalo kulo mbiko, kuyenzeka ukuthi uthole umbono wezwe lonke elibonakalayo ngesikhathi sinye ongase ungabonakali, esikhathini esijwayelekile, okungenzeka ungabonakali. Lokhu kungaba usizo ekuboneni amaphethini abanzi namathrendi angadalula ukuthi ucwaningo lwe-Unisa kanye nemizamo yokusungula isendleleni efanele noma ukuthi umsebenzi noma izici zayo zidinga ukuqondiswa kabusha noma zilungiswe kabusha.

Sekukonke, lo mbiko uxoxa ngendaba yonyaka oyimpumelelo kakhulu ocwaningweni nasekusungulweni kwezinto ezintsha e-Unisa, kanti futhi uveza izindawo ezithile lapho kungenziwa okwengeziwe noma lapho kudingeka khona ukunakwa ukuze kugwenywe izindawo okumanje ezingakhathazeki kangako noma ezimaphakathi ukuba zibe ngaphezulu ukuze zishiwo.

READ MORE

SETSWANA

Molaetsa wa Motlatsamotšhanselara

Ke motlotlo go begela setšhaba sa Unisa le baamegi ba rona ba kwa ntle ka tiro ya yunibesithi ya patlisiso le boitshimololedi ya paka ya go tloga 1 Firikgong go fitlha 31 Sedimonthole 2022. Go bega ka tsela eno ke tiragatso ya botlhokwa ya go bontsha maikarabelo mme gape ke tšhono ya go itshekatsheka gore re kgone go ipaakanya fa go tlhokega.

Fa dipholo tsa ngwaga otlhe tsa dipatlisiso le boitshimololedi di tlhagisiwa jaaka go ntse mo pegelong eno, go na le kgonagalo ya go nna le pono e e anameng e, ka tlwaelo, e neng e ka seke ya nna teng. Seno se mosola gonne se thusa go tlhagolaganya mekgwa le ditsela tse dirileng tse ka kakaretso di ka bontshang gore a maiteko a Unisa a patlisiso le boitshimololedi a mo tseleng e e siameng gongwe gore a go na le tiro gongwe dintlha dingwe tse di tshwanetseng go fetolwa.

Ka kakaretso, pegelo eno e anela kgang ya ngwaga o o atlegileng mo go tsa patlisiso le boitshimololedi mo Unisa, mme gape e ntse e senola dikarolo tse go ka bong go dirilwe botoka mo go tsone gongwe tse di tlhokang go totiwa go tila dintlha tse ga jaana di tshwenyang, e ka ne e le go se kae fela gongwe go bonalanyana, gore di se ke tsa etegela.

READ MORE

AFRIKAANS

Boodskap van die Visekanselier

Dit is vir my 'n voorreg om aan die Unisa-gemeenskap en ons eksterne belanghebbendes verslag te doen oor die Universiteit se navorsings- en innoveringswerk vir die tydperk 1 Januarie tot 31 Desember 2022. Om op hierdie wyse verslag te lewer, is 'n belangrike oefening in aanspreeklikheid en terselfdertyd 'n geleentheid vir selfrefleksie sodat ons, indien nodig, ons rigting kan aanpas.

Wanneer die resultate van 'n hele jaar se navorsing en innovering uiteengesit word soos wat dit in hierdie verslag gedoen is, is dit moontlik om 'n breë oorsig, wat onder normale omstandighede nie sigbaar sou wees nie, van die Universiteit se werksaamhede te kry. Dit kan help om duidelike patrone en neigings op te merk wat kan aantoon of Unisa se navorsings- en innoveringsondernemings op die regte pad is en of die werk of aspekte daarvan in 'n nuwe rigting gestuur of geherkalibreer moet word.

In die geheel gesien, vertel hierdie verslag die storie van 'n grotendeels suksesvolle jaar van navorsing en innovering by Unisa, terwyl dit ook uitwys dat meer gedoen kan word in sekere areas of dat minder aandag gegee moet word aan areas wat tans van minder of matige belang is om te keer dat dit nie meer aandag geniet as wat regverdig is nie.

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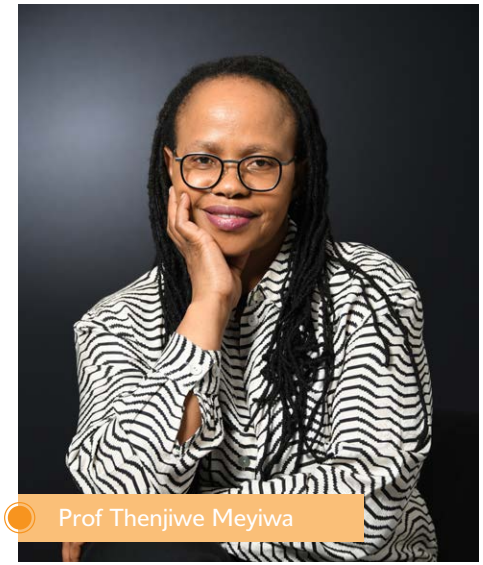
VICE-PRINCIPAL'S MESSAGE



Prof Thenjiwe Meyiwa

What an exciting and invigorating year 2022 was for research and innovation at Unisa. As humanity began to emerge from a period of isolation unprecedented in modern history, we as scholars, researchers and research managers came together again with a renewed appreciation of one another and the great things that can be co-created and accomplished together.

After the enforced separation that had characterised the two previous years, we made the most of the opportunities that 2022 presented to rejoice in being part of something bigger than our individual selves – a research and innovation community determined to contribute to a healthier, safer, more equitable, just and peaceful world.

These are not just lofty sentiments. We are putting words into action.

Fairness, equity and diversity in global research partnerships

It is well known that when researchers from low- and middle-income countries engage in international research partnerships, they are not always fairly acknowledged in the published works, or are relegated to minor research roles, among other challenges. This is set to change, and we are proud that Unisa is part of that change. In May 2022, at the Seventh World Conference on Research Integrity in Cape Town, Unisa's Research Integrity Office helped lay the groundwork for what was to become a global clarion call for fairness, equity and diversity in global research partnerships – the Cape Town Statement on Fostering Research Integrity through Fairness and Equity. (Refer to page 38 for more information.)

As the year progressed, Unisa continued to encourage debate on globally relevant matters, such as the importance of research in ensuring that open and distance e-learning (ODeL) lives up to its potential to bring higher education to people everywhere. The occasion was the 2022 Unisa ODeL Conference, the third in this conference series. The conference, which was held virtually, attracted over 1 500 delegates from 47 international countries (17 of which were from the African continent) and drew attention to the important research that has been done – and still needs to be done – to ensure the success of ODeL students, many of whom would otherwise not have the opportunity to enrol for tertiary studies. I am proud of how this conference (see page 14 of this report) has grown from strength to strength.

More signs of co-creation were evident when the university launched its inaugural Innovation Festival, a two-day celebration of the great strides Unisa has been making as an entrepreneurial university that can act as a catalyst for local, national and socio-economic development. We applauded enthusiastically as inventors from the ranks of our students and staff pitched their innovations for putting an end to traffic jams and pollution, dealing with the energy crisis, teaching numeracy, literacy and coding to preschool children and developing new and better drugs to treat cancer, to name a few.

In between these groundbreaking events, we came together at many other seminars, webinars, mini-conferences and team meetings – in person, virtually and in hybrid format – to debate, collaborate, brainstorm and problem-solve – delivering the results you can read about in this report.

It was a year of co-creation and camaraderie. Together.

"Our research and innovation community is determined to contribute to a healthier, safer, more equitable, just and peaceful world."

VICE-PRINCIPAL'S MESSAGE

ISIZULU

Umlayezo kaSekela-Thishanhloko

Yeka unyaka ojabulisayo nokhuthazayo ka-2022 wocwaningo nokusungula izinto e-Unisa. Njengoba isintu siqala ukuvela esikhathini sokuhlukaniswa esingakaze sibonwe emlandweni wanamuhla, thina njengezazi, abacwaningi nabaphathi bocwaningo saphinde sahlangana futhi nokwazisana okuvuselelwe kanye nezinto ezinkulu ezingadalwa ngokubambisana futhi zifezwe ndawonye

Ngemuva kokwehlukana okuphoqiwe obekugqame eminyakeni emibili edlule, siwasebenzise ngokugcwele amathuba u-2022 awethulile ukuze sijabulele ukuba yingxenye yokuthile okukhulu kunokwethu ngabanye - umphakathi wocwaningo kanye nokusungula ozimisele ukufaka isandla ekuphileni okunempilo, okuphephile, nokuningi. izwe elinobulungiswa nelinokuthula.

Lena akuyona nje imizwa ephakeme. Siyakwenza esikushoyo.

READ MORE

SETSWANA

Molaetsa wa ga Motlatsa Mogokgo

Ngwaga wa 2022 o nnile o o kgatlhisang le o o rotloetsang mo tlhotlhomisong le tsenyotirisong ya dikakanyo tse dintšha mo Unisa. Fa botho bo ne bo simolola go tlhagelela go tloga mo pakeng ya tlhaolo e go neng go sa itsiwe ka yone mo hisetoring ya sešweng, rona re le barutegi, batlhotlhomisi le balaodi ba tlhotlhomiso re ne ra kopana gape ka go itumelelana le go tlotlana go go ntšhafetseng le go itumelela dilo tse dikgolo tse re ka di dirang le go di fitlhelela mmogo.

Morago ga kgaogano e e neng e gapelesega ya dingwaga tse pedi tse di fetileng, re dirile ditšhono tse dintsi tse di tlhagisitsweng ke 2022 go itumelela go nna karolo ya sengwe se segolwane go re feta – setlhopha sa tlhotlhomiso le tsenyotirisong ya dikakanyo tse dintšha se se ikaeletseng go nna le seabe mo lefatsheng le le itekanetseng thata, le le babalesegileng thata, le le tsholang batho ka go lekalekana, le le siameng mme le tletse kagiso.

Seno ga e se maikao fela. Re tsenya mafoko tirisong.

READ MORE

AFRIKAANS

Boodskap van die Viserektor

2022 was 'n opwindende en verkwikkende jaar vir navorsing en innovasie by Unisa. Namate die mensdom 'n tydperk van ongekende afsondering in die moderne tyd agtergelaat het, het ons, as vakkundiges, navorsers en navorsingsbestuurders, met 'n hernude waardering vir mekaar en die uitsonderlike dinge wat saam geskep en bereik kan word, weer bymekaargekom.

Na afloop van die gedwonge afsondering wat die twee vorige jare gekenmerk het, het ons die geleenthede aangegryp wat 2022 gebied het om deel van iets groter as onsself as individue – 'n navorsings- en innovasiegemeenskap wat vasbeslote is om 'n bydrae tot 'n gesonder, veiliger, billiker, regverdiger en vreedsame wêreld te lewer – te wees.

Dit is nie bloot hoogdrawende sentimente nie. Ons voeg die daad by die woord.

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RESEARCH

"Our research chairs have a dedicated focus on research areas in which Unisa excels and which are national and continental priorities."

RESEARCH CHAIRS

Research chairs are an indispensable part of the university's research efforts as they allow for dedicated focus on specific areas of research in which Unisa excels and which are national and continental priorities. These chairs are part of the research excellence initiatives managed by the Department of Research, Innovation and Commercialisation to strengthen and advance research and scholarship.

All but one of the research chairs in operation in 2022 were endowed chairs funded through the South African Research Chairs Initiative (SARChI), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and a corporate sponsor. The exception was the Chief Albert Luthuli Research Chair, which Unisa itself funds.

EXXARO CHAIR IN CLIMATE AND SUSTAINABILITY TRANSITIONS

Research and innovation towards climate resilience and net zero emissions

The Paris Agreement, Sendai Framework and the Glasgow Climate Pact present pathways that require the world to build climate resilience to extreme and slow-onset events such as rising sea levels, biodiversity loss, droughts, migration and displacement, cyclones, ocean acidification, increasing hailstorms and wildfires. The global pacts further build narratives towards net zero emissions by 2050 to which every progressive organisation should subscribe.

Against this background, the fields of climate change and governance, COVID-19, disaster risk reduction and sustainable development are focal points of the work of the Exxaro Chair in Climate and Sustainability Transitions. The Sustainable Development Goals (SDGs) are a major emphasis of the chair's sustainable development work.

Prof Godwell Nhamo, Exxaro Chair in Climate and Sustainability Transitions

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Photograph by JC Fourie

CHAIRS AND INSTITUTES

SARCHI CHAIR IN ICT FOR DEVELOPMENT (ICT4D)

Designing, developing and evaluating sustainable digital systems for marginalised communities

The SARChI Chair in ICT for Development (ICT4D) seeks to harness the potential of information and communication technologies (ICTs) for social good by understanding user needs and designing, implementing and evaluating technologies for under-served, under-resourced and under-represented populations. The chair's research aligns with the UN's Sustainable Development Goal (SDG) 4: Quality education, as well as the NRF Research Agenda: Smart connected economy and society.

Based on the chair's performance in the first cycle (2016 to 2020), the ICT4D Chair was renewed for a second term running until 2025.

The chair, located in the School of Computer Science within the College of Science, Engineering and Technology, conducts interdisciplinary research that integrates aspects of technology and human socio-economic development. This involves research on the design, development and evaluation of digital systems for marginalised communities, as well as investigating how specific groups engage with technology and the implications for policy development.

READ MORE

Prof Judy van Biljon, SARChI Chair in ICT for Development (ICT4D)

UNESCO CO-CHAIR IN EARLY CHILDHOOD EDUCATION, CARE AND DEVELOPMENT (ECD)

Expanding knowledge and the evidence base for action, social justice and equity

The UNESCO Co-chair in 2022 embarked on a host of activities to allow for the growth of evidence-for-action under the banner of ECD at the Margins to transform an emerging sector in public service. A landmark achievement was the publication of four peer-reviewed books. Each book focuses on the effort to transform ECD from an informal sector to public service that pays attention to systemic change for social justice and equity.

In the scramble to "build forward better and differently", it was necessary to tease out the lived experiences of children, their families and the workforce in ECD. To this end, a co-edited volume was produced with two Australian colleagues, entitled *Responding and Speaking Back to a Global Pandemic in Early Childhood Education: Challenges and Opportunities*. The book offers international perspectives on the impact of the pandemic on key stakeholders and possibilities for moving the ECD agenda forward.

In light of the complexities in ECD, it was also essential to drive the point that situatedness and diversity are key drivers in developing early childhood policy and practice. This led to the production of a volume entitled *Critical Issues in Professional Development: Situated Accounts from South Africa*. As the first editor, the co-chair carefully chose articles that disrupted conventional wisdom of best practices in a highly fragmented ECD sector.

READ MORE

Prof Hasina Ebrahim, UNESCO Co-chair in Early Childhood Education

CHAIRS AND INSTITUTES

Prof Letseka, UNESCO Chair on Open Distance Learning

UNESCO CHAIR ON OPEN DISTANCE LEARNING

At the forefront of national, regional and international ODL developments

During 2022, the UNESCO Chair on Open Distance Learning (ODL) responded to its founding objectives, namely:

- producing ODL research that is responsive to Unisa's vision of the African University shaping futures in the service of humanity
- building capacity geared at improving the quality and coverage of higher education through the ODL mode
- positioning the chair as the Southern African regional hub for an integrated system of research, training, information sharing and documentation in ODL
- aligning with international players in order to facilitate exchange and collaboration in the delivery of quality distance education and service to humanity

READ MORE

CHIEF ALBERT LUTHULI RESEARCH CHAIR

Critical engagement on Africa's challenges and possibilities

The Chief Albert Luthuli Research Chair affords critical engagement between established and emerging scholars who seek to radicalise the academic space and critically engage with ways in which Africa, its challenges and possibilities could be tackled from interdisciplinary perspectives while also grappling with issues concerning connections between the Global South and Global North.

The research chair's objectives are to a) build the capacity of emerging researchers, including master's and doctoral students, postdoctoral fellows and others; b) build collaborative networks involving projects with researchers, institutes and institutions; c) produce research outputs by established and emerging scholars in reputable journals and publishers; d) fund its various projects externally; and e) create an active research environment by hosting seminars, colloquia, workshops and retreats, participating in conferences and engaging in public science that is community-context-relevant and accessible.

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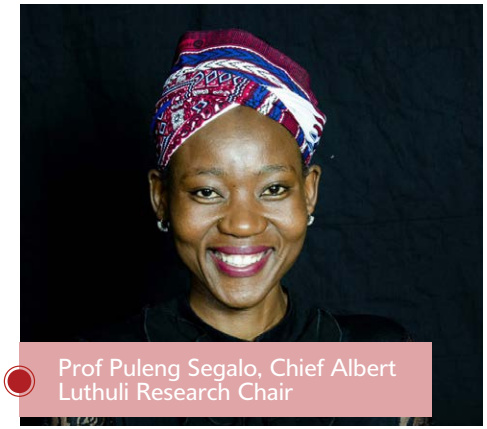


Prof Puleng Segalo, Chief Albert Luthuli Research Chair

Prof Malik Maaza, UNESCO Unisa Ithemba Labs-NRF Chair in Nanosciences and Nanotechnology

UNESCO UNISA ITHEMBA LABS-NRF AFRICA CHAIR IN NANOSCIENCES AND NANOTECHNOLOGY (U2ACN2)

Multidisciplinary approach towards addressing Africa's water, energy and health needs

The U2ACN2 Chair is a trilateral partnership between UNESCO, Unisa and iThemba Labs-National Research Foundation in nanosciences and nanotechnology. Headquartered at Unisa's main campus in Pretoria, the chair's core aims are to instigate and coordinate significant capacity-building and human capital mobility programmes in nanosciences and nanotechnology.

READ MORE

RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

The sustainable development goals (SDGs) are a collection of 17 interlinked global goals designed to be a "shared blueprint for peace and prosperity for people and the planet, now and into the future". The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by 2030.

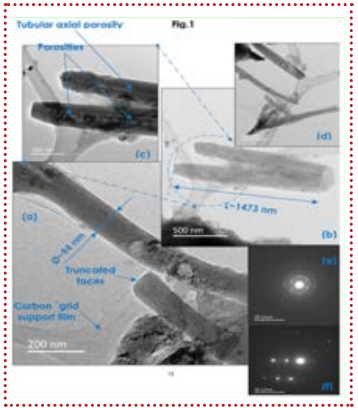
The pages that follow contain examples illustrating the kind of research conducted at the university that contributes to the SDGs.

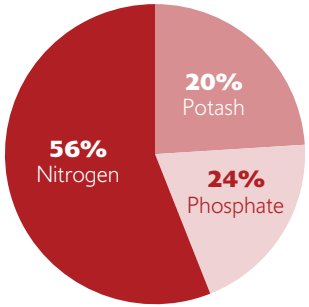
U2ACN2 MAJOR FLAGSHIP PROJECTS

In line with the Vice-Chancellor's (VC) Catalytic Niche Areas and the United Nations (UN) Sustainable Development Goals (SDGs), the UNESCO-UNISA-ITLABS/NRF Africa Chair in Nanosciences and Nanotechnologies (U2ACN2) has positioned and geared its research and educational activities towards nano-scaled sciences which bear direct benefits for society. The motto of such research activities is "Nano-Sciences for Society". Within such an umbrella, multi-disciplinary research is conducted through several flagship programmes.

NANO-FERTILIZERS AND FOOD SECURITY

This flagship programme is in line with SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture) and the Catalytic Niche Area which focuses on food security. The aim with this programme is to produce nanomaterials for use in producing nanofertilizers.





Nanofertilizers are one of the most promising engineered materials currently being tested to increase crop yield and growth.

INDIGENOUS KNOWLEDGE FOR ADVANCED HEALTH

The programme is in line with SDG 3 (Ensure healthy lives and promote well-being for all at all ages) and the Catalytic Niche Area focusing on health and well-being. This flagship programme is aimed at confirming indigenous knowledge scientifically and using such knowledge to develop advanced health products.

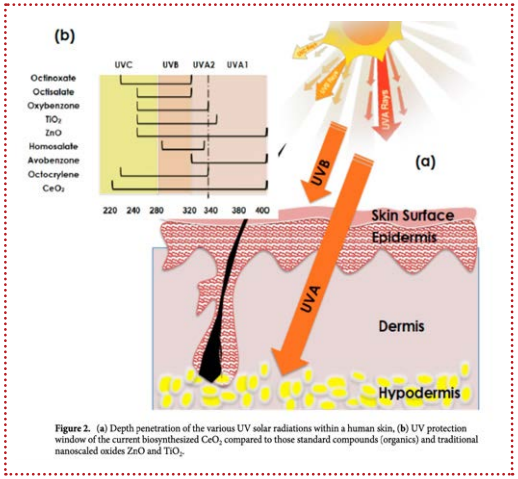


Figure 2. (a) Depth penetration of the various UV solar radiations within a human skin, (b) UV protection window of the current biosynthesized CeO_2 compared to those standard compounds (organics) and traditional nanoscaled oxides ZnO and TiO_2.

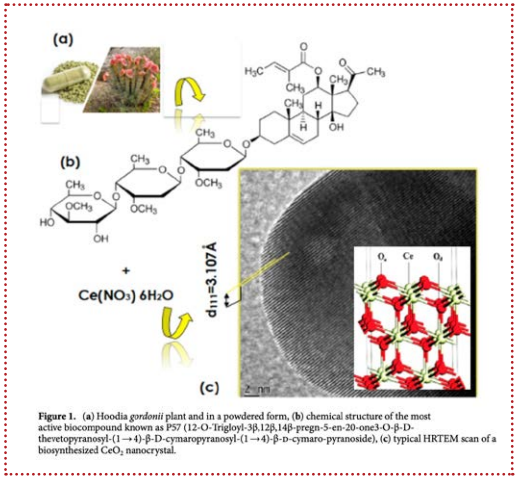
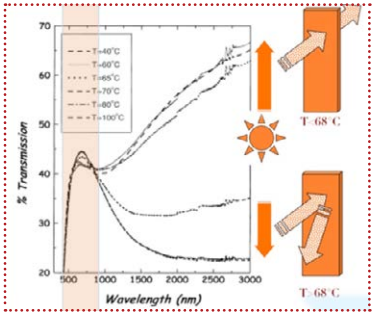


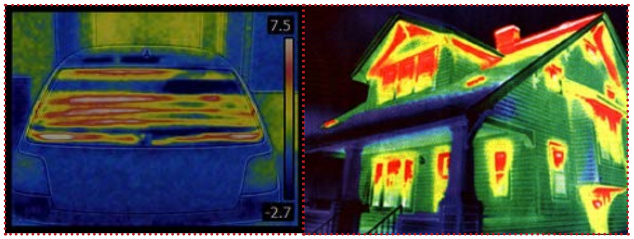
Figure 1. (a) Hoodia *gordonii* plant and in a powdered form, (b) chemical structure of the most active biocompound known as P57 (12-O-Trigloyl-3β,12β,14β-pregn-5-en-20-one3-O-β-D-thevetopyranosyl-(1→4)-β-D-cymaropyranosyl-(1→4)-β-D-cymaro-pyranoside), (c) typical HRTEM scan of a biosynthesized CeO_2 nanocrystal.

U2ACN2 MAJOR FLAGSHIP PROJECTS

MINERAL BENEFICIATION AND ENERGY SAVING IN AUTOMOTIVE SECTOR

In line with SDG 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) and the Catalytic Niche Area of focusing on energy, this flagship programme is aimed to engineer advanced nano-coatings for solar heat management in the form of smart windows. These intelligent coatings, using minerals mined extensively in South Africa, can be applied both in the automotive and building industries.

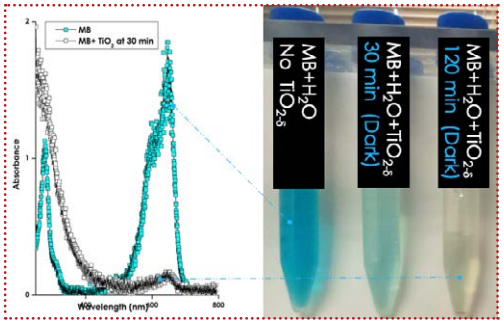


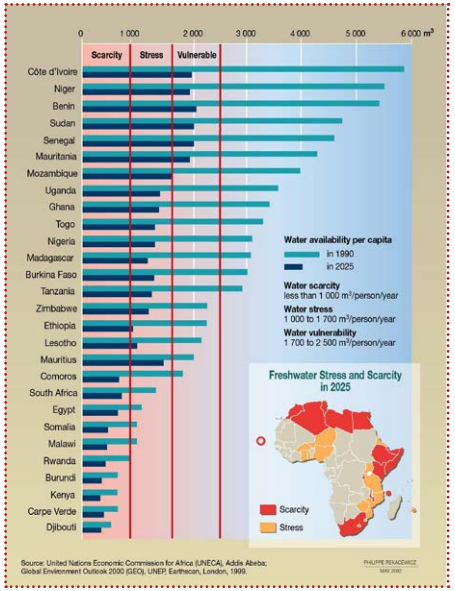


WATER SCARCITY IN AFRICA

This flagship programme is in line with SDG 6 (Ensure availability and sustainable management of water and sanitation for all) and the Catalytic Niche Area with a focus on water. It is aimed at developing cost effective, advanced nanotechnologies for waste water decontamination.

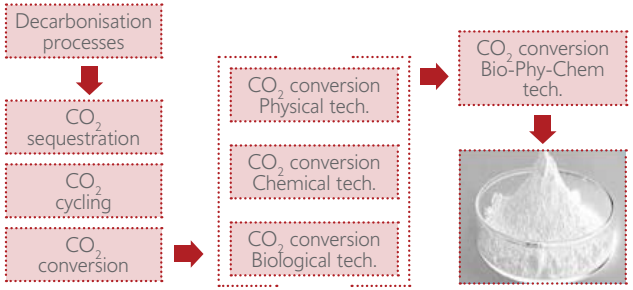
Within two hours, Black nano-TiO2 showed a remarkable capability to decompose Methylene Blue and equivalent pesticides in contaminated water.

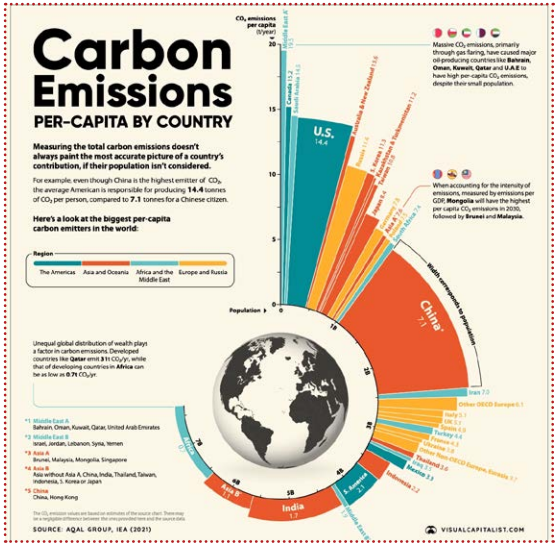




DECARBONISATION

In line with SDG 13 (Taking urgent action to combat climate change and its impacts) and the Catalytic Niche Area of climate change actions, the aim with this flagship programme is to capture or remove carbon dioxide (CO_2) and convert it into different useful material used, for example, in cement or paint production.





RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

RELEVANT EDUCATION AND APPOINTMENTS ON MERIT WOULD STRENGTHEN LOCAL GOVERNMENT DISASTER MANAGEMENT

As climate-induced floods and fires grow in frequency and intensity in South Africa, the disaster and risk management capabilities of municipalities in coastal regions are on shaky ground.

Although there are a multitude of intertwined reasons why disasters are wreaking such havoc, particularly but not exclusively among poor and vulnerable people, one factor stands out: a general absence of disaster management knowledge and competency among municipal officials, especially those responsible for coordinating disaster management.

"The problem is a lack of disaster management knowledge, skills, experience and competency among municipal officials, who are often political deployees."

Prof Sibongiseni Ngcamu

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RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

TRAVERSING THE FINE LINE BETWEEN POOR VS NON-POOR POVERTY

International debates about poverty generally lead to efforts focused on relieving extreme poverty. Less attention is paid to the position of people who are living above the poverty line but could fall below it in the event of even a minor financial blow.

This prompted the South African Research Chairs Initiative (SARChI) Chair in Social Policy at Unisa to conduct the "Precarious non-poor in Africa" project as part of a broader umbrella project, "Rethinking poverty".

The study is focused on estimating the size of the population living above the poverty line, but who face the risk of slipping below the poverty line as they are not really wealthy enough to withstand any incident that can change their economic situation.

The study was conducted in South Africa, Uganda, Kenya, Ethiopia, Nigeria, Ghana, Senegal, Morocco and Algeria.

An earlier study conducted in South Africa showed that the life conditions of the precarious non-poor do not differ from those living below the poverty line, as was seen during the COVID-19 pandemic when people's well-being and economic positions were affected. The concern is that these people may not access any social support as they do not fall under the category of being classified as poor, despite their risky situation.

The researchers in the new study propose that, rather than classify people as "poor" or "extremely poor", they should be classified according to how secure they are socially.

Two measures were used to estimate the population size of people living above the poverty line. These were, firstly, the likelihood of their slipping below the poverty line should they lose their income and, secondly, how easily they can slip below the poverty line if their situation changes due to numerous other factors affecting their economic situation.

INVESTIGATING THE IMPACT OF LAND POLICY REFORMS ON WELL-BEING AND LIVELIHOODS

Researchers from the SARChI Chair in Social Policy set out to assess how land and agrarian policy reforms in Zimbabwe have improved the well-being and livelihood of beneficiaries in the land and agricultural sector.

The project, "Social policy dimensions of land and agrarian reform", is part of a broader project titled "Rethinking social policy". In this project, researchers are concerned with policy decisions or actions that use principles or strategies to address social issues and improve the well-being of citizens all at once, including their ability to produce, their protection from problems, the sharing of resources, the continuation of society and the sense of togetherness.

Researchers collected data in 2015/16 and, in 2022, a research team went back to Zimbabwe to collect data in the four districts of Zvimba, Goromonzi, Kwekwe and Chiredzi, using the same research methods as previously.

Photograph by JC Fourie

RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

SUSTAINABLE TOURISM: HOW TO BRING COMMUNITIES IN FROM THE COLD

Tourism authorities and operators in Southern Africa are acutely aware that unless local communities are brought into the tourism supply chain, they will have no interest in supporting conservation efforts. And without the support of communities, wilderness areas and the wildlife living in them will simply disappear over time.

This is a sobering prospect but it is not inevitable. Prof Kevin Mearns of Unisa's Department of Environmental Sciences has been part of a number of sustainable tourism success stories where local communities have been integrated into the heart of the business models and supply chains of tourism ventures.

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"This goes beyond selling crafts – which are so limited and can lead to environmental degradation."

Prof Kevin Mearns

UNSKILLED STAFF DRIVE A CORRUPTION AGENDA AT SOUTH AFRICAN UNIVERSITIES

The deployment of unskilled workers in strategic positions has driven a corruption agenda at South African universities. Even though universities are required to adhere to sophisticated legislation, corruption nevertheless remains rife, since good governance depends primarily on the employment and retention of the right staff.

These are the findings of a research study conducted by Prof Sibongiseni Ngcamu of Unisa's Department of Public Administration and Management and Prof Evangelos Mantzaris of the Mangosuthu University of Technology.

Prof Sibongiseni Ngcamu

Recently published in the *Journal of Academic Ethics*, the findings were based on a qualitative study conducted at four previously disadvantaged universities (PDUs): Fort Hare, Mangosuthu University of Technology, the University of Zululand and Walter Sisulu University. The researchers collected data through interviews with a sample of 20 middle and senior managers at these institutions.

Owing to inherent historical injustices, these universities are not financially sustainable, with far fewer financial resources than their more advantaged counterparts, the researchers say. Consequently, they are highly reliant on government for their operations. Government has therefore made a special earmarked grant available to eight PDUs, including the four that formed part of the study, for the achievement of strategic priorities which are aligned to government policies.

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RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

MULTILINGUAL APP HELPS CHILDREN WITH CANCER MANAGE SYMPTOMS

A team of researchers from South Africa and Sweden have developed a multilingual app for symptom management in children with cancer.

Dr Ensa Johnson

The results from the feasibility study have shown that the app, PicPecc, can be used for symptom management in both Sweden and South Africa and that children find the app useful in managing their health symptoms.

The app was developed through an international collaboration involving two South African universities, Unisa and the University of Pretoria, as well as the University of Gothenburg and several other Swedish universities.

The project is part of the ongoing South Africa-Sweden Bilateral Scientific Research Cooperation Programme and the South Africa-Sweden University Forum (SASUF). It has been funded through a National Research Foundation (NRF)/Stint International collaboration grant, as well as two SASUF grants.

The year 2022 was the final year of this four-year project, which focused on two of the Sustainable Development Goals, namely SDG 3: Good health and well-being and SDG 10: Reducing inequalities.

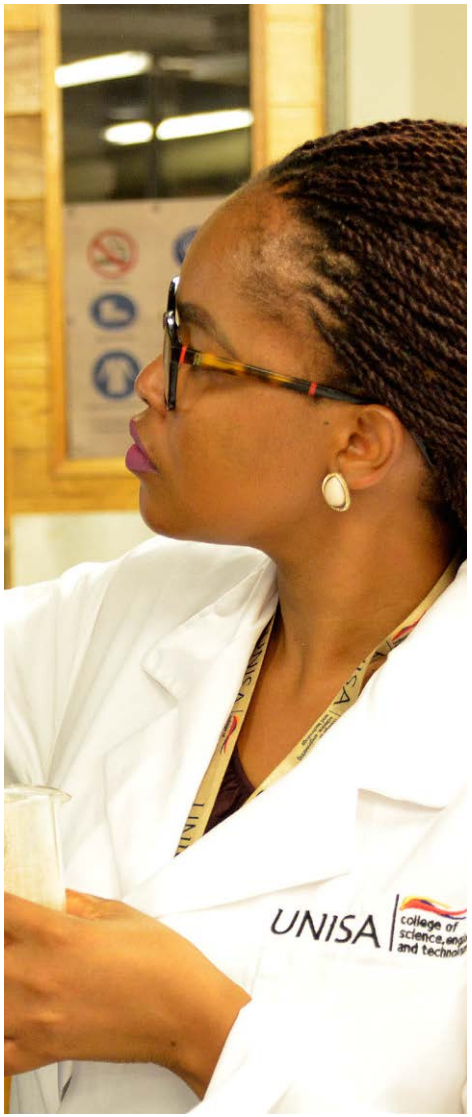
The principal investigators were Prof Stefan Nilsson of the University of Gothenburg and Dr Ensa Johnson of Unisa's Inclusive Education Department in the College of Education. She supervised two postgraduate students, Dr Ariné Kuyler and Dr Khetsiwe Masuku in this regard.

The research consortium held five meetings in 2022, some virtual and some in-person (in Lund, Sweden in June and in Pretoria, South Africa in September). Data was also collected in Sweden and in South Africa using the PicPecc app that was developed.

This evidence-based smartphone app uses 11 languages for symptom management and has a user-centred, universal design. A new assessment scale, the electronic Faces Thermometer Scale was also developed in the app, and preliminary analyses show that the scale is valid for assessing symptoms.

A position paper on the project was published in the *Nursing Inquiry* journal and received the Wiley Top Cited Article 2021–2022 award.

Dr Johnson has received a new NRF Support for Rated Researchers to continue with a follow-up study where the app will be implemented in a clinical setting.



HEALTHIER SOIL PRODUCES HEALTHIER CROPS

Knowledge validation of water use efficiency and soil carbon sequestration of selected indigenous and modern crop cultivars for sustainable agriculture intensification and climate change mitigation

Dr Sandiswa Figlan of the Agriculture and Animal Health Department is leading a team doing research on knowledge validation of water use efficiency and soil carbon sequestration capacity of maize, wheat and sorghum, crops which were selected based on their production and importance in the Southern African agricultural systems.

The aim is to enhance soil water storage by using selected indigenous crop varieties to boost soil carbon sequestration, which will ultimately improve the soil's capacity to hold water and nutrients. In order to improve the crop's water use efficiency, drought tolerance and capacity to sequester carbon mitigating climate change, the initiative helps develop new crop types with a balanced biomass allocation between roots and shoots. The initiative is driven by the numerous obstacles that crop production systems face because of climate change.

The methods used in the study permit increasing selection intensity and, ultimately, increase the rates of genetic gain in improving biomass allocation for drought tolerance and soil carbon sequestration. The research will lead to the production of new crops.

Strong collaborations with local and international institutions have brought together distinguished researchers across research institutes beyond the African continent and have played a crucial role in strengthening ties between Unisa and other research-intensive institutes in the African and European continents. This strategically placed Unisa in an excellent position to facilitate new dialogues with policy makers and funders across the globe to identify ground-breaking solutions and create opportunities for investment in the transformation of food systems looking at enhancing food security. With the new wave of renewable energy and bioenergy crops, there is substantial potential to scale up sustainable production of bioenergy from cultivation of some crops in southern Africa

The project has achieved key successes. One student has graduated with a PhD and produced four publications in high-impact journals while another completed a six-month internship on this flagship project. Furthermore, 47 MSc and PhD students and young researchers from different SADC nationalities were trained in a short on-the-job training course on mastering meta-data analysis. Two students will be completing their MSc degree in 2024. The project will be sustained through robust training of a cohort of students who are strong in research in the area of plant breeding, molecular genetics and bioinformatics, as well as the establishment of a network of research partners, which will result in more funding and bigger grants for future projects.

RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

THE TIME BANK MODEL IS HELPING TO FIGHT POVERTY

Time is precious and the Unisa Graduate School of Business Leadership (GSBL) knows this. Ms Morafe Tabane and Prof Pamela Msweli have introduced an innovative community activism programme that uses time as the currency of exchange.

In the GSBL's "Time-banking volunteer programme for rural-urban global business skills transfer", the participants are volunteers who "deposit" their time by giving skills, practical help and support to assist rural communities in developing self-help projects that alleviate poverty. Then, when the volunteers need something done themselves, they can "withdraw" their time from the Time Bank.

The time-banking programme was initiated after the GSBL observed that entrepreneurs in rural communities were being displaced owing to the presence of big business. This has exacerbated the economic crisis many communities have been experiencing since the COVID-19 outbreak.

The time banking system is a way of exchanging skills and resources without spending money and is particularly useful for mobilising resources to assist communities in economic distress.

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LANGUAGE FESTIVAL HIGHLIGHTS THE VALUE OF LINGUISTIC AND CULTURAL DIVERSITY AND MULTILINGUALISM

Language, as a principal method of human communication, consisting of words conveyed by speech, writing or gesture, is closely linked with people's identity.

In line with Unisa's commitment to make education accessible to all, enforce transformation in the education sector and address the marginalisation of some of South Africa's languages, the Unisa Language Festival Project was established.

"The project was created to raise the status of previously marginalised languages, which not only affects the language itself but educates learners and teachers on the importance of mother-tongue-based education in ensuring throughput and academic excellence."

Dr Fiona Ferris-Leone

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ONLINE MULTILINGUAL DICTIONARY OF PROVERBS SMOOTHS THE WAY FOR INTERCULTURAL UNDERSTANDING

"Proverbs are the palm oil with which words are seen."

Chinua Achebe

This powerful quote by Nigerian novelist Chinua Achebe greets visitors to the Unisa Multilingual Proverbs Dictionary website homepage.

The online dictionary offers a collection of approximately 200 common equivalent proverbs updated and compiled from existing Sepedi, Xitsonga, Tshivenda and English proverbs. It can be accessed at https://www.unisa.ac.za/sites/corporate/default/Colleges/Human-Sciences/Schools,-departments,-centres,-institutes-&-units/School-of-Arts/Department-of-Linguistics-and-Modern-Languages/Unisa-Multilingual-Proverbs-Dictionary.

It was one of the projects Unisa's College of Human Sciences embarked on to celebrate the United Nations' International Decade (2022–2032) of Indigenous Languages.

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RESEARCH FOR SUSTAINABLE DEVELOPMENT GOALS

LEKGOTLA AND TRADITIONAL DISPUTE RESOLUTION UNDER THE RESEARCH LENS

African dispute resolution embraces a humanistic value system founded on the interconnectedness of human beings. Idiomatic expressions seek to harmonise the process of lekgotla (an African system of dispute resolution) and to heal families involved in disputes, says Macdonald Rammala, researcher and chair of the Community Engagement Portfolio in the College of Law.

In a journal article on the Lekgotla La Batho Research Project, Rammala discusses the interrelations between lekgotla and idiomatic expressions in traditional dispute resolution, as used by the Bakgatla Ba Mosetlha traditional council in Makapanstad village in South Africa's North-West province.

He says the interrelations between lekgotla and idiomatic expressions constitute a complex process that seeks to bring families together to negotiate, confess, forgive, compensate, heal and engage in a ceremony that restores harmony in the community.

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SMART CITIES AND AEROTROPOLI ARE THE FUTURE OF INFRASTRUCTURE

As the world becomes increasingly urbanised, interconnected and dependent on technology, smart cities provide a promising picture of the city of the future.

Wellington Thwala, a Research Professor in the Department of Civil Engineering in the College of Science, Engineering and Technology, is currently working on a Smart Cities and Aerotropolis project, focusing on digital technology advancement solutions to the age-old problems of cost, time and quality in building project delivery.

"The use of sophisticated and integrated information and communications technology (ICT) in various urban activities, from transportation, energy, buildings and manufacturing to government, not only encourages the more effective improvement of the quality of public services but also the sustainable use of resources and increased city liveability," says Thwala.

This also provides greater opportunities for people to connect with others and access economic opportunities.

READ MORE

DESIGNING FISCAL POLICIES FOR THE ENERGY TRANSITION

The research was led by Prof Malik Maaza, UNESCO-Unisa-ITLabs/NRF Africa Chair in Nanoscience and Nanotechnology (U2ACN2). The research set out to investigate how developing countries that depend on non-renewable energy, for example coal, oil or natural gas, as sources of energy, can develop and implement environmental fiscal policies that will enable funding for changes towards using renewable energy.

Fossil fuels are important sources of revenue and these developing countries' governments depend on that revenue to meet various goals, including the transition to a sustainable, scalable renewable energy sector.

Moving towards renewable energy to meet the Paris Agreement goals, which is a set of goals to address climate change by limiting global warming, will create a gap in the economies of these countries as they have a mandate to move away from the use of fossil fuels such as oil, coal and natural gas to using renewable energy sources such as solar or wind energy.

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CATALYTIC NICHE AREAS

The Vice-Chancellor has identified 10 niche areas that will not only activate and enhance the academic agenda but will also enhance the academics' experiences as engaged scholars who refuse to be academic pies in the sky by deliberately integrating societal needs in their scholarship. These are:

MARINE STUDIES

According to the Marine Research Plan of the Department of Science and Technology (2014), coastal oceanography is still in its infancy. There exists a plethora of commercial activities and trade along the 2800 km coastline of South Africa. The Port of Durban is the biggest and busiest port in South Africa. The university needs to tap deep into the opportunities for supporting economic growth through teaching and learning, research and innovation as well as engaged scholarship, while at the same time creating awareness on how to protect our marine world from degradation.

AVIATION AND AERONAUTICAL STUDIES

South Africa has about 18 airports, with OR Tambo, Cape Town and King Shaka being our common international airports. These airports cater for people and goods coming into South Africa or transiting to and from other countries. This information confirms that this is a niche area that could be one of our economic muscles. Participation in aviation and aeronautical studies would range from among others, aviation mechanics and engineering, electronics, operations and safety policy space in accordance with international standards and conventions, as well as traveler experience.

AUTOMOTIVE STUDIES

The South African Automotive Master Plan (SAAM) 2021–2035 envisages the automotive industry to grow from 600 000 to 1.4 million vehicles a year in production at its peak (Businesstech.co.za). This is a confirmation that in this specific niche are, there is a potential to be explored even in our commitment to producing quality students.

ENERGY STUDIES

The Energy mix spectrum in South Africa comprises generation, distribution, and service (including sales), all requiring different and specific knowledge and skills. Developments concerning power shortages in recent years, are proof that there is an urgent need to review how we provide energy to the growing and transforming population. South Africa is bestowed with natural light to generate solar energy, as well as wind energy which has since seen the establishment of wind energy farms in the Northern Cape. Developments such as these, are an opportunity for Unisa to participate in building an energy-secure country and a continent that is lit using sustainable energy.

SPACE STUDY AND SQUARE KILOMETRE AREA

The work being done in this regard is of a pioneering nature, involving multi-disciplinary experts and scientists working collaboratively from across the globe. Building such sophisticated and far-reaching telescopes, would be a product of extreme engineering, the building of huge capacity information and communications technology hardware and software, and related functions and capabilities. The fact that the magnitude and scope of this kind of project require skills from across the world, speaks to the internationalisation agenda that the university is embarking upon.

NATURAL SCIENCES (BIOTECHNOLOGICAL STUDIES)

The need for the development of vaccines among others, illustrates the point for the need to improve and rapidly develop research capacity and technology. With these studies, our lives and the health of our planet, including sustainable food production methods that are friendlier to the environment, could improve significantly.

CATALYTIC NICHE AREAS

FOURTH INDUSTRIAL REVOLUTION AND DIGITALISATION

The impact of the 4th industrial revolution is upon us and has drastically changed production methods and trade methodologies. Disruptive technologies such as 3D printing, the use of cryptocurrencies, machine learning, the use of big data and algorithms to create data analytics, robotics, among others, are defining the new normal of conducting daily business and studies. Such developments speak to the need for building capacity in the legal, commercial, as well as the technology fields at the university. It is clear that embracing the effects of the 4IR's cannot be left to 'catch-up' processes at the tail end, but should be part and parcel of training and development by institutions of higher learning, such as Unisa.

HEALTH STUDIES/ MEDICINE

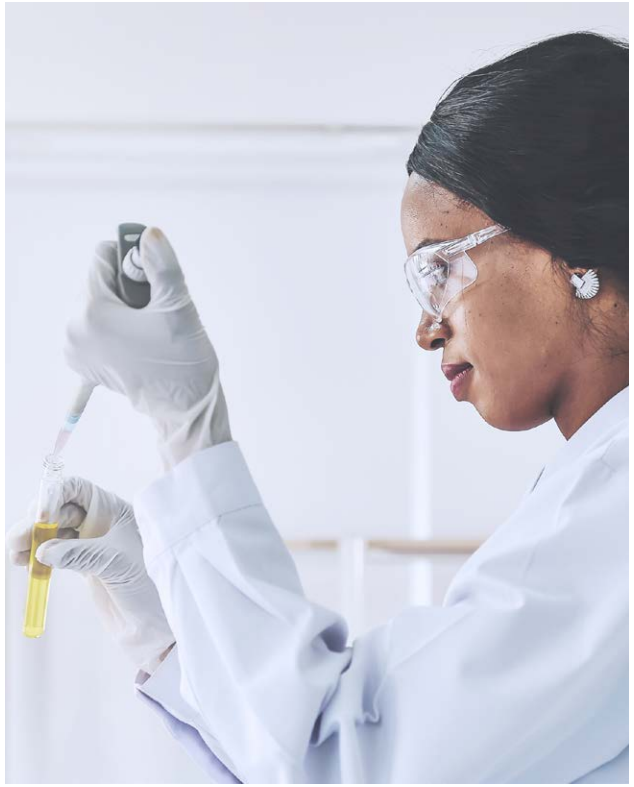
COVID-19 has in many ways tested our capacity to respond to health challenges including any other pandemic that may erupt. Research in molecular biology, healthcare, the development of health equipment, and the development of specialised skills in pulmonary medicine is urgently needed. In fact, the country has to develop the capacity to continue training medical specialists in different areas that may be deemed critical and urgent at the emergence of any other future pandemics and life-threatening diseases (medical emergencies).

FEMINIST, WOMANIST AND BOSADI THEORISATIONS

It is often stated that the most disrespected person in society is a black woman. The most unprotected person is a black woman. Therefore mainstream/Western feminism is not enough, there is a need for intersectionality – a gender-concious framework that protects all, regardless of one's race, gender identity, socio-economic class among others. For example, the Bosadi (womanhood-redefined) concept is a theory for the context of African-South African women encompassing racial oppression, classism, culture, and sexism in the broader South African among others. It is crucial for the university to foreground a diversified gender focus in our tuition offerings and research.

STUDENT SUPPORT AND CO-CURRICULAR ACTIVITIES

Being an African university that caters for numerous student populations drawn from different walks of life, including and especially, those coming from poor backgrounds, it is important that proper support and tutelage be offered to such students. Equipping students with life skills beyond academics is crucial. The ongoing globalisation and the interconnection of the world order, dictate that the education and skills imparted to our students are such that they allow them to be citizens of the world, who can compete favourably in the global village as they explore different ways of doing things and yet remain proudly African/ South African.



Work regarding the implementation of some of the niches is already being done in the various colleges. Below are some insights gained from some of the colleges regarding their efforts (planned and existing) in operationalizing the catalytic niches.

CATALYTIC NICHE AREAS

MARINE BIOTECHNOLOGY

Beneath the waves of the ocean live a rich array of marine organisms, from sponges to seaweeds and gastropods, that could yield abundant harvests of natural products with nutritional, cosmetic and medicinal value. Led by Dr Machawe Motsa, teams of researchers, postgraduate students and postdoctoral fellows from the College of Science, Engineering and Technology are immersing themselves in a number of important marine biotechnology research projects designed to tap into this abundance.

The first project involves investigating the extraction of bioactive compounds with potential health benefits. With this in mind, a master's candidate is currently working on a project which seeks to isolate bioactive compounds from marine sponges. Two other PhD candidates have been recruited, with one candidate working on extracting bioactives from marine gastropods and the other working on bioactives from seaweeds (Sargassum species).

The second project is on seawater desalination and mineral/ nutrient recovery, and has already delivered one patent with a Patent Cooperation Treaty (PCT) number.

The third project is about AMD and defluoridation and entails The recovery of precious metals and chemicals. It is important to note that AMD desalination plus pumps and turbines produce electricity. One master's and two PhD candidates have been recruited on this project.

The fourth project is on microplastic research, focusing on recovery, recycling and re-use.

There have been three publications on this project, one already published and two submitted.

A further three projects will be implemented in the next phase of the marine biotechnology research. These entail harvesting and processing of algae for pigment extraction and production for use in food and pharmaceutical industries and the production of flavouring agents; production of food supplements with medicinal value; and the study of marine algae for biofuel production.

PROJECT PREPARES VULNERABLE COMMUNITIES TO COUNTER THE HEALTH IMPACTS OF GREENHOUSE GAS BUILD-UP

Southern African communities that are already struggling to access health care because of a shortage of public health-care workers are likely to be especially vulnerable to the health effects of climate change. Knowing this, a research team led by Prof Monika dos Santos at Unisa's Department of Psychology is developing strategies to assist such communities to avoid these effects.

The "Climate change adaptation: community health and system-strengthening project" was initially undertaken in the greater Bushbuckridge municipality in Mpumalanga but has since expanded nationally and internationally. Not only has the project informed South Africa's national policy on climate change and health, but it has also contributed to the World Health Organization's (WHO) climate change and health strategy.

Changes in climate and the weather can affect human health in various ways. This project set out to measure the impact of climatic variability of health outcomes and to undertake a workforce assessment in public health-care facilities (PHC) in identified human settlements in and around Bushbuckridge.

The project was implemented in communities that are already facing severe shortages in human resources in health (HRH), which are creating extensive problems in access to health care and acknowledged as one of the major contributing factors to the Southern African region not meeting health-related Sustainable Developmental Goals (SDGs).

Strategies to counter the health effects of climate change

The impact on the region and Africa in general is that these communities will be unable to prevent the build-up of greenhouse gases and will be particularly vulnerable to climate change and its consequential health effects. What is required to counter the impact is to develop strategies to assist these communities in avoiding these effects.

The ultimate strategy, according to Dos Santos, has three key components. The first is to undertake a pilot assessment that incorporates an eco-epidemiological and PHC workforce investigation. The second is to develop the skills required to deliver health-care support to affected communities in Africa. Thirdly, national and regional institutions must develop the knowledge and capacity to manage health adaptation strategies, with emphasis on climate and health information, disaster preparedness, health care and strategic planning.

The project has also been expanded to a national and global level. For example, with funding from the German Development Corporation (GIZ), a Risk and Vulnerability Assessment Framework has been developed for the National Department of Health and the National Department of Forestry, Fisheries and the Environment, and is being adopted nationally. Case studies from the project have also been used to inform the WHO's climate change and health strategy and report for the United Nations's annual Climate Change Conference, known as COP.

Other international partners are the United Kingdom-based Wellcome Trust and Imperial College London. They are part of the international project entitled "Global dialogues to set an actionable research agenda and build a community of practice in climate change and mental health".

Prof Monika dos Santos

4IR WORKPLACE HAS ETHICAL IMPLICATIONS FOR HUMANS

Futurists predict that a third of jobs that exist today could be replaced by smart technology, artificial intelligence, robotics and algorithms (STARA). Robots will handle 52% of current work tasks by 2025, almost twice as many as in 2019. Rapid changes in machines and algorithms or computer processes could create 133 million new roles in the place of 75 million displaced between 2019 and 2022 (World Economic Forum, 2018).

Prof Rudi Oosthuizen

STARA and its influence on the workplace is the study field of Prof Rudi Oosthuizen from the Department of Industrial and Organisational Psychology. He argues that while a plethora of research focuses on technological transformation, the impact on human levels seems to be under-explored, especially around conscious and unconscious processes.

"My focus is to enlarge my scholarship in the field of STARA and my profession, and to have a significant impact on how we train prospective industrial psychologists in the context of STARA."

Prof Rudi Oosthuizen

Recent research indicates that while the transformation of the workforce may happen over a century, organisations should understand the growing capabilities of technology and its impact on the workforce over the next decade or two. Stephen Hawking and Bill Gates have warned of mass unemployment linked to the rise of STARA.

Employees at risk include accountants, commercial pilots, client administrators and sales, and office staff. STARA could also substantially affect education (e.g., through web-based learning), transportation and farming enterprises. In general, research has demonstrated that 47% of occupations are in danger of being eliminated by STARA.

This has important ethical implications.

What will people do with their time in a labourless society? How will AI influence the recruitment process (bearing in mind that AI can be tricked and influenced by the bias in its decision making to produce the desired results of the person managing it)?

The income inequality gap is another ethical issue that is worsening due to 4IR. Global income inequality is at an all-time high with just 8% of the population earning half of the world's total income and the remaining 92% earning the other half.

These statistics highlight the importance of greater social responsibility in industry participation and government cooperation in managing these ethical issues.

South Africa has a significant skills shortage, limiting the supply of managers, researchers and workers for the 4IR. There are also problems of poor-quality infrastructure, reflecting weak governance and state incapacity. The state has a poor record in policy formulation and implementation, especially across departments, with notable delays in cybersecurity and data protection.

READ MORE

CATALYTIC NICHE AREAS

ANTI-CANCER DRUGS LIKELY TO REDUCE SIDE EFFECTS AND DEVELOPMENT TIME

Unisa researchers are developing a pipeline of anti-cancer drugs that are likely to produce fewer side effects than chemotherapy and take a third less time than the norm to develop.

The pipeline, being developed at the College of Agriculture and Environmental Sciences (CAES), consists of five small-molecule drugs that target cancer-causing proteins.

The majority of these drugs are repurposed and therefore stand a good chance of moving quickly through the development process.

The impact of this project could be significant, according to Prof Monde Ntwasa, the lead researcher on the project and Acting Executive Dean of CAES.

"Targeted drugs are preferred to chemotherapy because they are likely to produce fewer side effects. Furthermore, the repurposing or repositioning of drugs is the preferred approach worldwide because it significantly reduces the development time. The development of therapeutic drugs typically takes more than 15 years, whereas the repositioning of current drugs can reduce this by more than five years."

Prof Monde Ntwasa

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ROBUST MATHEMATICS TEACHING AND LEARNING DEPENDS ON THE CONTEXT

Teachers possess an in-depth understanding of their unique contexts, their learners and the challenges they face. Their ability to identify specific needs within their classrooms can contribute substantially towards improving the quality of education.

Having spent 20 years as a mathematics teacher and mathematics head of department, Prof Piera Biccard has sought to understand the intricacies of mathematics teaching and learning since her classroom days.

In trying to find answers in her seven years at Unisa, through the "Teaching for robust understanding of mathematics in the Intermediate Phase" research project, Biccard has continued with her passion for mathematics teaching and the professional development of mathematics teachers.

The project, housed in the College of Education, aims to provide development for Intermediate Phase mathematics teachers and to engage the Teaching for Robust Mathematics framework as formative professional teacher development by addressing the current resources and context of a school. The envisaged collaborative project will respond to the self-identified needs of project partners, including the mathematics teachers themselves.

In doing so, the project is keenly attuned to the unique resources and contextual factors present within a school environment.

"We managed to find and share resources with teachers, to help them develop strategies that could benefit mathematics teaching and learning in their contexts. We also spent time appreciating teachers and thanking them for their meaningful contribution to society," she says.

By focusing on the Intermediate Phase, this project acknowledges the critical role that educators play in shaping learners' mathematical understanding during a crucial stage of their development.

"In essence, this project represents an effort to elevate the quality of mathematics education within the Intermediate Phase. It places teachers at the centre of their own professional growth journey, empowering them to enhance their instructional practices and, ultimately, provide learners with a stronger foundation in mathematics."

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TRANSFORMATION

"Central to our vision of "shaping futures in the service of humanity" is our commitment to scrutinising traditional Euro-Western research ethics approaches through the lens of Africanisation and decolonisation."

TRANSFORMATION

Three broad themes underpinned the transformation work of the Research, Innovation, Postgraduate Studies and Commercialisation Portfolio in 2022. These were (1) the continued development of a new generation of researchers and innovators, (2) the promotion of indigenous languages in research and innovation at Unisa, and (3) steps taken to Africanise and decolonise the university's research resources and research management processes. This transformation report highlights some of the progress made against these themes in the various directorates that constitute the portfolio.

1 CONTINUED DEVELOPMENT OF A NEW GENERATION OF RESEARCHERS AND INNOVATORS

1.1 The power of Africa-centred innovations

Emphasis is placed on encouraging and supporting staff and student innovation that identifies African solutions and strategic African focus areas and concerns. Supported by the Directorate Innovation, Technology Transfer and Commercialisation (DITTC), a number of these Africa-centred innovations were demonstrated or exhibited at events such as the World Science Forum in Cape Town in December 2022 and the inaugural Unisa Innovation Festival in the same month.

At the Innovation Festival, for the first time, external innovation experts participated in a panel assessing the potential "bankability" of some of these inventions, commenting favourably on their likelihood to succeed in the marketplace. The judges were most impressed with the uMbalabala Education Toolkit designed by Mbuso Ngcongo, a BSc computing student, and the bicycle business of Nkamogeleng Matloga, a BSc biochemistry and microbiology student. Mr Ngcongo's education toolkit is designed to help preschool children learn numeracy, literacy and coding skills, while Ms Matloga aims to create a "culture of mobility" in South Africa while at the same time tackling the problem of traffic jams.

1.2 Young Academics Programme (YAP)

Recognising the importance of academic development, Unisa continues to run the Young Academics Programme (YAP) to fast-track young academics in the areas of tuition, facilitation of learning, research, community engagement and academic citizenship. Those who successfully complete the programme become part of the university's talent management pool of quality managers and leaders.

The 2022 intake consisted of 29 participants, 16 of them female and 13 male. They attended the 14-week programme full time between mid-June and mid-September. The content consisted of four modules, the first on managing and leading the self, the second on teaching and learning, the third on research and the fourth on community engagement. The Research, Innovation, Graduate Studies and Commercialisation Portfolio coordinated and facilitated the research sessions, covering a broad range of relevant topics, including research in the era of climate change, sustainable development goals and industry 4.0; innovation and commercialisation of research; transformation, Africanisation and decolonisation within a research paradigm; and research collaboration and internationalisation, to mention a few.

By comparing participants' pre- and post-evaluation feedback, it was clear that their understanding of key research paradigms, methodologies and processes had improved significantly. The majority of respondents indicated that their understanding of most of the topics covered was good to excellent after attending the training.

1.3 Supervision Capacity Development

In 2022, the College of Graduate Studies again offered a cycle of the Unisa Supervision Capacity Development Programme. This DHET-supported programme supports supervisors to deliver exceptional guidance to master's and doctoral students, and has 10 modules that address the core elements of postgraduate supervision, from the pre-candidature phase to research project finalisation and intensive research skills training.

Following the 2022 cycle, 468 attendees completed the evaluation survey. The responses signal the impact and necessity of the programme. Some 98% of respondents confirmed that the programme assisted them in reflecting and improving on their supervisory practices, while 99% of respondents praised the quality of the course materials and confirmed that the materials allowed them to increase their subject knowledge.

2 PROMOTION OF INDIGENOUS LANGUAGES IN RESEARCH AND INNOVATION AT UNISA

2.1 Advancing the use of African languages in postgraduate studies

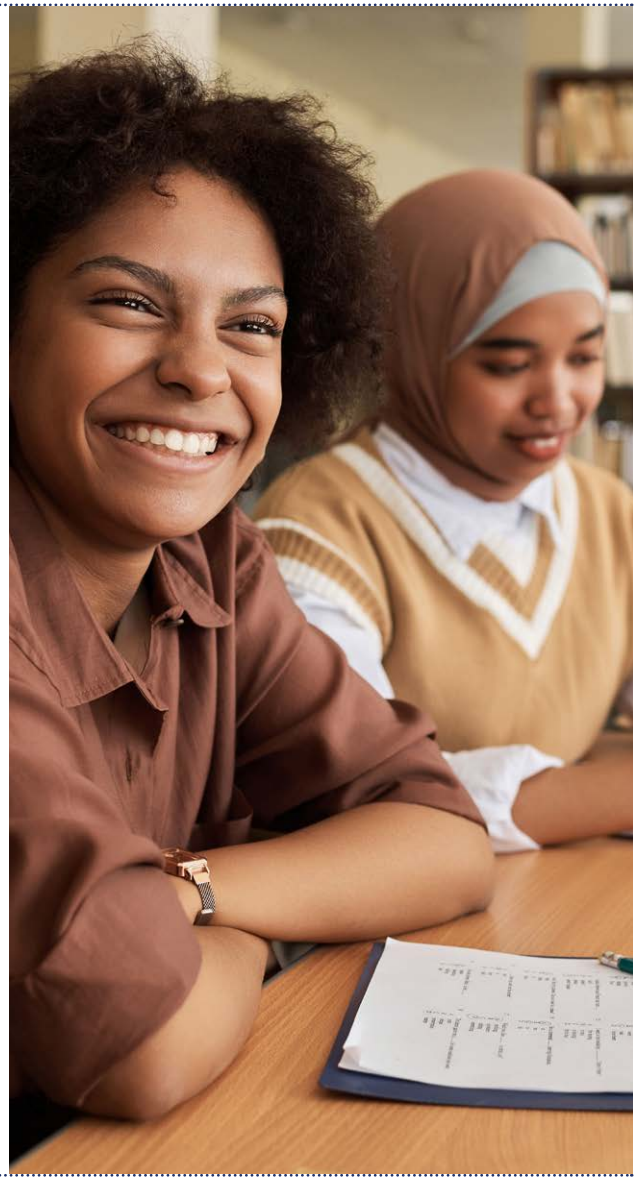
The College of Graduate Studies, located within the Portfolio, continued to lead the implementation of the recommendations flowing from the National Doctoral Review, particularly recommendation three, calling for the advancement of indigenous languages in research and academia at Unisa. This recommendation states that Unisa must "interrogate its Language Policy in terms of fairness and feasibility to fully engage and maximise its transformative potential".

The College has been working with other portfolios within the university to develop and implement a two-phased approach towards implementing the transformative potential of the Language Policy. The first phase involves establishing in which languages and under what conditions candidates are able to write and submit their theses. The second phase entails concrete steps to assist with the development and implementation of software solutions to support the application of the Language Policy.

Supporting the writing of doctoral research in indigenous languages will assist in mainstreaming these languages in new knowledge creation and innovation.

2.2 Knowledge Dissemination

During 2022, Unisa Press entered into two new collaborations to promote the use of indigenous languages in research and innovation. One is with Addis Ababa University Press, which will see the two partners publishing a book in Amharic, the national language of Ethiopia. The other new collaboration is with Ssali Publishing House, which publishes African narratives by African authors and is joining forces with Unisa Press in a publishing project for East African universities.



3 AFRICANISING AND DECOLONISING THE UNIVERSITY'S RESEARCH RESOURCES AND RESEARCH MANAGEMENT PROCESSES

3.1 Afro-global outlook on research integrity and ethics

Central to our vision of "shaping futures in the service of humanity" is our commitment to scrutinising traditional Euro-Western research ethics approaches through the lens of Africanisation and decolonisation.

During 2022, the Research Integrity Office facilitated training sessions on indigenising research ethics and collaborated in presenting two Round Table discussions as part of the Asikhulume initiative of the Vice-Principal: Research, Postgraduate Studies, Innovation and Commercialisation. Some 245 participants attended these sessions, the purpose of which was to synthesise Eurocentric and Afrocentric research ethics within the framework of an Afro-global standpoint.

At the roundtable event on 27 October 2022, titled "Four sides to a coin", the presenters, who included South African and Kenyan ethics experts, emphasised the importance of valuing African knowledge, which transcends the physical world and includes the metaphysical. Harnessing this knowledge can assist in fair ethics research oversight practices and guard against the adoption of dehumanising research approaches.

In moving towards a more inclusive research integrity and ethics culture, the Research Integrity Office prepared for isiZulu, Tshivenda and Sepedi translations of the Unisa Standard Operating Procedure on Research Ethics Risk assessment.

3.2 Transformation of research resources

Unisa Library and Information Services (LIS) is making progress in increasing the collections of African and decolonised material. Despite challenges such as limited donations of such material and a general scarcity of printed African content, LIS has been able to secure, sort and digitise some valuable material.

An example is the Thabo Mbeki Presidential Library and Museum collection, which added five new items of subject content on the African National Congress (ANC) National Executive Committee, ANC conferences, the Congress of South African Trade Unions (COSATU), State visits and speeches. This content is accessible through the digital platform of the LIS at http://digilibrary.unisa.ac.za/digital/.

Since October 2022, the Library has been creating a room to preserve African music and a Special Collection for future generations.

In the meantime, it is also creating digital access to previously print-only theses and dissertations on South African languages of the pre-merger Unisa, Vista and Technikon RSA institutions. By the end of July 2022, 325 theses and dissertations on African Languages were available on the Unisa Institutional Repository (UnisaIR) at https://uir.unisa.ac.za/handle/10500/2723.

3.3 Better reporting on researcher demographics and impact

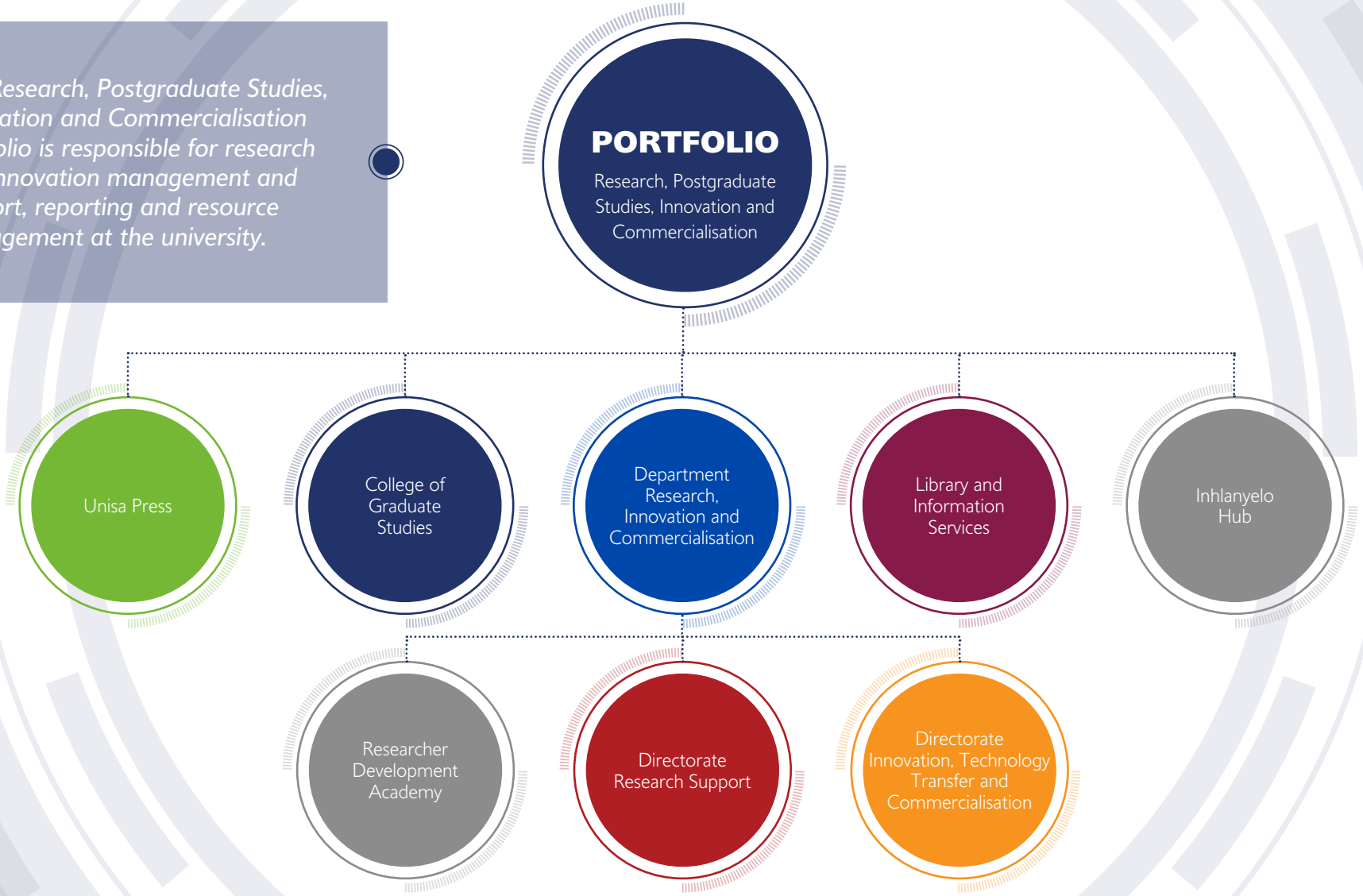
While the transformation of the research demographics of Unisa has been visible in terms of the number of authors and their respective subsidy claims, it has not been possible to analyse their academic impact until now. Thanks to the progress made in implementing the Unisa Research Excellence Framework (UREF), it will be possible for the Portfolio to accurately analyse the impact of Unisa authors and the contribution being made to the overall transformation of research.

During 2022, the UREF team implemented the first phase of the Researcher Impact Repository and harvested metrics from SciVal (a benchmarking tool that uses Scopus data to identify research output). These metrics can be linked to Unisa authors, based on the author identifiers (such as ORCID ID).

Using this data, together with the data submitted to the Department of Higher Education and Training (DHET), the UREF team will be able to obtain a holistic view of all Unisa authors and their contribution to financial impact (DHET subsidy) and academic impact (SciVal metrics).

PORTFOLIO

The Research, Postgraduate Studies, Innovation and Commercialisation Portfolio is responsible for research and innovation management and support, reporting and resource management at the university.



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SUPPORT

At Unisa, academics at all career stages, as well as professional and administrative staff, have access to support to develop their research capabilities.

RESEARCH SUPPORT

Unisa makes a substantial contribution to national research outputs and strives to maintain this into the future through comprehensive and well-planned research support that spans the research cycle and all stages of researchers' careers.

Directorate research support

This Directorate is responsible for grant management, research and innovation training, rating assistance and other research services that are available to the university's researchers and innovators so that they can produce high-quality, impactful results.

Grant funding was a key focus in 2022, understandably so in the constrained funding environment in which the higher education sector finds itself. Unisa succeeded in almost doubling the amount of external grant funding received from sources other than the National Research Foundation (NRF). Non-NRF grants increased from R10.2 million in the previous year to R19.4 million in 2022, demonstrating the competitiveness, impact and relevance of the research being conducted at the university.

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RESEARCHER DEVELOPMENT ACADEMY

The Unisa Researcher Development Academy (RDA), a strategic project within the Department of Research, Innovation and Commercialisation at Unisa, aims to support the advancement of scholarship and the personal and professional development of researchers at all levels of the researcher pipeline. One of the key strategic objectives of the RDA is to coordinate, centralise and facilitate capacity-building programmes aimed at developing research capacity and excellence through a collaborative approach. The RDA aspires to create a needs-driven researcher development ecosystem that ensures an enabling environment.

The RDA was launched on 1 August 2022 with the appointment of the programme manager, Dr Marianne Engelbrecht, and the commencement of its activities aimed at nurturing the growth and success of Unisa's researchers. By providing resources, training, support and networking opportunities, the RDA will assist researchers in developing essential skills, advancing their careers and contributing meaningfully to their respective fields of study.

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PROFESSIONAL RESEARCH GROUP

In the space of one year, the Professional Research Group (PRG) at Unisa has doubled its accredited research outputs, demonstrating the growing contribution this group of researchers is making.

All professional and permanent administrative support staff at Unisa are automatic members of the PRG, with access to a range of research support initiatives aimed at encouraging them to improve their qualifications and produce quality research.

Evidence that this support is paying off includes the 38 accredited research publications that PRG researchers delivered in 2022, compared to 19 in the previous year.

In addition, nine members of the group succeeded in obtaining master's or doctoral degrees, up from seven in 2021. Of the nine who obtained their higher degrees in 2022, five completed doctorates and four obtained their master's.

There was also a significant increase in the number of research ethics applications that were approved for PRG researchers: 27 in 2022 against 19 in 2021.

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RESEARCH INTEGRITY AND ETHICS

Ongoing changes in research funding, management and publishing necessitate continuing scrutiny of the applicable standards of responsible research conduct (RCR). Furthermore, it is vital to consider the role African perspectives and contexts should play in shaping policies, principles and practices around research ethics and integrity.

At Unisa, research ethics and integrity are essential to building a culture of trust, transparency and accountability for advancing science and knowledge generation. Central to our vision of "shaping futures in the service of humanity" is our commitment to scrutinising traditional Euro-Western research ethics approaches through the lens of Africanisation and decolonisation.

Redressing past epistemic injustices in research ethics regulation and practices

In 2022, the Research Integrity Office (RIO) at Unisa was instrumental in ensuring that the university continued to pay close attention to redressing past epistemic injustices in research ethics regulation and practices.

The RIO adapted its training programme and facilitated sessions on indigenising research ethics. Joining hands with the Vice-Principal: Research, Postgraduate Studies, Innovation and Commercialisation, Prof T Meyiwa, the RIO reached 245 participants through two Round Table discussions as part of the Vice-Principal's Asikhulume initiative. The primary objective of these dialogue sessions was to synthesise Eurocentric and Afrocentric research ethics within the framework of an Afro-global standpoint.

In other initiatives intended to develop a more inclusive research integrity and ethics culture within Unisa, the RIO prepared for isiZulu, Tshivenda and Sepedi translations of the Unisa Standard Operating Procedure on Research Ethics Risk Assessment.

Cape Town Statement on fairness, equity and diversity in research

In 2022, Unisa's RIO was at the centre of plans to address power imbalances in global research collaborations, many of which are characterised by a lack of fairness, equity and diversity in research. These imbalances directly affect research ethics and integrity, which have broadened in recent years to encompass social justice issues relevant to research. Where discrimination and exclusion are practised, implicitly or otherwise, research cannot meet 21st-century standards of ethics and integrity.

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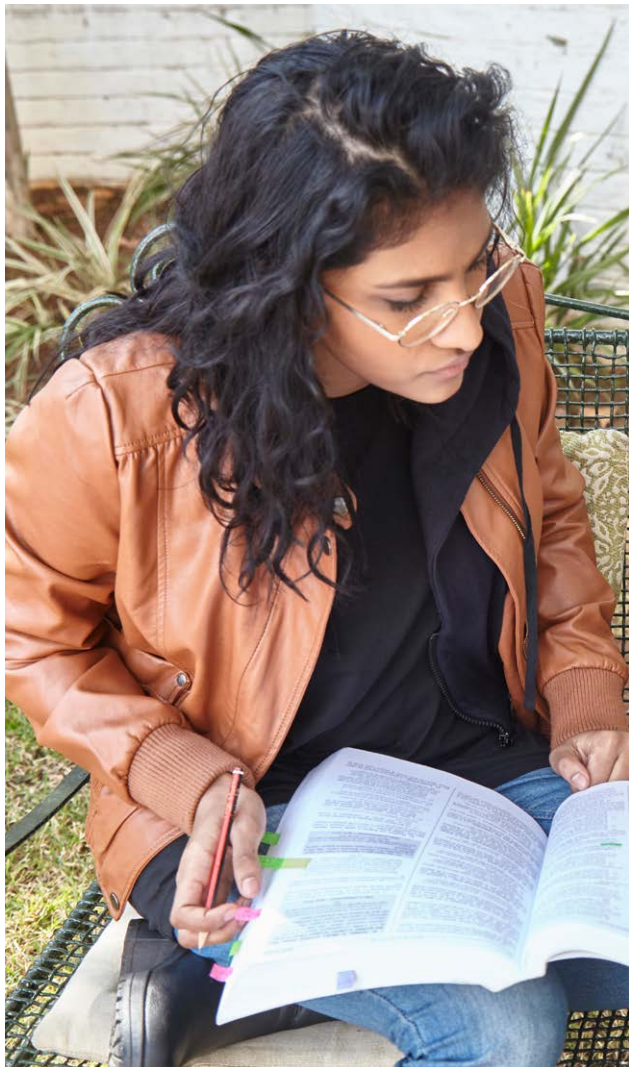

INTERNATIONALISATION AND COLLABORATION

The aim of the Internationalisation office within the Department of Research, Innovation and Commercialisation is to optimise Unisa's capacity to contribute towards the delivery of Africa's development goals, as expressed in the Sustainable Development Goals 2030 and the African Union's Agenda 2063. Relevant and effective partnerships and collaborations in research, innovation and postgraduate studies are key vehicles for contributing to the realisation of these goals.

The guiding principles and priorities of the internationalisation office include strengthening the university's institutional relationships in Africa in particular, and securing funding to support, fund and expand collaboration with African and international institutions and networks. In addition, the office implements strategies to increase the enrolment of international postgraduate students and encourage intra-African research mobility through joint applications for grants and proposals.

In working towards these goals, the office cooperates closely with the other directorates within the Research Department, as well as with the internationalisation offices of the eight Unisa colleges.

An example is the annual International Student Exchange Programme for student innovators, under the auspices of the Directorate of Innovation, Technology Transfer and Commercialisation. Four international universities participated in the 2022 exchange programme, namely the University of Dar-es-Salaam in Tanzania, the University of Basel in Switzerland, Michigan State University in the United States, the University of Rwanda (which is part of the Swiss-Southern Africa Business Innovators Network).

READ MORE

RESEARCH IMPACT

Unisa invests substantial amounts in research support for the university's researchers and innovators and it is crucial that these investments deliver satisfactory returns. Such returns would typically manifest in improvements in Unisa's annual research outputs and other indicators of research performance, as well as in our research performance in relation to other public universities in South Africa.

The Research Support Directorate, which is responsible for tracking research at Unisa, closely follows the results and trends highlighted in the Department of Higher Education and Training's (DHET) annual evaluations of universities' research outputs, as well as in credible rankings systems such as the Times Higher Education World Rankings and the SciVal performance-monitoring system.

The Directorate then uses the results from these reports and ranking systems to map the university's positioning in the higher education sector and to inform planning around future research support initiatives and interventions.

Based on these information sources, 2022 was by and large a successful year for research, innovation and creative outputs at Unisa, although there were also some disappointing results where strong focus will be needed to achieve improvements, especially when it comes to the percentage of Unisa staff with doctoral qualifications and the low rate of research outputs per capita.

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INNOVATION, TECHNOLOGY TRANSFER AND COMMERCIALISATION

Within Unisa, the DITTC has spent the past decade designing and putting in place the many components that go into creating settings where innovation and innovators thrive. There is still a long way to go before all the ingredients of the ideal environment for innovation are fully in place and working together but, as the achievements of 2022 demonstrate, progress is certainly being made.

Intellectual property portfolio continues to grow

Since the first patent in Unisa's name was granted in 2015, the university's portfolio of patents has grown steadily. In 2022, a further 20 patents were granted, compared to 17 in the previous year. By the end of December 2022, the total number of Unisa-held patents stood at 75.

The two main jurisdictions in which Unisa innovations were patented were South Africa, with nine, followed by the European Union, with five. The remainder are distributed across the Africa Regional Intellectual Property Organization (ARIPO), Brazil, Canada, China, the United Kingdom and the United States. Figure 1 alongside shows the geographical distribution of the 22 granted patents in 2022.

Meanwhile, the DITTC filed a further 29 patent applications, compared to 41 in 2021. The applications for 2022 were distributed across 10 jurisdictions, as shown in figure 2.

With regard to patent prosecution, which refers to the interaction between patent applicants, their representatives and patent offices, the DITTC handled 211 prosecution-related matters, including the 29 patent applications.

The DITTC received 10 intellectual property disclosures from Unisa staff, compared to 13 in the previous year. The numbers for both years are lower than in the preceding eight years, when disclosures ranged from 15 in 2013 to a high of 34 in 2019.

Figure 1: Patents granted in 2022

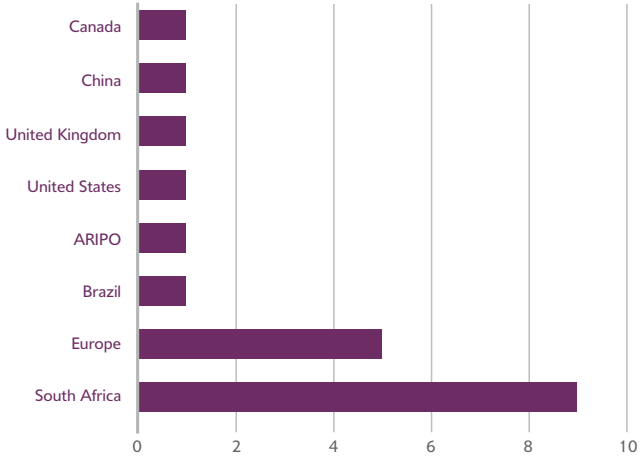
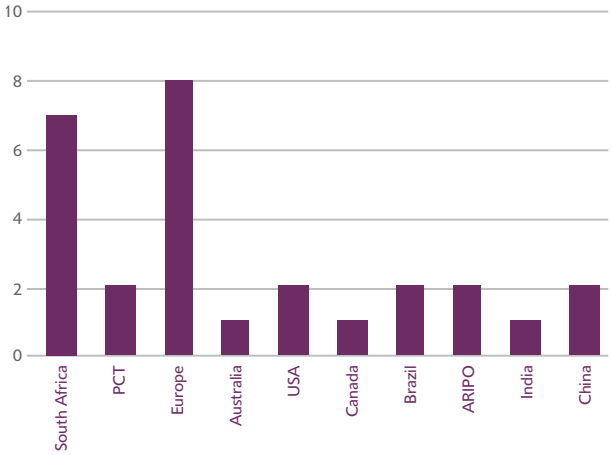


Figure 2: Distribution of patent applications per jurisdiction



Inaugural Unisa Innovation Festival held

An important step forward for Unisa's evolution as an entrepreneurial university was the hosting of the inaugural Unisa Innovation Festival in December 2022. The event showcased Unisa's innovation initiatives and saw some of South Africa's top innovation leaders serving as speakers and panellists.

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LIBRARY AND INFORMATION SERVICES

The Unisa Library provides extensive support to the Unisa research community through its considerable interdisciplinary print and electronic collection and services to support research methodology, research evaluation, research and reference management, and the e-visibility of researchers.

While print is still the mainstay of the collection, the shift to digital library services and resources gathered pace in 2022. The Unisa Library increased its stocks of e-resources, grew the capacity of the Unisa Institutional Repository and conducted online training sessions for thousands of students and staff members.

In addition, the Library assisted researchers in identifying quality publications versus predatory publications, while collaborating with lecturers to optimise the research proposal and module sites on myUnisa, the university's learning management system.

The aim, across the spectrum of services offered, was to contribute to enhancing research outputs for the benefit of researchers and Unisa.

Print is still key but e-resources gain ground

The strategic shift towards an e-format for library resources was reflected in the growth of the Library's e-resources and slight reduction in print collection development.

A reduction of 0.73% was recorded for the print collection, equating to a decrease of just over 18 000 items. At the end of the year, the print collection consisted of 2 454 418 items, housed in the Muckleneuk, Science and regional libraries.

On the other hand, e-resources experienced strong growth.

At the end of 2022, the Library had over 496 027 e-books that can be accessed via its website. This was approximately 10% more than in the previous year. In addition, each college had an e-book budget to purchase individual e-books and e-reference sources on demand.

Similarly, the number of e-journals grew by around 10%.

The Library's e-Journal Finder allows access to all journal titles available on the full-text databases which, in 2022, totalled 402 individual e-resource databases providing access to 450 746 e-journals.

Usage of the Library's e-resources varies according to the resource concerned. Full-text downloads (articles and book chapters) increased by almost 10% and e-chapter usage by approximately 13%. However, there was a 9% decrease in searches done and a very sharp drop of approximately 68% in electronic audiovisual materials used.

Table 1 provides more details of the usage of e-resources in 2022 compared to the previous year.

Table 1: Usage of e-resources in 2021 and 2022

OVERALL USAGE	2021	2022
Searches done	2 079 708	1 898 406
Full-text downloads (articles and book chapters)	2 180 485	2 401 749
Number of full-text articles used	1 724 306	1 210 692
Number of e-book chapters used	448 399	515 617
Electronic audiovisual materials	142 192	46 091
EBSCO Discovery Service Publication Finder	101 526	77 294

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Photograph by JC Fourie

UNISA PRESS

Unisa Press again showed resilience in 2022. Even though it operates in a small, niche industry, which has seen university presses proliferate in the past two years, there continues to be an appetite in the market for the Press's services. There was an increase in the number of books published and strong sales of both books and journals and this, together with stringent cost management, made for a positive year financially.

That said, 2022 was not without challenges such as delayed peer reviews, a global phenomenon that has a negative impact on the efficiency of the publishing programme because the credibility of scholarly books is centred around the peer-review process.

On the other hand, the investment made two years ago in a Science Open preprint server – the only one owned by an African publisher at the time – is starting to yield positive results. In 2022, the server was viewed by users in approximately 115 countries.

Book publishing thrives after hiatus

Unisa Press published 16 books in 2022, showing growth of 120% compared to the previous year. The book-publishing programme is therefore back to pre-2019 levels, when a moratorium led to a steep drop in the number of books published annually. Where 16 books were published in 2018, only five were published in 2019, two in 2020 and seven in 2021.

A highlight for the book publishing programme was the open access book-funding grant of R650 000 awarded to Unisa Press by the National Institute for the Humanities and Social Sciences. The grant is for four books.

Another important development was the reintroduction of book launches as an important part of the publishing process and valuable tools in generating sales and success for the authors.

Unisa Press also explored several new platforms to improve the searchability and accessibility of its books. These included online e-book platforms such as Vital Source, to which 10 Unisa Press books were uploaded in 2022, along with EBSCO Information Services in the United States, Takealot and Google book platforms.

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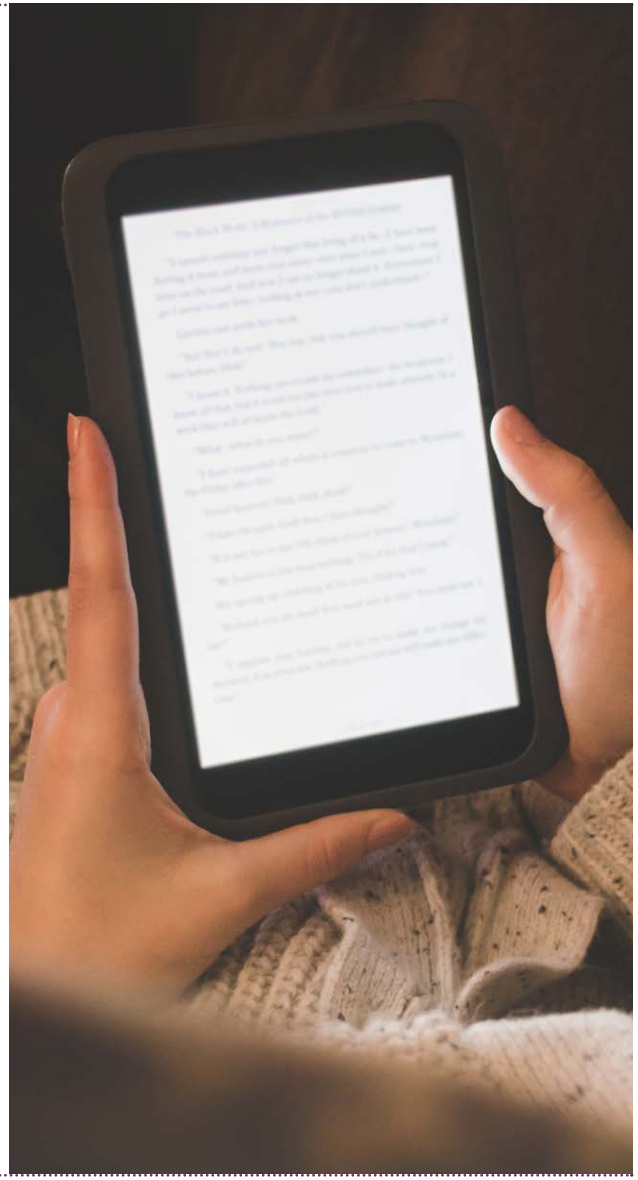


COLLEGE OF GRADUATE STUDIES

Supporting postgraduate students and shaping scholarship

The College of Graduate Studies (CGS) is actively shaping popular and scholarly conversations while supporting postgraduate supervisors and students, and theorising and creating new knowledge from an African perspective.

Throughout 2022, the School of Interdisciplinary Research and Graduate Studies supported capacity development for supervisors and postgraduate students by offering symposia, seminars and workshops. These initiatives were all the more significant because they embedded the institution's commitment to the promotion of interdisciplinarity, indigenous knowledge production and African epistemologies.

The CGS served as the institutional home for three engaged scholarship projects, all with urgent social and epistemological relevance. The projects are "Promoting the visibility and use of public archives in South Africa through public programming", "The indigenous knowledge guild of Credo Mutwa: A pedagogical challenge to institutions of higher learning" and "Child homelessness: Nature, causes, impact and policy responses".

The knowledge emanating from these projects has been shared via various channels, including the Credo Mutwa Indaba lecture, which was held on 20 June 2022 and made available on YouTube/social media platforms, a workshop on Public Programming Strategy Implementation from 23 to 25 August 2022, and publications in accredited journals.

Chairs receive international recognition

Some outstanding highlights were reported by the two endowed chairs within CGS, namely the UNESCO-Unisa-iTLABS/NRF Africa Chair in Nanosciences and Nanotechnology (U2ACN2) and the South African Research Chairs Initiative (SARChI) Chair in Social Policy.

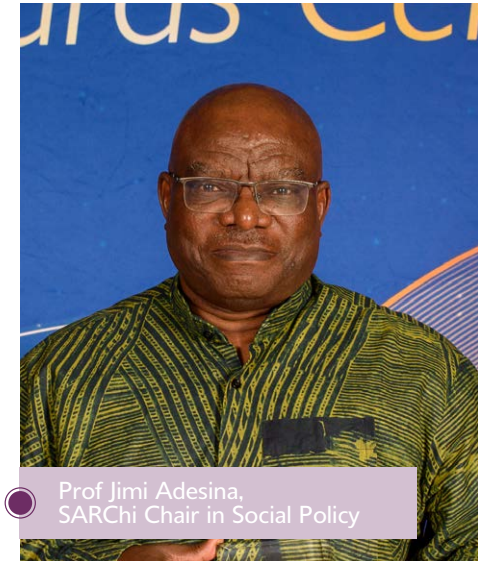
U2ACN2 PhD fellow Boitumelo Mabakachaba was selected for a 2022 l'Oreal-UNESCO award for Women in Science, while four members or associates of U2ACN2 were ranked among the top 2% of highly cited scientists globally, according to the Clarivate Stanford University ranking. They are Dr K Kaviyarasu, Prof A Fakim Gurib, Prof P Manikandan and Prof Malik Maaza, the Chair.

The United Nations Institute for Economic Development and Planning in Dakar, Senegal appointed Dr Jimi Adesina, SARChI Chair in Social Policy, to develop, direct and deliver the 2022 online research/policy nexus capacity-building programme for African policymakers. The title of the programme is "Social Policy for Development Planners for an Inclusive, Resilient and Sustainable Recovery Post-COVID-19".

The Chair also launched two new research projects during the year, namely the "Bottom-of-the-Pyramid Meets Social Protection" project and the "Social Policy Dimensions of Land Reform" project, and finalised the "Precarious Non-Poor in Africa" research project.

Both research chairs within CGS are leading the way in terms of transformative research approaches by foregrounding skills transfer and the development of emerging scholars through the constitution of diverse, multi-level research teams. Other CGS units are also actively contributing to research transformation.

READ MORE



Prof Jimi Adesina, SARChi Chair in Social Policy

Prof Malik Maaza, UNESCO-Unisa-iTLABS/NRF Chair in Nanosciences and Nanotechnology

THABO MBEKI AFRICAN SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

The Thabo Mbeki African School of Public and International Affairs (TM-School) is envisioned as a premier graduate school to advance public sector education in public and international affairs. The TM-School seeks to be a magnet of excellence in education, experiential learning and research.

In 2022, three research associates and two professors extraordinarius were appointed. The TM-School boasts four researchers with ratings from the National Research Foundation (NRF). The school inherited the *International Journal for African Renaissance Studies (IJARS)*, which remains nationally and internationally accredited.

Scholars at the TM-School produced 14 research outputs, including 10 articles, three book chapters and one authored book.

Flagship projects

Two flagship projects, the South African Democracy Education Trust and Lekgotla La Batho, were implemented in the TM-School in the 2022 academic year.

The South African Democracy Education Trust project is headed by research professor, Prof Sifiso Ndlovu. The project has consistently produced accredited research outputs. In 2022, volume 10 of the *Road to Democracy* series was published. Its full title is *The Road to Democracy in South Africa, Volume 10: Africans and the anti-colonial struggles in the African continent, the Caribbean and the Americas.*

Action research underpins the project Lekgotla La Batho: Regenerating Community Knowledge for Dispute Resolution in the South Africa Context, led by Macdonald Rammala. Here, research is not done for the sake of research itself but conducted in such a manner that knowledge holders from the respective communities are the main participants in and beneficiaries of the research.

In this regard, the College of Law and the TM-School promote an "African harmony model" for dispute resolution that draws knowledge from the African way of resolving disputes, in contrast to the typical Western dispute management model. Based on the basic principles underlying Lekgotla, the African harmony model is directed at an inclusive group process that has as its objective the restoration of social equilibrium (restorative justice). The conflict management model manages the opposing positions of individuals or groups, normally to the exclusion of third parties, whereas the process of Lekgotla does the opposite.

Thabo Mbeki AFRICAN SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS UNISA

Professor Sibusiso Vil-Nkomo, Executive Dean, TM-School

CREATIVE OUTPUTS

The recognition that the Department of Higher Education and Training (DHET) gives annually to high-quality creative and innovation outputs from universities is important. It demonstrates that the best creative work being produced at universities has academic merit in its own right and that the intellectual effort invested in, for example, an art exhibition or musical composition, may be every bit as rigorous as that mobilised for long-established research outputs such as journal articles, books, book chapters and conference proceedings.

The system of rewarding creative outputs in various forms, including the fine arts, literary arts, music, design, film and television and theatre, performance and dance, was introduced in 2019 and was in its fourth cycle in 2022.

To date, the DHET has awarded a total of 17.0652 subsidy-bearing units to Unisa for creative outputs submitted, representing a success rate of 66.67% for 2020 and 100% for 2021. A year-by-year breakdown shows that the DHET approved zero units for 2019, 12.83 for 2020 and 4.2352 for 2021. Unisa submitted 15 successfully peer reviewed applications in 2022. We await the unit allocation from DHET.

In 2022, for the first time, Unisa began awarding research incentives to staff members whose creative outputs received approved units from the DHET. The first group to receive these incentives are five art and three music scholars whose work was submitted for the 2020 creative output cycle.

The music scholars are Prof Karen Devroop, whose work received 4.5352 units from the DHET, Marc Duby Professor Extraordinarius (1.5 units) and Mr Bernett Nkwayi Mulungo (two units).

The arts scholars are Elfriede Dreyer Professor Extraordinarius (one unit), Dr Ania Krajewska (one unit), Mr Lawrence Lemaoana (one unit), Dr Nathani Luneburg (one unit) and Dr Gwenneth Miller (one unit).

READ MORE

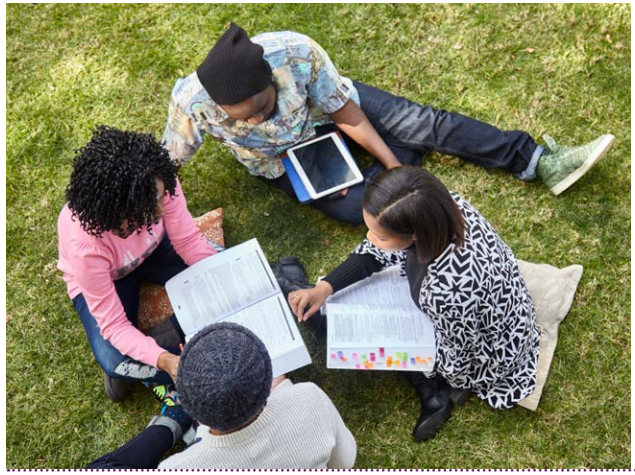
Dr Gwen Miller during the academic talks at Uncanny story

Hetta Pieterse
Soft targets

ENGAGED RESEARCH

Unisa has made major advancements in establishing engagement as a critical orientation to scholarship that responds to the needs of society. In 2022, the Division: Community Engagement and Outreach (DCEO) worked to deepen discourse, consciousness and action in establishing Unisa's identity as an engaged university.

The DCEO developed engaged scholarship, theoretical and conceptual frameworks, governance structures and processes, policy and procedures, a suite of support services for our engaged scholarship projects, an annual capacity-building programme, a nationwide stakeholder and community educator database and alignment to national, continental and international development frameworks. The division also capitalised on the opportunities provided by education technologies to widen our reach, while remaining alert to digital and information gaps across communities.



What is engaged research?

Engaged research is a collaborative process between engaged researchers and the engaged community that creates and disseminates knowledge with the goal of enriching academic praxis while strengthening the agency of communities and supporting sustainable development.

The characteristics of engaged research and engaged researchers are:

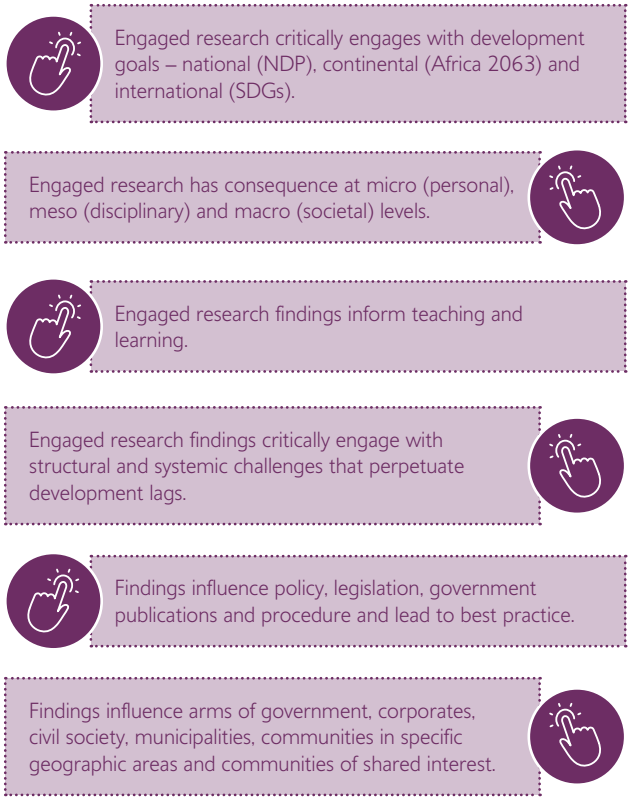
- valuing collaboration and breaking down silos to work in a multi-, inter- and transdisciplinary manner;
- actively involving non-academic dialogue partners and critical interlocuters in the research process (in addition to engaging the body of knowledge and academic experts);
- having intentional public purpose leading to critical and concrete development action;
- producing critical and reflective research in dialogue with communities of shared interest or shared place;
- being laden with transformative potential when effectively mobilised.

Impactful engaged research is not merely about citations, it seeks to mobilise best practice, share valuable development and nation-building knowledge, highlight policy gaps, influence decision makers and enhance the skills of development agents.

READ MORE

The figure below illustrates the touch points for engaged research and engaged researchers at Unisa.

Figure 3: Engaged research touch points



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05

STUDENTS

"I appreciate being part of the Unisa Pre-Incubation Programme and the Future Females Business School."

Caroline Mantenchi

STUDENT EXCHANGE OPENS STUDENTS' EYES TO INTERNATIONAL ENTREPRENEURSHIP TRENDS

The International Student Exchange Programme is an initiative of Unisa's Directorate of Innovation, Technology Transfer and Commercialisation (DITTC). It allows Unisa-registered students to visit, learn, inspire and be inspired by their peers at international universities.

Participants in the 2022 exchange programme were selected from the Unisa Innovation Challenge Programme winners, Research and Innovation Postgraduate Student Showcase and the Tshwane Inter-University Innovation Challenge.

The four international universities participating in the exchange programme were the University of Basel in Switzerland, the University of Rwanda (as part of the Swiss-Southern African Business Innovators network), the University of Dar-es-Salaam, Tanzania and Michigan State University, USA.

Unisa students promoted their research and innovation work and participated in innovation and business plan competitions by presenting projects geared toward addressing some of Africa's societal and socio-economic challenges.

Alongside, two postgraduate students, La-Portia Mahlangu-Matjila and Nomonde Huma, who were part of the 2022 International Exchange Programme, share their experiences.

From academic theory to practical implications

La-Portia Mahlangu-Matjila was one of nine Unisa delegates who visited Tanzania's University of Dar Es Salaam (UDSM) from 21 to 28 May 2022. She is a PhD student in Business Administration and Management.

"This visit created an ideal opportunity for me to be exposed to the research and innovation environment at the UDSM," she says. "Our hosts prepared an exciting programme, and our visit coincided with their Research and Innovation (R&I) week. I am grateful for the opportunity because my needs, interests and expectations were met. It was a fruitful and educational visit for my field of study and my role as an administrative employee at Unisa."

READ MORE

Nomonde Huma


The Unisa and Brazil delegations at St Gallen, Switzerland


La-Portia Mahlangu-Matjila


Unisa delegation at the University of Dar-es-Salaam Business School

Xola dos Santos

UNISA STUDENT CREATES APP TO CONNECT TECH TALENT WITH THE TECH INDUSTRY LABOUR MARKET

Young engineers studying technology, data science and software engineering in South Africa struggle to find opportunities to put their academic knowledge into practice.

At the same time, talent acquisition specialists have difficulty finding the right tech talent to implement their digital transformation strategies.

When supply and demand can be matched, the skills gap is resolved.

Xola dos Santos, a BCom Business Informatics student, set out to bridge the gap (which he and other students like him had experienced for themselves).

Dos Santos developed the **Recruit Engine platform**, a LinkedIn-like Software as a Service (SaaS) application to provide an online, community-driven directory of students looking for work opportunities.

Innovation Challenge Programme

The app has come a long way since 2019 when Dos Santos received the Technology Leadership Award and a grant of R100 000 through Unisa's Innovation Challenge Programme to realise his innovative idea to address a societal challenge.

"Getting the funding allowed me to start scaffolding out, not just a prototype, but building up a web application, building up a back end, connecting it to various services and making an application that people can install on their phones," he says.

The funding allowed Dos Santos to build his company, XDODE (Pty) Ltd, into a small team of six. He hopes to secure more funding (at least R400 000) to grow the engineering team to execute his mission of further building a solid prototype and going to market with it.

"My aim was to help ensure that a pipeline of outsourced talent is continuously available at the right price, the right time, at the right quality and from a platform evaluated by professionals."

UNISA STUDENT INNOVATOR ACCEPTED INTO THE UK FUTURE FEMALES BUSINESS SCHOOL

Three years after becoming a Unisa Innovation Challenge winner, Biomedical Science student Caroline Mantenchi has spread her wings. She has been accepted into the United Kingdom's Future Females Business School, which aims to increase the number of females and boost their success in tech-based businesses, allowing them to have a positive impact on their communities.

Her innovation journey began when she was named one of the winners of Unisa's 2020 Innovation Challenge Programme. She is currently part of the university's Pre-Incubation Programme supported by the Directorate of Innovation, Technology Transfer and Commercialisation (DITTC).

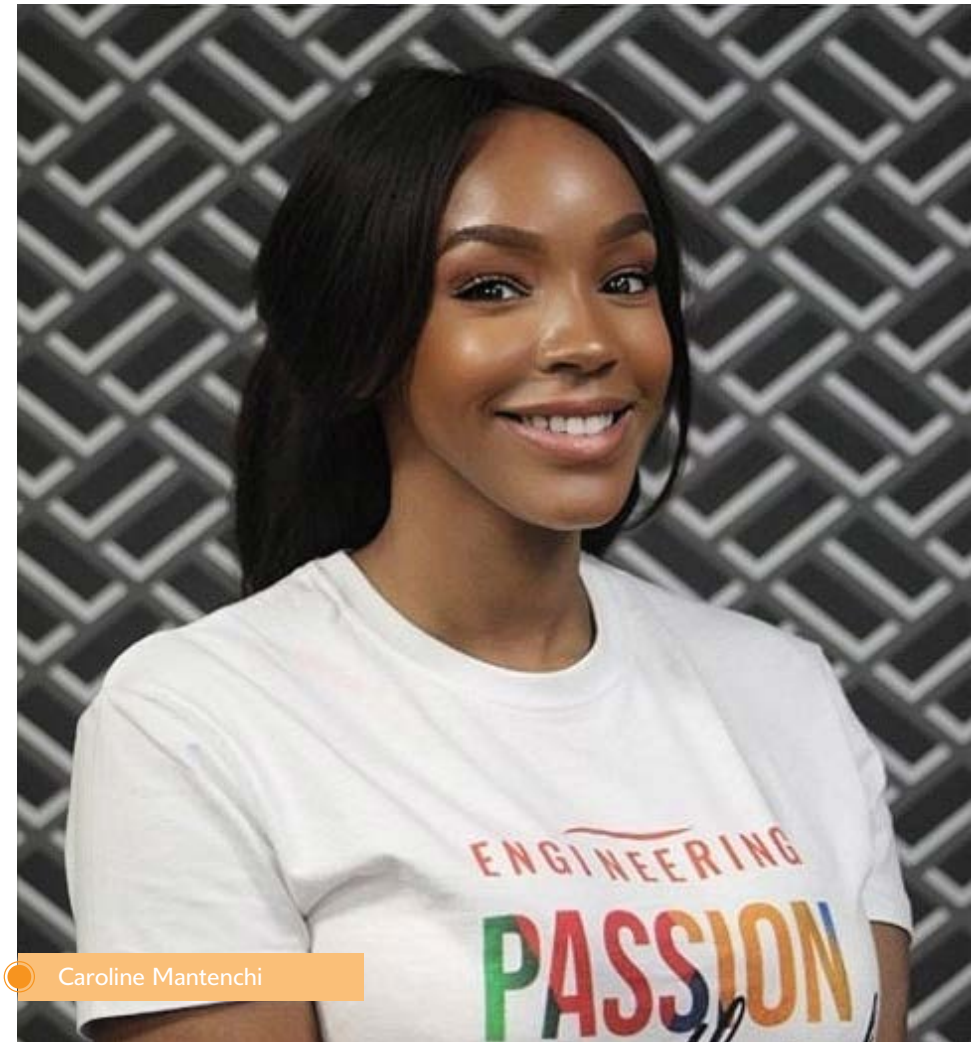
There has been tremendous growth in Mantenchi's early-stage start-up, according to Basanda Pongoma, leader of the Pre-Incubation Programme. Her start-up is based on an Agricultural Smart Sensor that measures seven distinct parameters when plugged into the ground. It is waterproof and dustproof and supports wireless remote viewing for improved harvests through databases.

Three of her prototypes are currently in the validation stage and being tested by several agricultural researchers.

Mantenchi has received generous support for her start-up development from the DITTC's Pre-Incubation Programme through seed funding and leadership in project management, customer development, product development and mentorship.

Since successfully applying – through the DITTC – to join the Future Females Business School Accelerator Programme, she has been working with her coach on Green-Tech content and developments in South Africa.

Mantenchi says she appreciates being part of the Unisa Pre-Incubation Programme and the Future Females Business School, which she believes has created a space where women can feel vulnerable, give and receive feedback while sharing in each other's successes and lift each other when needed.



Caroline Mantenchi

R&I SHOWCASE FOR POSTGRADUATE STUDENTS SHOWS WHAT IS POSSIBLE IN AFRICA

Unisa continues to take the lead in embracing the role of technology in research and innovation. By hosting the remarkable Research and Innovation Postgraduate Student Showcase (RIPSS), the university is supporting the advancement of future researchers and preparing them to contribute to the African continent and the rest of the world.

The RIPSS is a joint initiative, involving the College of Graduate Studies, the National Student Representative Council and the Department of Research, Innovation and Commercialisation, to develop the research and innovation skills of postgraduate students at Unisa.

The 2022 RIPSS programme began when postgraduate students from different disciplines were invited to submit research abstracts. The students who submitted the best abstracts were offered mentorship and training on multiple levels.

The theme of this edition of the RIPSS was "Navigating all things in research using the power of technology".

Opening the event, the Acting Executive Dean of the College of Graduate Studies, Prof Tennyson Mgutshini, said technology is critical to Unisa's evolution and to the skill set of every postgraduate student, given how important technology is in the fast-changing job market.

On the first day of the showcase, postgraduate students presented their abstracts in breakaway rooms with experienced adjudicators and an audience.

On the second day, virtual awards were presented by Prof Khanyisile Mbatha, the Acting Director of the School of Interdisciplinary Research and Graduate Studies. In addressing the students at the awards ceremony, Mbatha said:

"Postgraduate students, you are not registered only to acquire information or technical skills but also to be intensely involved in research and innovation to solve the current and future challenges on different horizons."

The winners were as follows:

Arts and humanities:

Lebohang Prudance Mbonambi
Honours and postgraduate diploma category

Michelle Beverley van Zyl
Master's category

Amogelang Isaac Molaudzi
Doctoral category

Natural and physical sciences:

Clint Raynor Morar
Honours and postgraduate diploma category

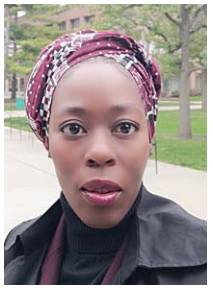
Tumelo Nhlapho
Master's category

Haripraya Rama
Doctoral category

Social sciences (accounting, education, law and management and economic sciences):

Seliki Barnard Nkgweng
Honours and postgraduate diploma category

Themba Genius Nkosi
Master's category



Zamandlovu Sizile
Doctoral category

06

HIGHLIGHTS

"Unisa has given me the wings to fly and space to grow as an academic. I have been equipped with the epistemology and technological skills to empower novice academics in the departments and the college."

PRESTIGIOUS AWARDS AND MEMBERSHIPS
CHANCELLOR'S AWARD

CONVERTING ENERGY FROM ANY CARBON FEEDSTOCK TO POWER AFRICA

Prof Xinying Liu's research on energy conversion using newer processes to convert all possible carbon feedstock into liquid fuel and chemicals has the potential to benefit Africans in more ways than one.

"Firstly, applying green energy resources can help to mitigate climate change," Liu says. "Secondly, providing distributed energy solutions rather than traditionally centralised ones will improve access to energy, improve the quality of life among historically disadvantaged communities and provide a sustainable energy solution to Africa."

He is a full professor heading the catalysis research group at Unisa's Institute for the Development of Energy for African Sustainability (IDEAS) and an elected member of the Academy of Science of South Africa (ASSAf).

His research on green energy has been published in high-impact journals, a patent on it has been granted and a number of postgraduate students have been trained to completion. Liu has also reached out to high-school students to attract more young talent into science and share information on the potential for energy solutions in townships.

Prof Xinying Liu, College of Science, Engineering and Technology

Prof Micheal Van Wyk, College of Education

"I am deeply honoured to receive the Chancellor's Award as it represents not only recognition for me and my team's hard work and dedication but is also a reminder of the support and opportunities Unisa has provided. It will motivate me to carry on the work we are doing to provide sustainable energy solutions to Africa."

Prof Xinying Liu

FROM PLUMBING TO TEACHING AND UNISA'S TOP RESEARCH AWARD

Chancellor's Award winner Prof Micheal van Wyk's journey is a true reflection of hope, dedication and perseverance.

Now a C3-rated academic in Unisa's College of Education, he completed his plumbing apprenticeship after leaving school in Cape Town and worked as a plumber for six years. His mentor recognised his skills in teaching, the ability to read building plans and knowledge of the construction industry, and inspired him to save up to study for his teacher's qualification.

After completing his studies, Van Wyk taught at various schools, where his leadership had a great positive impact. As a lifelong learner, he completed his PhD studies and has continued to achieve numerous prestigious awards in recognition of his dedication and leadership and as an accomplished scholar. He has an NRF C3 rating.

"Unisa has given me the wings to fly and space to grow as an academic. I have been equipped with the epistemology and technological skills to empower novice academics in the departments and the college."

PRESTIGIOUS AWARDS AND MEMBERSHIPS
CHANCELLOR'S AWARD

RESEARCH MUST REACH AND BE USED BY DECISION MAKERS

"I am deeply honoured to have received the Chancellor's Award for Excellence in Research and am grateful for the recognition of my research work in the broad field of information science"

Prof Omwoyo Bosire Onyancha

This exceptional researcher is one of six who received what is regarded as the most prestigious award for research at Unisa during the 2023 Research & Innovation Awards. The Chancellor's Award for Excellence in Research recognises high-quality published research by permanent Unisa researchers and research groups.

Onyancha is a research professor in the Department of Information Science in the College of Human Sciences. His research focus is domiciled in the field of Library and Information Science (LIS).

With over 130 journal articles, 11 book chapters and two edited books to his name, Onyancha has made a significant contribution to the development of his discipline and cognate disciplines.

"My interest in knowledge mobilisation, utilisation of research, evaluation of research performance and scientometrics/informetrics was sparked when my academic supervisor pointed out its potential significance in decision making and policy formulation," he says.

These topics have since captivated his attention, and he has been continuously learning and researching in these research areas to explore their potential impact further.

His research studies have provided insights into the impact of information and communications technologies in information processing and use, the role of metadata in information retrieval, and the importance of knowledge management in organisational performance.

Prof Omwoyo Bosire Onyancha, College of Human Sciences

TOP SCIENTIST SEEKS TO INSPIRE OTHER FEMALE RESEARCHERS IN STEM

The bioremediation of organic pollutants from various environmental contexts is the research focus of Prof Memory Tekere, a research professor in the Department of Environmental Sciences in the College of Agriculture and Environmental Sciences.

Her extensive research covers applied environmental microbiology and biotechnology with a focus on microbial ecology, diversity and bioprospecting, environmental pollution, ecotoxicology and bioremediation.

A C3-rated researcher, Tekere has published 109 peer-reviewed publications and successfully supervised 10 PhD and 23 MSc students to graduation at Unisa.

In 2022, among her top research highlights and achievements, she garnered three external research grants: BioScavenge Denmark Rio Tinto linked Grant, Water Research Commission Grant and NRF Competitive Programme for Rated Researchers Grant.

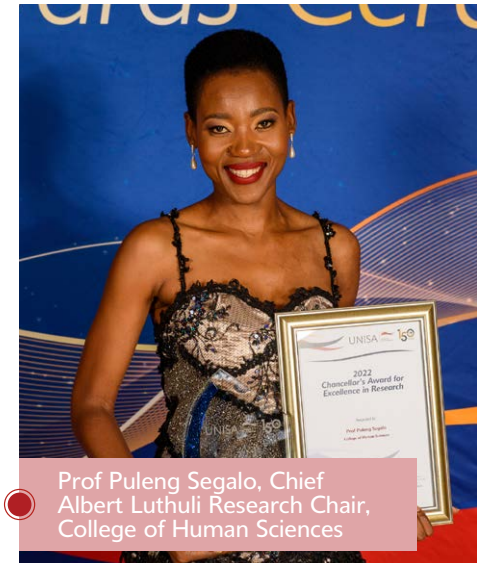
Commenting on her Chancellor's Award for Excellence in Research, Tekere says: "I always endeavour to be a top-performing female scientist and believe that this great achievement will inspire many other female researchers in science, technology, engineering and mathematics (STEM).

"This award is a reminder that more lies ahead in terms of the relevance of my research in academia and society; when one summit is conquered, there is still more to conquer. It also makes me very humble, and cognisant of the immense external and internal institutional support received and available for such achievements to be realised."

Prof Memory Tekere, College of Agriculture and Environmental Sciences

PRESTIGIOUS AWARDS AND MEMBERSHIPS
CHANCELLOR'S AWARD

RESEARCH DOCUMENTS THE LAYERS OF TRAUMA OF BLACK SOUTH AFRICAN WOMEN



Prof Puleng Segalo, Chief Albert Luthuli Research Chair, College of Human Sciences

Many black South Africans, particularly women, live with layers of hidden trauma that take skill and courage to uncover. Within the discipline of psychology, Prof Puleng Segalo explores possibilities for healing and well-being through research that integrates science, aesthetics and culture.

She has been inspired to use aesthetic methods, including embroidery and poetry, to tap into the psychological, relational and political experiences of black South African women and document the layers of trauma within the individual and society.

Segalo, Chancellor's Award recipient, describes this work as being positioned at "the intersection of academia and activism", meaning that its impact goes beyond academia and is also part of engaged scholarship.

Segalo, who is a professor of psychology and incumbent of the Chief Albert Luthuli Research Chair, has received many other awards. In 2014, she received the Women in Science Awards (WISA): Distinguished Young Woman Researcher, and gained South African Young Academy of Science (SAYAS) membership in 2016.

More accolades have followed. Segalo was the recipient of the 2021 The World Academy of Sciences (TWAS) Regional Award for Public Understanding and Popularisation of Science. Most recently, she has been appointed as a Research Fellow at both the University of Kansas's African Studies Center and the University of Ghana's Institute for African Studies.

She currently has a C2 rating from the NRF.

SMALLER, KINDER, COMMUNITY-BASED TOURISM IS THE FUTURE

While there will always be a market for mass tourism where people flock to popular attractions in large numbers, the industry is moving towards a "smaller, kinder" brand of tourism that integrates communities into tourist operations and is less environmentally destructive.

"There is a big move in the tourism industry towards being more responsible and academics are part of that. We can have a great impact on the sector," says Prof Kevin Mearns of the Department of Environmental Sciences in Unisa's College of Agriculture and Environmental Sciences.

This Chancellor's Award winner first started making his mark on the sustainable tourism landscape about two decades ago when he conducted one of the first studies on tourism in the Kruger National Park. He was later part of the team that drafted South Africa's responsible tourism guidelines, followed by the national standards.

More recently, Mearns and his postgraduate students have been working on an array of research projects across Southern Africa, much of it focused on integrating communities into the supply chains and operations of tourist operators.

He says there is a clear difference between "sustainable" tourism and "responsible" tourism. Sustainable tourism refers mainly to environmental and economic sustainability, while responsible tourism is broader and refers to everyone, including clients, staff and communities.

"Ultimately, conservation is about people. If you don't have sustainable development in communities around the national parks, the people will have no interest in them. But when they see the value, they will help to conserve the area."

Prof Kevin Mearns, College of Agriculture and Environmental Sciences

PRESTIGIOUS AWARDS AND MEMBERSHIPS PATENTS

LED INVENTION PATENTED IN EUROPE AFTER RIGOROUS EXAMINATION

Prof Lukas Snyman (centre), College of Science, Engineering and Technology

Light-emitting diodes (LEDs) have revolutionised watches, television sets and cellphones in recent years. Unisa semiconductor physicist Prof Lukas Snyman has taken the field a step further as leader of the team that invented a white LED of extremely small dimensions, at low cost, with the capability to emit 650 nanometre (nm) wavelength colour.

It was developed collaboratively between Unisa's Institute of Nanotechnology and Water Sustainability (iNanoWS) and the École Supérieure d'Ingénieurs en Électrotechnique et Électronique (ESIEE), a technical university in Paris, France.

In 2022, the LED, called the "650 nm wavelength silicon avalanche light-emitting device", was granted a European patent by the European Patent Agency and is currently filed as a second patent in several European countries.

"This was after a very rigorous patent evaluation process by European international examiners," say Snyman, adding that the same application is also being considered in the United States and China.

This new LED can be easily integrated into electronic chips and multiprocessors. Then, when used in conjunction with other semiconductor devices integrated on the same chip, it can be applied to generate advanced micro- and nanosensors able to monitor environmental parameters such as temperature, light intensity and colours, and even identify gases and biomaterials on small device areas.

These LEDs could soon be fabricated on watches, cellphones and various appliances in multiple fields, says Snyman.

"Additionally, since this particular LED can be switched on and off at gigahertz speeds, it can also be used for futuristic low-cost 'optical fibre' and Wi-Fi communication at micron dimension for the so-called futuristic 'optical signal processing' on a chip."

Prof Lukas Snyman

PRESTIGIOUS AWARDS AND MEMBERSHIPS GRANTS

SIR GRANT COULD HELP IMPROVE LIVES OF LGBTQ+ PEOPLE IN RURAL AREAS

Prof Azwihangwisi Mavhandu-Mudzusi, Head of the Office of Graduate Studies and Research, College of Human Sciences

As the recipient of a South African Medical Research Council (SAMRC) Self-Initiated Research (SIR) grant of R600 000, Prof Azwihangwisi Mavhandu-Mudzusi's work could help improve the lives of lesbian, gay, bisexual, transgender, intersex, queer and plus (LGBTIQ+) individuals in rural communities.

The SIR grants programme is designed to support original research initiated by a researcher at a recognised research institution in various areas of health.

Mavhandu-Mudzusi believes she won the grant because of the potential impact her proposed project could have on the lives of LGBTQI+ individuals in rural communities. A committed advocate for LGBTIQ+ rights, she also has a strong track record in utilising and managing previous grants.

She is well known for encouraging emerging and developing researchers to persevere when faced with challenges. "Sometimes in life, you may think you are just wasting your time, as people seem not to recognise what you are doing. Be that as it may, keep doing good because when the opportune moment arrives, you will reap the rewards of your labour."

Before she retires, her dream is to see the cohort of young academics whom she is supporting through the Postdoctoral Incubation Programme becoming established researchers who engage in research that has a positive impact on society.

INDEFATIGABLE INNOVATOR LIKES NOTHING BETTER THAN TO APPLY KNOWLEDGE

Prof Lukas Snyman, College of Science, Engineering and Technology

A passion for applying knowledge and tapping into the country's natural resources, especially solar and thermal energy, are the secrets to Prof Lukas Snyman's insatiable drive to innovate.

He and his students at the Institute for Nanotechnology and Water Sustainability have been attracting about R2.2 million in external grant funding a year. What is more, they have so far filed 15 intellectual property (IP) disclosures at Unisa, some of which have resulted in local and international patents being granted.

In 2022, Snyman and his students (who performed most of the construction work) created four new working-product prototype systems and demonstrated them to the public.

"These included cleaning drinking water from Escherichia coli bacteria, and removing salt from sea and borehole water using membranes and solar energy at low cost," he explains.

In addition, they developed a novel thermal energy harvesting system that enables South African households to convert thermal energy to electricity.

Snyman, who has published more than 100 scientific journal articles, has been selected as one of four panel members from the College of Science, Engineering and Technology to visit the High Expertise Centre on Innovation and Entrepreneurship in China.

PRESTIGIOUS AWARDS AND MEMBERSHIPS

EMERGING ODEL RESEARCHER STRIVES FOR VISIBLE AND BENEFICIAL CHANGE

Dr Mpho-Entle Modise, College of Education

Research should bring about visible, beneficial change while being rooted in the highest ethical principles, says Dr Mpho-Entle Modise, recipient of a Unisa Women in Research: Emerging Researcher Award.

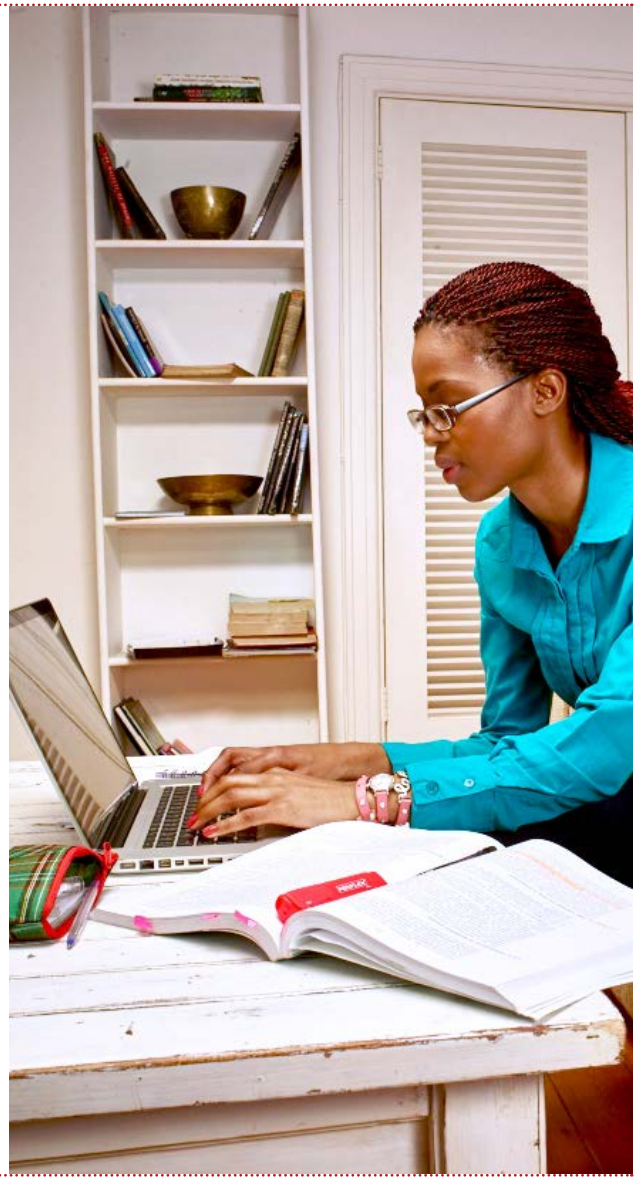
"It should improve our practice and performance as educators, as well as the quality of teaching and support for students."

Dr Mpho-Entle Modise

Her research interests are in open and distance e-learning (ODeL), the continuous professional development of academics and teachers, student support, technology adoption and integration, the use of e-portfolios, open educational resources (OERs) and massive open online courses (MOOCs).

Modise's research highlights and achievements include receiving the 2022 Doctoral Dissertation Award from the South African Education Research Association (SAERA), where she is an executive committee member, representing the needs and interests of early career researchers in South Africa and other African countries.

At Unisa's 2021 ODeL conference, one of her PhD papers won the Best Paper Award. She has also been a recipient of the Digital Humanities Open Educational Resources Champions Initiative, which is a grant from the North-West University UNESCO Chair on Multimodal Learning and Open Educational Resources.



PRESTIGIOUS AWARDS AND MEMBERSHIPS

SOME WOODS ARE LESS HAZARDOUS THAN OTHERS FOR COOKING AND HEATING

Dr Khomotso Semenya, Chair of the Department of Environmental Sciences, College of Agriculture and Environmental Sciences

Health experts have long warned that burning wood for cooking and heating can be extremely polluting, posing significant health risks linked to smoke inhalation. Yet this may not be true for all types of woods, says Dr Khomotso Semenya, recipient of a Unisa Women in Research Award: Emerging Researcher.

"Not every wood emits the same level of pollutants," says Semenya who, during her PhD research, isolated several types of woods that turn into coal when burned rather than emitting large amounts of toxic smoke.

These woods include the leadwood (motwiri in Sepedi), redbush willow (mohwelere) and sickle bush (moretshe). "If used correctly, such woods can be considered renewable energy sources," says Semenya, whose study entailed comparing the emissions characteristics of various kinds of woods used by communities where wood-burning for cooking and heating is still common.

She points out that many of these communities, especially in rural areas, have no affordable, accessible alternative to wood as fuel. Given these limitations, it makes sense to replace woods with more hazardous fumes with those less harmful.

Note that Semenya's findings about wood emissions are laboratory tested. "After being out in the field, I went back to the lab and checked the smoke for pollutants."

For her current research, she is collaborating with a colleague from the Department of Agriculture, Dr A Tagwi, on a community energy project that involves small-scale farmers in KwaZulu-Natal. "We are looking at the materials they have on their farms that they could use to generate energy," Semenya says, adding that sugar cane and cow dung show promise as they can be used to make biogas.

This project includes investigating how much gas different materials produce and an environmental risk assessment on how harmful it could be to be exposed to the various gases, as well as the risks of short-term and long-term exposure.

Semenya is also collaborating on research with teams of students, including a student in Ethiopia who is focusing on children with asthma, exploring possible links with wood-burning. "He is planning to develop a small stove that could reduce the health risks. I hope it works, because then we could also bring it to communities in South Africa," she says.

Her own research output since completing her PhD in 2020 has been impressive. Semenya has authored 13 journal articles with different colleagues and co-authored three with her students, written two book chapters and supervised 12 master's students in environmental sciences or environmental management to completion.

On top of all this, she is Chair of her department, with many administrative duties, and has a family – begging the question as how she manages to get everything done. Semenya says her bedtime is 20:00 so that she can rise at 02:00 or 03:00 to work on her research.

"It's all about time management!"

Dr Khomotso Semenya

PRESTIGIOUS AWARDS AND MEMBERSHIPS

YOUNGEST FEMALE DOCTORAL GRADUATE SETS OUT TO SOLVE SCHOOLS' WASTE PROBLEM

Schools in South Africa generate enormous amounts of solid waste, and some have minimal or no waste management practices in place. Dr Lettah Sikhosana, who completed her PhD in Environmental Education at the age of 27, has come up with a strategy to address that.

For her doctoral research, she developed and implemented a sustainable intervention strategy for solid waste management at primary schools in the Nkangala District of Mpumalanga.

Her strategy for waste management at schools differs from other strategies as it involves partnerships to assist schools in managing their solid waste.

Sikhosana completed her doctorate in just two years and became the youngest female PhD graduate at Unisa in 2022.

A former teacher at Buhlebesizwe Secondary School in Mpumalanga, she is currently employed as a lecturer in the College of Education at Unisa.

She also serves as the Chair for Research, Postgraduate Studies, Innovation and Commercialisation in the College's Department of Science and Technology Education.

Dr Lettah Sikhosana, College of Education

STUDY AND STRUGGLE, ON AND OFF THE GROUNDS OF THE ACADEMY

Prof Michelle Fine,
College of Human Sciences, A2

A2-rated researcher Prof Michelle Fine is on the faculty of two universities – one in Africa and the other in the United States – with "long and complex dedication to access and the radical imagination", as she puts it.

"As Unisa was the mechanism for legal education of Mandela and comrades, so too City University of New York (CUNY) is committed to 'all of the children of the city', to persons who are incarcerated, to those without 'papers' to poor and working-class students, and to lively/rich/contentious debates through our vibrant differences," she says.

"And of course we are public institutions; plagued by fiscal precarities, always in struggle – but this is the project of study and struggle, on and off the grounds of the academy."

At CUNY's Graduate Center, Fine is a Distinguished Professor of Critical Psychology, Women's Studies, Social Welfare, American Studies and Urban Education. At Unisa, she is a Professor Extraordinarius in the Psychology Department for the period 2021 to 2024.

Fine describes herself as a scholar, expert witness in litigation, teacher and educational activist whose work centres theoretically and epistemically on questions of justice and dignity, privilege and oppression, and how solidarities emerge.

She has engaged in research with collectives of women in prison, activists in immigrant/undocumented communities and teachers and students in resource-deprived schools. "I am drawn to research that is historically rooted, theoretically framed, qualitative and quantitative and aesthetic, that can 'be of use' to movements, and can transform theoretical understandings of social inequities."

Fine often serves as an expert witness in lawsuits brought on behalf of finance inequity, racial discrimination and/or gender exclusions in schools. "And of course I love teaching – and particularly loved working with the brilliant PhD students at Unisa asking large, bold, multi-scalar questions borne in their lives and then interrogated through scholarship, literature, community wisdom, arts and inquiry designed to 'tell a different story' than the one being told about them."

Her A1 rating came about when she and Prof Puleng Segalo, now incumbent of the Chief Albert Luthuli Research Chair, decided to apply for rating. This was partly to honour work undertaken with (not on) communities and movements.

"My rating is of course a privilege – but one obviously connected to the privileges of my being from the Global North, being white, having more than 30 years in the academy. I am thrilled that my rating can bear fruit for the psychology programme and school at Unisa – ubuntu indeed. We are entangled in scholarship, struggle, solidarities and, yes, love."

Prof Michelle Fine

TRANSFORMATIVE SOCIAL POLICY TAKES A BROAD VIEW OF HUMAN WELL-BEING

Prof Jimi Adesina, SARChI Chair in Social Policy, College of Graduate Studies, B1

Fidelity to a social policy approach that is focused on development and African agency is at the core of the work of Prof Jimi Adesina, DSI/NRF SARChI Chair in Social Policy at Unisa's College of Graduate Studies.

Adesina says he is humbled and grateful to have received an NRF B1 rating, which validates his commitment to enhance African ontology in his scholarship. He is confident in approaching every intellectual narrative and theory from an African viewpoint, and says that his social policy framework was inspired by the works of the late Prof Thandika Mkandawire.

He also acknowledges the contributions of researchers, alumni and postdoctoral fellows at the Chair in Social Policy.

"Together we have deepened the value of a transformative approach to social policy, and demonstrated the relevance of an expanded set of policy options, including land and agrarian reform, to its wider vision."

Prof Jimi Adesina

Another accolade that went to Adesina in 2022 was the Lifetime Achievement Award bestowed on him by the South African Sociological Association for his contributions to the discipline and the association.

THE BEST OF BOTH WORLDS: SEASONED PROFESSIONAL AND HIGHLY RATED ACADEMIC

A seasoned professional with extensive expertise in project management and project procurement, Prof Pantaleo MD Rwelamila brings three decades of experience in consulting to his role as Professor Extraordinarius and Emeritus of Project Management and Procurement Systems at the Unisa Graduate School of Business Leadership.

Prof Pantaleo MD Rwelamila, Graduate School of Business Leadership, B2

His expertise lies in construction economics, policy development, project appraisal, construction project planning, procurement, contract formulation, management, project performance evaluation, risk management, strategic project management and strategic alliances.

As such, Rwelamila has made a significant contribution to the African and international construction industry.

"My professional journey has taken me across borders, where I have undertaken high-level assignments in South Africa, Australia and the United Kingdom." These assignments have included pivotal roles such as contributing to the development of South African construction industry policy, through the Department of Public Works, and participating in the re-evaluation of operations at Shelter Afrique in Nairobi, Kenya.

"My commitment to professional development has seen me organise and lead more than 60 continuous professional development courses for construction and related industry practitioners across various countries, including South Africa, Botswana, Zambia, Tanzania, Uganda, Kenya and Australia. Notably, 10% of these courses have been dedicated to public–private partnership (PPP) fundamentals and best practices."

His academic journey has been similarly impactful. Rwelamila, who has studied at universities in Tanzania (ARI/ARDHI University), the United Kingdom (Brunel University) and jointly at the University of Liverpool and the University of Cape Town, has authored over 200 peer-reviewed journal articles and conference proceeding publications, research papers and study reports.

Applying for an NRF rating was a significant step in my academic and research career," he says. As a highly rated researcher, he has opportunities to collaborate with other renowned scholars, both nationally and internationally. This has led to innovative and groundbreaking research projects in project procurement systems and PPP research studies.

Prof Pantaleo MD Rwelamila

SOLVING EVERYDAY PROBLEMS IS SUPPLY CHAIN EXPERT'S STRENGTH

Effective, efficient supply chains and smart technology can help solve many of the problems facing humanity in the 21st century. No one exemplifies this better than Prof Marcia Mkansi, with her steadfast determination to solve everyday problems through interdisciplinary research.

Prof Marcia Mkansi, College of Economic and Management Sciences, C1

Mkansi, who is Head: Graduate Studies and Research at the College of Economics and Management Sciences, investigates the systems, technologies, platforms and multimedia technologies that support business operations and the supply chain.

She feels strongly that problems with information systems in the supply chain and operations cut across every industry. "Innovation in this field can be versatile and can have many applications. This is what drew me to the subject matter. I understood it very well and could see how I could make a contribution to the field."

Mkansi focuses on research-based innovations that address last-mile distribution, in particular, and how they contribute to the environment and economic growth, as well as the prosperity and sustainability of businesses.

Her research, for which she received the Chancellor's Award, uses supply chain principles to address constraints in the knowledge supply chain that makes it a complex environment for students to work in.

By using language processing, machine learning and matching techniques, she strives to enable students to work with large quantities of data, in various forms. "In this way we can transform how we teach and learn research methods, while also accommodating an indigenous worldview in research.

PRODUCING OBJECTIVE, CREDIBLE RESEARCH TO PROMOTE AND PROTECT HUMAN RIGHTS

Prof Tameshnie Deane, College of Law, C2

Promoting access to justice is close to the heart of College of Law's Prof Tameshnie Deane, who contributes to this in several ways – as an Acting Judge of the Labour Court since 2019, as an admitted Advocate of the High Court and, of course, through her research, scholarship and community engagement work.

"I find myself in an ideal position to pursue, among other goals, advocacy initiatives, social justice and reform, access to justice and constitutional transformation initiatives from different platforms,' says Deane, a C2-rated researcher who focuses on humanitarian rights, specifically in war-torn countries, children's rights, women's rights (including menstrual rights), minority rights, educational rights, human trafficking, and media and communication law.

"My main aim for conducting research in these fields is the need to act to promote or protect human rights in a peaceful manner, and in a manner that is founded on objective, credible evidence."

Deane, who has been with Unisa for 23 years, says she quickly learnt that a successful academic had to balance key areas of teaching, research, community engagement, mentorship and academic citizenship. "I have attempted to create a balance while upholding excellence and being committed to my students."

Her C2 rating has been an important career highlight – not least because she received this rating on her first NRF application.

Deane has been nominated for various awards over the years, including the Human Sciences Research Council/Universities South Africa Medal for the Social Sciences and Humanities.

"My research plays a crucial role in the advancement of minority rights, refugee rights, health care, education, technology and social policy, among other fields," she says. "Without research, we would not be able to make the significant advancements that have improved lives and contributed to the betterment of society."

Prof Tameshnie Deane

WATER AND FOOD QUALITY BOOSTED BY REMOVING EMERGING CONTAMINANTS FROM WATER

Prof Simiso Dube, Deputy Executive Dean of the College of Science, Engineering and Technology, C3

Prof Simiso Dube's research provides critical information on the safety of the water we drink, the food we eat and the environment we are exposed to. In addition, her research informs policy and decision makers on the quality of the water and food provided to communities. "By extending our research to removing emerging contaminants from water, we are working to find solutions to those issues hampering the provision of clean water to all."

Her research focuses on green analytical chemistry methods, ranging from separation science (typified by chromatographic and electrically driven miniaturised systems) to microextraction sample preparation methods. These methods, which are developed and validated in research laboratories, offer in-depth insights into the level of emerging contaminants in water, the environment and food products.

Dube's interest in extracting nanofibrous material from biopolymers, which has been successfully applied in the removal of emerging pollutants from water, is now being explored for medical applications.

She has published extensively and supervised 24 postgraduate students to completion, consisting of 13 master's and 11 PhD students. Dube has also mentored postdoctoral fellows and emerging scholars in the field of analytical chemistry.

Her research group continues to explore green sample preparation methods for very challenging food contaminants and complex biological matrices, using cleaner solvent systems.

"We are also exploring other types of material that can be used as nanomaterial for water solutions, and for powering energy devices. We will continue to explore the capabilities of nanofibres in medical applications."

Prof Simiso Dube

PROLIFIC RESEARCH OUTPUT UNDERPINS COMMUNITY PSYCHOLOGIST'S Y RATING

Dr Nick Malherbe,
College of Human Sciences, Y1

Twenty high-quality journal articles and nine book contributions in the space of five years is a prolific output by any standards but all the more noteworthy for an up-and-coming researcher. Add to that three editorships and it is clear that Dr Nick Malherbe is passionate about his research on community psychology, violence, discourse and visual methods.

Malherbe, a senior researcher at the Institute for Social and Health Sciences (ISHS), is editor of *Social and Health Sciences*, action editor of the *Journal of Community Psychology* and counterspace editor of *Psychoanalysis, Culture & Society.*

Not content with that, he is also a member of the executive committee of the Psychological Society of South Africa.

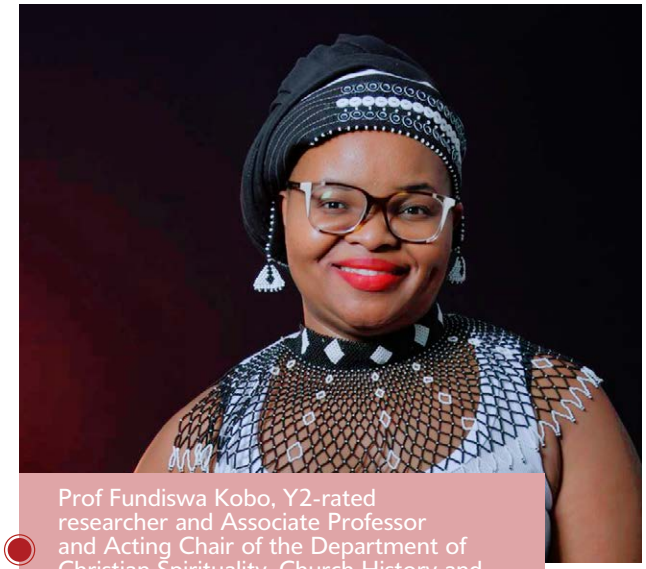
A key attribute of a good researcher is the ability to learn from failure, he says.

"Setbacks can be valuable learning opportunities. Therefore, I encourage students to persevere through challenging times."

Dr Nick Malherbe

Malherbe also emphasises the importance of collective learning and learning with others.

WOMANISM AND BLACK THEOLOGY OF LIBERATION



Prof Fundiswa Kobo, Y2-rated researcher and Associate Professor and Acting Chair of the Department of Christian Spirituality, Church History and Missiology, College of Human Sciences.

In exploring possible contours of dialogue between Black Theology of Liberation and Womanist Theology, Prof Fundiswa Kobo strives for the liberation of fragmented black humanity as a whole.

As a womanist, she argues that a black woman is the author of her own liberation. She says that methodologically, this would be doing theology from below with an African black woman as an interlocutor. This method is a disturbance to the Western epistemology that sidelined this black woman.

In her work, this black woman is coming out of the dungeons to decentre the West. "My publications expose her dilemma in her quest for liberation from racism and white patriarchy and black patriarchy, what many scholars who inspire me refer to as double, triple or multiple oppressions of a black woman," she says.

Yet, like her, Kobo adopts a "hardline pro-black position" in her realisation that her liberation is the liberation of fragmented black humanity as a whole, and that includes her fellow black men.

"I am inspired by a theological vision that dreams of a comprehensive liberation for women, the African church and the world through the gospel of Jesus Christ."

Kobo, an ordained minister in the Uniting Presbyterian Church in Southern Africa, says her role as a pastor in South African townships has inspired her to be in constant dialogue in the quest for life-affirming theologies and spiritualities that speak to the African continent.

VukaniBantu-TshohangBatho movement

Open minded, and sensitive to cultural differences, Kobo is a researcher and Chair of VukaniBantu-TshohangBatho (wake up/ rise people) movement, a historical project of black liberation whose vision is to invest in spiritual capital for the liberation of Black African people and humanity in general. The movement contributes to the decolonisation and Africanisation agenda of Unisa.

"It is the tradition of Black Consciousness to run projects aimed at restoring the self-reliance and dignity of black humanity," she says. The current project of the movement is looking at the continued importance of doing Liberation Theologies for decolonial times through conferences and seminars in universities and churches in the townships by focusing on themes of spiritualities of liberation.

The project explores several questions posed on Black Theology of Liberation, Womanist Theology and African Theology in the 21st century.

It looks, among others, at whether Liberation Theologies needs an epistemological broadening, additional to the content matter of socio-economic-religious aspects. She posits whether it should include a deep critical discourse towards other societal imbalances such as ecology, gender-based violence, human trafficking, disability, marginalisation of sexual minorities, and post- and decolonialism.

Kobo has published in high-impact and accredited journals and contributed to edited books. She is a member of the AOSIS Scholarly Books Editorial Board of Theological and Religious Studies and Ecclesial Futures Editorial Board.

She co-edited a book in honour of the mother of African women's Theology, Prof Mercy Amba Oduyoye, and co-edited a special journal collection in honour of the late Prof Vuyani Vellem, a distinguished scholar of Black Theology of Liberation.

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