

NELSON MANDELA

UNIVERSITY



Research & Innovation Report

2020/21

Cover image: The newly launched Nelson Mandela University Medical School. One of the key strategic growth areas for the institution and surrounding community, the Medical School is being intentionally and collectively driven as a beacon of hope on the Missionvale Campus in Gqeberha.

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Impactful Research for Sustainable Futures

By Professor Sibongile Muthwa, Vice-Chancellor

For Nelson Mandela University, the 2020/21 period has been characterised by the turbulence, change and uncertainty that has afflicted the world as a whole, coupled with collectively mourning the passing of many of our own due to the coronavirus pandemic. However, this has strengthened our resolve to steer a considered course towards focusing on research, innovation and transformative engagement that achieves immediate impact while also pioneering new frontiers of knowledge through groundbreaking discoveries.

As part of our Vision 2030 strategy, we seek to position Nelson Mandela University globally as an engaged, responsive higher education institution in the service of society. This strategy includes a firm commitment to the generation of knowledge, products and services that contribute to a sustainable, socially just future. In doing so, the University strives to co-create innovative solutions to the complex challenges confronting society and the planet, through collaborative local, national and international partnerships.

As a university, we are proud to be a leader in many areas of research, including women and gender studies, ocean sciences, food security, sustainability science, health and well-being, nanotechnology, and marine robotics.

In 2021, under the leadership of our DVC: Research, Innovation and Internationalisation, Dr Thandi Mgwebi, Mandela University participated in the Times Higher Education (THE) Impact Rankings for the first time. These are global performance tables that assess the contribution of universities to the United Nations Sustainable Development Goals (SDGs). Out of 1115 universities from 94 countries or regions, Mandela University ranked fourth overall in South Africa, with the universities of Johannesburg, Pretoria and Cape Town as the top three.

Mandela University's strongest ranking was Life Below Water [SDG 14] – 40th globally – and we were the only university in South Africa to rank in this SDG. For partnerships [SDG 17], we ranked the highest in South Africa, together with the universities of Cape Town and Pretoria. We were also recognised for our strengths in addressing Life on Land [SDG 15] and Good Health and Well-being [SDG 3].

The latter is reflected in Mandela University's new Medical School, which has a strong focus on primary healthcare, and which opened

its doors to the first cohort of medical students in March 2021. The Medical School's integrated, interdisciplinary approach to the basic medical sciences will contribute to the establishment of an interprofessional research hub on the Missionvale Campus,



Prof Sibongile Muthwa

addressing healthcare concerns with a high impact on the surrounding communities and the Eastern Cape.

The technology-intensive approach at the Medical School, including virtual or augmented reality visualisations of structures – from biomolecules to skeletons – offers a unique opportunity in medical education research.

The role of technology has become more crucial than ever before and the pandemic has significantly accelerated the University's digital transformation trajectory as part of our quest to enhance the agility and efficiency of our systems and processes. In light of persistent inequalities in our country, it is imperative that we address the digital divide through significant investments in fostering a more equitable future for all, particularly those who have been historically marginalised and do not have access to mobile devices and internet connectivity.

Researchers in our Faculty of Business and Economic Sciences have written a chapter on this which will appear in a book entitled *Digital Literacy, Inclusivity and Sustainable Development in Africa*, to be published in 2021/22. Furthermore, the Centre for Community Technologies (CCT) helped to develop the eReady ICT Maturity Assessment tool to improve basic education. This is an easy to download app designed to assess and evaluate the e-readiness of public schools in South Africa.

Significant impact can be achieved through the leadership of flagship programmes such as research chairs, entities and NRF-rated researchers. Mandela University hosts 16 research chairs, and three of the most recently appointed chair holders are black, with two contributing to the revitalisation of the humanities, and the third linked to the Medical School.

In ensuring that Mandela University serves as a powerful engine for building the kind of society we all wish to live in, it is key that we advance decolonisation, transformation, and the fight against gender-based violence and racism. The Chair for Critical Studies in Higher Education Transformation (CriSHET) held by Professor

Andre Keet, is driving the transformation agenda by grounding it in critical studies and framing it within the concept of an African-purposed curriculum. CriSHET's strategy for strengthening research includes the appointment of six honorary professors, seven visiting professors, two adjunct professors, 17 research associates and two professional associates, spanning a wide range of disciplines from around the world.

In October 2020, Professor Johanna Botha from our Faculty of Law was one of twelve global experts offering input at a seminar addressing state obligations in terms of the International Convention on the Elimination of All Forms of Racial Discrimination. Furthermore, one of the new humanities chairs is the SARChI Chair for African Feminist Imaginations, held by Professor Pumla Gqola from the Centre for Women and Gender Studies (CWGS). The Chair promotes inter- and transdisciplinary studies to build an African research feminist hub in the Eastern Cape. The CWGS's mandate is to resuscitate all African women's voices and histories – workers, rural women, women in business, politics and the arts.

Students hosted by the CWGS are being connected to maternal sociological knowledge and matriarchal history that was always a distinct feature of the African continent. Throughout the pandemic the CWGS has hosted seminars with scholars from all over the world. Acting Director of the CWGS, Dr Babalwa Magoqwana said: "To actively collaborate globally is one of the most beautiful moments for us in this tragic time. We have literally experienced the Centre going global."

Another significant area of decolonisation and revitalising the humanities at Mandela University is the recentring of the African canon within curricula that have been dominated by Western knowledge frameworks. The systematic erasure of African knowledge traditions has stripped our society of values, self-awareness and world views that need to be reawakened.

In the sciences, there is a pressing need to revitalise support for the basic sciences in our country, such as theoretical and computational sciences research and training that is required for the Square

"The technology-intensive approach at the Medical School, including virtual or augmented reality visualisations of structures – from biomolecules to skeletons – offers a unique opportunity in medical education research."



Kilometre Array (SKA) and other national key projects. Not only is this research at the cutting edge of new breakthroughs, it is also part of the future world of work in South Africa and globally.

First of its kind in Africa is the recently installed electron detector technology in our Centre for High Resolution Transmission Electron Microscopy (CHRTEM) in the Department of Physics. This technology is used to study the dynamic behaviour of materials at an atomic level, and further enhances our University's standing as one of the world's leading electron microscopy research facilities.

The expansion of the global footprint of the University in all faculties specifically prioritises forging and strengthening South-South linkages and expanding our African footprint. At the same time, we are committed to strengthening all global partnerships with Baltic and Nordic countries, the Caribbean islands, South America and France.

Many of our researchers have distinguished themselves on the international front. Ilse Truter, Distinguished Professor of Pharmacy, is one such pioneer, whose many years of exceptional work were rewarded in 2020 when she was inducted as a Fellow of the International Society for Pharmacoepidemiology. This is the largest, most distinguished society of clinicians and researchers in the world. Prof Truter is also the leader of the University's Drug Utilisation Research Unit (DURU) and an expert member of the WHO International Working Group on Drug Statistics Methodology.

At Mandela University, we are significantly expanding the reach, volume and impact of our research productivity throughout the academy. We wish to congratulate the recipients of awards for excellence in research and innovation, while also acknowledging the contributions of all researchers who have remained productive despite the complex challenges of this time.

“ ... we are significantly expanding the reach, volume and impact of our research productivity throughout the academy.”



Sustainability for the future

**By Dr Thandi Mgwebi, Deputy Vice-Chancellor:
Research, Innovation and Internationalisation (RII)**

Sustainability sciences at Nelson Mandela University seek to address key local and global questions, such as how to most effectively improve social capacity to guide interactions between nature and society toward more sustainable futures.

Research aligned to the goals of sustainable development has long been pursued from disciplines as diverse as geography and geochemistry, ecology and economics, chemistry and mechatronics; or physics and political science. Increasingly, however, a sustainability science research agenda has emerged that transcends the basis of foundational disciplines and focuses instead on understanding the complex dynamics arising from interactions between human and environmental systems.

Central questions in this agenda include, but are not limited to: How can these dynamic interactions be better incorporated into emerging models and concepts that integrate the earth systems, social development, and sustainability? How are long-term trends in environment and development reshaping nature–society relationships? What factors determine the limits of resilience and sources of vulnerability for such interactions? How can science, technology and innovation be more effectively harnessed to address sustainability goals?

The strength of sustainability sciences at Mandela University, built over many years, is reflected in the 2021 Times Higher Education (THE) Impact Rankings which indicate the University is emerging as a leader in sustainability in South Africa and Africa.

Mandela University's approach to sustainability science research aligns not only with the United Nations' Sustainable Development Goals (SDGs), but also with the African Union's *Agenda 2063 – The Africa We Want*, and South Africa's National Development Plan. This means that the University is addressing global issues from a uniquely African perspective that has local impact and global relevance. This approach is also based on the University's Vision 2030, in particular its focus on sustainable futures, as articulated in Strategic Focus Area 2: *"Pursue impactful, pioneering research, innovation and internationalisation to address grand societal challenges and promote sustainable futures"*.

An institutional building process for advancing sustainability science is underway, applying the core principles of sustainability – transdisciplinarity and systems-thinking – that are already



Dr Thandi Mgwebi

increasingly entrenched in the University's research, teaching and learning and community engagement. Alongside this, we promote a strong ethos that extends to the University's day to day actions, entrenching sustainability as an institution-wide culture.

The World Bank states that climate change is the most significant challenge to achieving sustainable development, and it threatens to drag millions of people into grinding poverty, particularly in the developing world. Therefore, sustainability science that focuses on the multiple challenges posed by this global change has to be placed at the forefront of the research enterprise. This cannot simply be research for its own sake; it has to inform policy direction

and decisions. Furthermore, it has to offer tangible solutions that will impact communities on the ground.

Moreover, the COVID-19 pandemic has again emphasised the urgent need for good governance and Pan-African economic solutions that deal with infrastructure, transport, education, health, and prosperity. Disruptions in global value chains on which Africa depended for product and technology imports impose a sense of urgency on African innovators to accelerate solutions to bridge the gap created by market disruptions. In addition, the intersecting challenges of environmental threats and the need for equality and equity must continuously be addressed in shaping the future of the continent.

The University has a wealth of exceptional academic resources, particularly in the area of sustainability, where so much work is already in progress. Our campuses are strategically located within the Eastern Cape, South Africa and Africa. This, coupled with the University's well-established networks and partnerships, puts Nelson Mandela University in a prime position to take the next step in promoting cutting-edge endeavours in the following areas:

- Traditional academic investigation (whether basic, applied or strategic, and whether using quantitative, qualitative, practice-based or other methodologies);
- Professional and creative practice (including architecture, visual, performing and media arts, and consultancy and related activities, etc.);
- Knowledge and technology transfer (including development projects and other forms of innovation, commercialisation, prototypes, evaluation and other externally commissioned contracts, etc.).

Following this path will contribute to efforts of cultivating university graduates who are sustainability minded, as well as creating career-track opportunities for them to stay within the Eastern Cape and continue to contribute to their own communities. Meanwhile these students will also be able to contribute more broadly – in South Africa, on the continent and globally.

Local impact, global relevance

Adopted in 2015, the 17 SDGs outlined a global intention to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. They are an urgent call for global partnerships by all developed and developing countries, in the understanding that poverty and other deprivations cannot be overcome in isolation and will require integrated global action. This must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans, forests and biodiversity. Development must balance social, economic, and environmental sustainability.

Nelson Mandela University's approach to sustainable development aligns with the SDGs, with the African Union Agenda 2063 – *The Africa We Want* – and the National Development Plan. It requires addressing global issues from a uniquely African perspective that has local impact and global relevance.

Our overall intention is to promote sustainability in a way that ripples outward in circles of service, from deep within embedded university structures out into local communities, through the nation and continent and onwards into the global arena.

“ ... Nelson Mandela University is emerging
as a leader in sustainability in South Africa
and indeed, Africa.”



Research to inform online and hybrid learning

By Prof Cheryl Foxcroft, Deputy Vice-Chancellor: Learning and Teaching

Online and hybrid learning is a rapidly evolving area of research that seeks to achieve optimal student-centred engagement.

"With the shift to online and hybrid, or mixed-mode, learning accelerated by the COVID-19 pandemic, the theoretical framework in which we anchor our Learning and Teaching (LT) at Mandela University remains that of a humanising pedagogy," says Professor Cheryl Foxcroft, Deputy Vice-Chancellor: Learning and Teaching.

"We are known for having a supportive academic environment and we do everything possible to walk alongside our students so that they successfully complete the academic year. We are engaged in interesting research on online and hybrid learning, with a number

of surveys, articles and book chapters published in 2020/21 about how to optimise a supportive online learning environment for our diverse body of students. We further consulted colleagues internally and at other universities in South Africa and internationally, and we studied many articles on teaching during times of disruption."

Many lecturers were anxious about facilitating learning digitally, as it moved them out of their comfort zone of mainly using contact teaching. Multidisciplinary teaching development and learning experience design teams from the Learning and Teaching



Collaborative for Success (LT Collab) developed reading materials, curated an Online Teaching 101 Module, and ran workshops and consultations to prepare lecturers to shift to online learning. Virtual reflection sessions were arranged for lecturers to share their practices and key learnings. The resultant themes contributed to an overarching picture that emerged to guide the future of LT at Mandela University. This work was presented to various committees and became the subject of a number of conference presentations.

"During the hard lockdown," Prof Foxcroft continues, "we assessed that about 65% of Mandela University students had devices, and some of these only had smartphones or cellphones. With this knowledge and not knowing when we would get back to campus, we adopted a staggered, multiple pathways approach as a socially just way to give all our students the opportunity to complete the year."

Students with devices, connectivity and data started learning online in May 2020. As the University was able to supply more students with laptops, the next group of students restarted their learning in June 2020. "We also distributed learning packs to students who could not access technology. In the process we were able to identify which students were unable to learn remotely and could then invite them to return to campus when the various lockdown levels permitted." This approach was well received when it was disseminated at national and international conferences.

"To understand the changing student learning environment, we contributed to questions for the national Students' Access to and Use of Learning Materials (SAULM) Survey. Among the main findings from the survey were that our students' greatest challenges were with technology (connectivity, accessing devices and mobile data), followed by adapting to and becoming more confident with online learning (navigating the Moodle Learning Management System and mastering MS Teams, workload and time management issues),

Two Nelson Mandela University professors contributed a chapter to a seminal book on technology-based LT in the time of COVID-19, published in 2020:

Du Plessis, A. and Blignaut, S. (2020). Offline - Online Information and Communication Technology (ICT) Teaching and Learning Strategy in the Age of COVID-19 and Beyond. In N. Ndimande-Hlongwa, L. Ramrathan, N. Mkhize, and J.A. Smit (Eds.), *Technology-based Teaching and Learning in Higher Education during the Time of COVID-1* (pp. 92–119). Alternation African Scholarship Book Series, Volume #02. Durban: CSSALL Publishers (Pty) Ltd. <https://doi.org/10.29086/978-0-9869936-1-9/2020/AASBS02>

Academic success rates for 2020

In 2020, 25 551 undergraduate students and 3 911 postgraduate students were enrolled at Nelson Mandela University. Of these, 7 052 graduated in 2020 compared to 6 947 in 2019. "The success rate of first years was also fantastic at 83%," says Prof Foxcroft. "We were most worried about them as they only had six weeks of lectures before the pandemic hit us."

communication with lecturers and assessment overload, and home and family environments that were not conducive to studying. Thirty-one per cent said that they were not sufficiently prepared to use the technology required for learning online remotely, despite the online preparatory module we developed."

However, students persevered and in time many began to see the benefits of learning with technology. Nonetheless, students missed engaging with classmates and lecturers in class and some developed a sense of academic isolation from working on their own especially when they were learning remotely.

In response, as well as using RADAR (Risk Analysis and Detection to Assist and Retain students) to help monitor students' progress in this changing environment, the University's Communication and Marketing team researched social media to identify trending topics among students. "We used this information to identify hotspots and challenges and intervene before they became major issues," says Prof Foxcroft.

"When students could start returning to campus in batches as we moved through lockdown levels, we had to develop protocols for safe mask-to-mask (M2M) learning and assessment. We studied literature and research papers to develop our protocols and strategies. We also evaluated the learning experience of those who came to campus for M2M sessions. Generally, they adapted very quickly and were able to form peer learning communities where they supported each other.

"There were collective celebrations when I could announce that our success rates increased by 5% in 2020, and we graduated more students in 2020 than in 2019. The success rate of first years was also fantastic at 83%," says Prof Foxcroft. "We were most worried about them as they only had six weeks of lectures before the pandemic hit us.

"In addition," she concludes, "staff and students developed many self-management and independent learning attributes and became more digitally literate, which is essential in the 4IR era and future world of work."

Message from Directors of Research and Innovation

Dr Priscilla Mensah (Research Development), Dr Kwezi Mzilikazi (Research Support & Management) and Dr Nqobile Gumede (Innovation Office)

Our research community had a fruitful and productive year despite the very challenging conditions brought about by the COVID-19 pandemic. One of Nelson Mandela University's long-term strategic priorities is to create and sustain an environment that encourages, supports and rewards a vibrant research, scholarship and innovation culture.

Over the past year the Office of Research Development implemented various initiatives in pursuit of an enabling environment that enhances postgraduate student success and accelerates the career advancement of emerging researchers. Using a combination of internal and external funding, 699 postgraduate research scholarships were taken up by 177 honours, 369 master's and 153 doctoral students at an overall University Council investment of R33.1-million. An additional R15-million of external funding was allocated to the support 71 postdoctoral fellows.

Through the Black Academics Advancement Programme (BAAP), five staff members were funded in 2020 to pursue their doctoral degrees or postdoctoral research. The National Research Fund's (NRF) Thuthuka programme has been funding emerging researchers for over a decade, with 14 grant-holders at the University in 2020. The Nurturing Emerging Scholars Programme (NESP), which was launched in 2019, is currently in its second phase and the University has been allocated four NESP positions, two of which have already been filled. The 2020 New Generation of Academics Programme (nGAP) cohort at Nelson Mandela University consisted of 12 Black academics, of whom seven were women.

With respect to distribution across faculties, Education and Humanities led with three each, followed by Engineering

and Science with two each, while Law and Business and Economic Science had one each. Through the Department of Higher Education and Training's (DHET) University Capacity Development Grant, postgraduate support programmes were presented to academic staff enrolled for higher degrees. These structured programmes offered quarterly one-week modules to help develop sound proposals, literature reviews and data collection methods in the first year, with two follow-up support modules for data collection and analysis. These programmes were complemented by a suite of workshops on a wide range of research and supervision-related topics.

The hard work of our academics, postdoctoral and research fellows, research chairs, entities, research associates and honorary appointees, saw Nelson Mandela University research outputs continuing on an upward trajectory for four years in a row. In part, the Research Publication Management System also increased the efficiency of the submission of the research outputs, contributing to this positive growth. We are pleased to report that all 16 NRF rating applications that were submitted were successful, taking the total number of Mandela NRF-rated researchers to 87. The growth of the number of rated researchers is an area that we are consistently working on, targeting more early career researchers, in collaboration with the Office for Research Development.

“ ... all 16 NRF rating applications that were submitted were successful ... ”



The research and innovation strategy has set a target of adding a minimum of six research chairs in the period 2019 to 2024 (one new research chair per year). We are pleased to report that in 2020, four externally funded research chairs were secured. Notably, these research chairs respond to the University's strategic areas, including revitalisation of the Humanities; Ocean Sciences; and the Nelson Mandela University Medical School. In addition, all the chairs are linked to the Institutional Research Themes. Future endeavours will focus on growing the number of research chairs, with emphasis on externally and industry-funded research chairs. We further congratulate Prof Mike Roberts and Prof Mandy Lombard whose research chair funding has been continued for a

Diverse research fields receive external support

The academic and research community at Nelson Mandela successfully applied for various external grants in diverse fields, for example:

Dr Babalwa Magoqwana of the Centre for Women and Gender Studies, received R800 000 from the National Institute for the Humanities and Social Sciences Catalytic Research Programme for her research "Maternal Legacies of Knowledge: Towards a Woman-Centred Sociology of the Eastern Cape".

Mr Hiten Pramar from eNtsa and his team were awarded R7.9-million (£333 683) by the UK PACT Countries Programme for their project, "STRAPSA – Shifting the Transport Paradigm for South Africa". The project provides technical assistance to facilitate capacity building and knowledge acquisition on electric transportation.

Dr Gavin Rishworth and Prof Janine Adams from the Institute for Coastal Research/Zoology and Botany Departments were awarded R2.2M from UK Research and Innovation's Global Challenge Research Fund, as part of a consortium research project, "Ecosystem Management: Building Resilience and Adaptability to Coastal Climate Change Effects (EMBRACE)".

Prof Mike Roberts, Chair of Ocean Science and Marine Food Security was awarded the Newton Fund Prize for R4.2-million to continue his important work in the Western Indian Ocean (WIO), building research capacity within the region to enhance the WIO countries' ability to make decisions about their environment and food security.



Dr Priscilla Mensah

further five-year cycle.

The Innovation Office executes several programmes and services targeted at both students and staff to encourage innovation and facilitate the translation of research outputs into products and services that have national and/or global societal benefit. In 2020, ten invention disclosures were received, 29 patents proceeded to national phase filing and an income of R2.54-million was generated from intellectual property (IP).

Mandela University's commitment to support innovation and entrepreneurship extends well beyond its own internal environment. Driven by this commitment, the University, through its IP commercialisation vehicle, Innovolve (Pty) Ltd, and in partnership with Engeli Enterprise Development (a private sector business support company) established a joint venture incubator company, the Propella Business Incubator, to provide technology and business development support for innovative ventures. In October 2020, the Propella Business Incubator, in partnership with the Small Enterprise Development Agency, established and opened the Propella Township Hub, which offers customised, fit-for-purpose programmes specifically tailored to suit the needs



Dr Nomakwezi Mzilikazi

of township entrepreneurs. The satellite Propella Township Hub is located at the Neave Industrial Park, near the surrounding townships in Port Elizabeth, and currently supports 44 youth entrepreneurs, 22 female-owned ventures and a consolidated total of 50 Black-owned small, medium and micro enterprises.

Mandela University would like to acknowledge the funding support received from the various funders of innovation and technology



Dr Nqobile Gumede

development during 2020. In particular, we would like to thank the National Intellectual Property Management Office for providing funding that supported the Innovation Office's resource capacity and for co-funding the IP protection expenses incurred by the University.

We commit ourselves to continuously improving our efforts to provide an enabling environment for research and innovation, in service of society.

“We commit ourselves to continuously improving our efforts to provide an enabling environment for research and innovation, in service of society.”



Accelerating the transformation of internationalisation

Beata Mtyingizana, Senior Director: International Office

The strong and long-standing relations that Nelson Mandela University has built over the years with partners in Wuhan City of Hubei province in China gave the University early insight into the havoc that the outbreak of the SARS-CoV-2 virus was wreaking there. As we conveyed messages of support and solidarity to our partners and friends in Wuhan, there was also a realisation that the global spread of the virus was not a matter of 'if' but of 'when'.

The ease and speed with which the virus spread and the magnitude of the turmoil caused by COVID-19 – the disease it generated – necessitated unprecedented global collaborations. Scientists, researchers and higher education institutions worked hand in glove with industry, governments and civil society to respond to the crisis. The most remarkable lesson for the globe was the incredible ability of humanity to work as a single unit for the preservation of life.

Higher education institutions, like many other organisations, were forced to transform overnight. The might of the human force manifested itself in the richness of multidisciplinary research, scientific innovations and technological advances. The world needed to survive, life needed to continue, and so did learning, research and global interaction. Technological innovations carried the world as work, research, teaching and learning took an online turn. Internationalisation was no exception. Digital platforms such as Zoom and Microsoft Teams shrunk the globe, enabling a reimagining of internationalisation. All this changed the meaning of time and distance; it blurred geographic borders, challenged the notion of the 'international' and the 'local' as immigration laws governing the mobility of international students did not govern virtual learning spaces.

For Mandela University, the process of reimagining internationalisation during the time of COVID-19 is premised on the need to drive international collaborations and partnerships that deliver on our unwavering commitment to the co-creation of solutions that can meaningfully change the world. As the global online turn places digitalisation at the centre of international engagements, the embracing of the 'new normal' for the University has translated into a process of envisioning a digitalised internationalisation model of the future.

It is a recognition that the so-called Collaborative Online International Learning (COIL) bridge¹ can be used to connect



Beata Mtyingizana

institutions in every corner of the globe. It becomes a platform through which international engagements can be optimised through advanced communication technologies, where student mobility can be enabled through the Internet of Things, where access to information is enhanced through automation and where connectivity is accelerated through artificial intelligence and networking access.

Of course, the digital transformation of internationalisation is envisioned within the context of a university that bears the responsibility of living up to and aligning its efforts to the distinct iconic ethos of Madiba. Nelson Mandela spent his life advocating for a just and equitable society within which an interconnectedness of humanity embodied the advancement of rights, freedoms and dignity for all. With this in mind, Nelson Mandela University remains fully committed to being in service of society and to delivering life-changing and student-centric educational experiences and opportunities.

This commitment is embodied in the University's introduction of multiple pathways to learning and teaching, which enabled many international students to continue with their studies in their home countries and for those who remained in South Africa to receive all the support they needed. For those international students who remained in the country and were unable to travel due to financial circumstances or COVID restrictions, Mandela University assisted in a variety of ways: providing food parcels to alleviate hunger, extending flexible concessions to ease the financial burden of studying abroad, facilitating the extension of their medical aid coverage and obtaining visa extension authorisation from the Department of Home Affairs. International Office staff ensured a degree of human interaction and safe contact with students, which

was important, as the provision of emotional support helped to alleviate feelings of alienation and isolation.

An article in the University's news bulletin, titled 'Whatever the Nationality, a Mother's Care Knows no Borders', paid tribute to Natasha September, a member of the International Office staff responsible for postgraduate student support, who championed the distribution of food parcels amongst those students badly affected during lockdown. The article highlighted the feeling of warmth that they received from members of the University who reached out to ensure that all Mandela students were treated with dignity and care.

We continue to battle the impact of the COVID-19 pandemic. We are, however, undeterred in our efforts to work collaboratively with the rest of the world to discover new knowledge and produce groundbreaking research that offers solutions to global challenges, responds to the Sustainable Development Goals and channels efforts to connect with Africans on our continent and in the diaspora in order to deliver on the aspirations of the African Union's Agenda 2063: 'The Africa We Want'.

Beata Mtyingizana

Senior Director: International Office

"Nelson Mandela University remains fully committed to being in service of society and to delivering life-changing and student-centric educational experiences and opportunities."



¹ The notion of a COIL bridge emphasises the endless opportunities that can be harvested from several virtual platforms through which the internationalisation of higher education can be advanced including joint programme offerings, collaborative research, conferencing, exchanges and student mobility, amongst others.

Leveraging digital transformation to advance early career researchers in Africa

By Ms Huba Boshoff: Chief Representative Officer and Head: Neso South Africa/ Southern Africa; Dr Priscilla Mensah, Director: Research Development and Dr Samuel Bosire, Chief Information Officer.

Accelerating the career progression of emerging researchers to become leading international scholars is important for achieving the development goals articulated in the African Union's Agenda 2063.

Digital transformation has great potential to enhance the development of a critical mass of researchers at African universities and to help build academic and research communities on the continent, linking them to researchers and institutions in other parts of the world. However, early career academics not only face difficulties in finding time and funding for their research, but also need to adjust to the demands of the increasingly digitalised academic environment, accelerated by the ongoing COVID-19 pandemic.

To spotlight this issue, in 2020 the British Council, in partnership with Nuffic Neso South Africa, commissioned a study to determine the needs of these researchers in terms of digital access, perceptions and levels of engagement. The study comprised a review of published articles and reports, strategic plans and policy documents relating to digitalisation in higher education and research in Africa. This was followed by an electronic survey and focus group discussions with early career researchers in Ghana, Kenya and South Africa on their experiences with digitalisation of research, to establish how digital transformation can be leveraged to create an enabling environment for high quality research.

The literature review revealed the immense role of ICTs and digitalisation in enhancing research and international collaboration, and the potential this has for the advancement of early career researchers. The study found that most of the emerging researchers consulted had to rely on their own computers, tablets or smartphones as their institutions did not provide them with the devices and facilities they needed. This was particularly the case during the COVID-19 pandemic, when access to campus facilities such as offices, libraries and laboratories was limited.

Only 26% of the survey respondents indicated that they had access to devices from the institution to enable them to utilise digital resources and continue with their research projects from home.



Dr Priscilla Mensah

Although most of the researchers were positive about digital transformation at their institutions, some of them indicated that they did not have the necessary skills to fully utilise and benefit from these developments. They were not regularly engaged with these technologies, nor facilitated with supportive environments for their use.

The rapid growth in the use of ICTs and digital technologies has also been accompanied by various risks, emphasising the issue of digital safety and ethics. Most of those consulted reported not having cybersecurity support from their institutions. However, they protected their devices using strong security systems, mostly through their own initiatives.

A key outcome of the study was that digitalisation had created increased flexibility and access to research opportunities. It enabled them to find viable solutions to perennial research challenges such as the high cost of conducting research, especially reaching out to key informants located far away. This highlighted the need to review data collection protocols and processes and align them to the new realities of doing research online and via digital platforms.

The focus group discussions highlighted that moving research work online required development of specific skills for independent work. Participants agreed that a significant number of their peers and postgraduate students were struggling with the shift to online education during the pandemic due to mental health, well-being and emotional challenges. For some participants, working online or via digital platforms seemed to be non-stop, without a break.

They also noted that workdays seemed to be longer, as they were always connected and available online. This lack of boundaries resulted in feelings of being overwhelmed and digital fatigue. In addition, not being able to see colleagues and engage with them in person left a void. Several participants expressed hope that their institutions would do more to create an environment that considers and promotes wellness and well-being alongside digitalisation, both in policy and practice.

Recommendations

The study made the following recommendations:

- Digital transformation needs to be comprehensively integrated into university policies, plans and strategies;
- Institutions need to invest in ICT infrastructure and digital platforms to enhance the quality of teaching and learning and to support early career researchers in their endeavours;
- Provision of comprehensive support, training and development opportunities for all researchers in a rapidly digitalising space is essential in harnessing the opportunities offered through use of technologies; and
- Research on digitalisation in higher education should be prioritised, with specific focus on:
 - Development of hybrid models for in-person and digital research activities;
 - Academic, pedagogical and research use of digital technologies for research;
 - Research approaches for the digital space; and
 - Digital research design and methods.



Huba Boshoff



Dr Samuel Bosire

Awakening the African canon

The systematic erasure of African knowledge has stripped society of values and world views that need to be reawakened through our universities. This is an important undertaking in revitalising the humanities at Mandela University.

The language and the cultural practices of amaXhosa are gradually disappearing because of the Word and the present "light", brought by nations from the West ...

It is the responsibility of the Xhosa youth to consider with extreme care [the question of] when these and the language disappear, and the dignified cultural practices cease to exist, what else will follow?

**S.E. Krune Mqhayi, Preface to *Ityala Lamawele*, 1014
(translated from isiXhosa original)**

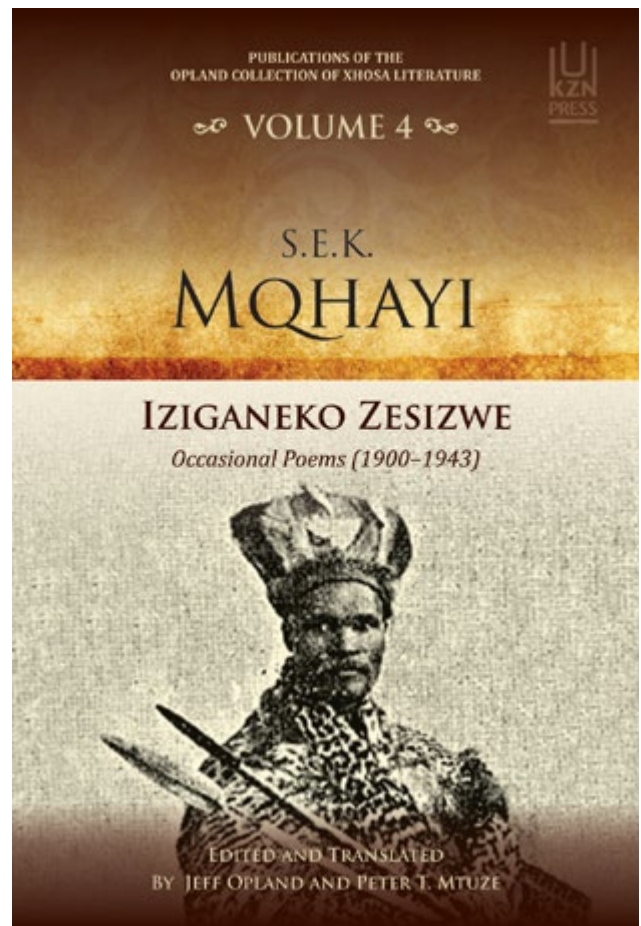
"When talking about coloniality and the role of educational institutions in including African epistemological frameworks in curricula otherwise dominated by Western knowledge frameworks, people tend to link these to contestations about teaching and learning in the 1980s, or to #FeesMustFall or #RhodesMustFall student protests, or to philosophers like Walter Mignolo or Frantz Fanon. These are credible, but what many don't know is that the contestations date back to the 1800s in the Eastern Cape," says Executive Dean of the Faculty of Humanities, Professor Pamela Maseko.

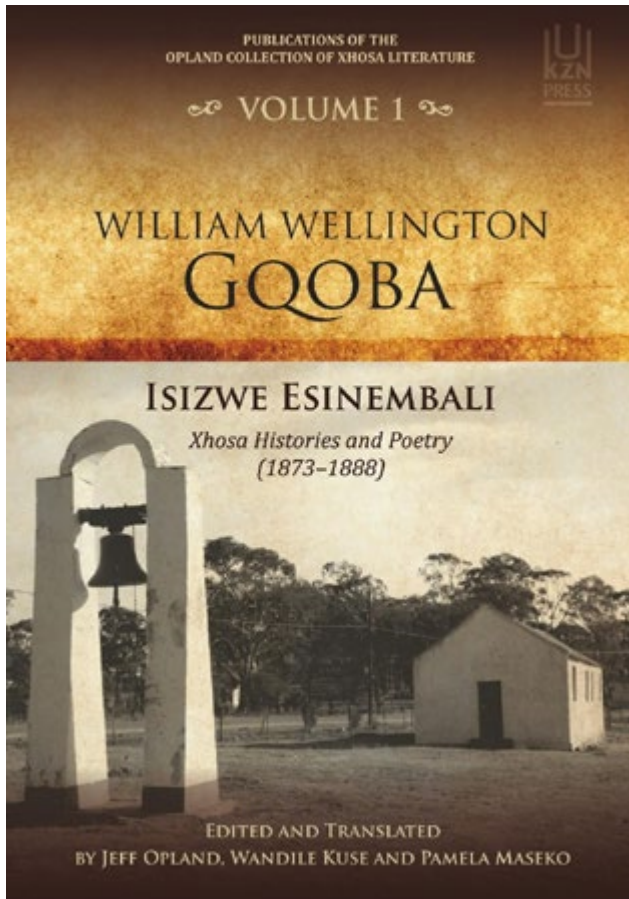
"In January 2021, we started the Curriculum Conversation Series, to challenge the faculty to reflect on practices that inform our scholarship, and start asking critical questions such as: Whose knowledge is privileged in the academy? How do we respond to gendered university spaces? How do we reimagine an Africa-purposed curriculum? It's a process during which, for example, we look at the writings in the late 1800s and 1900s of Mqhayi – one of the early African intellectuals – whose writings in isiXhosa were a form of political and cultural resistance. IsiXhosa was one of the first local languages to be systematically written down, a century before Afrikaans," says Prof Maseko.

With the advent of missionary education in 1823, black women and men in the Eastern Cape started to articulate, in writing, their discomfort with an education that uprooted their knowledge and values and replaced them with Western values. Prof Maseko explains: "These writings from the early black African intellectuals are mostly in isiXhosa, and in newspapers, which they adopted as platforms to contest missionary censorship of indigenous thought

systems, linguistic and cultural values. These archival records are historical data and they are heritage. They are important in presenting an African perspective to African historiography.

"We are focusing on reclaiming these African intellectual histories of the Eastern Cape and arguing for their inclusion in the academic canon. In addition to contributing to the republication of the works of Black South African writers and intellectuals from the 1800s, such as William Wellington Gqoba (1840–1888), Reverend Jonas A. Ntsiko (1860–1915), and Samuel Edward Krune Mqhayi (1875–1945), our aim is to position our university as an archival site for such works, especially from influential *oonozala* (sources of life)





such as Dr Brigalia Bam, who represents the marginalised voices of women in the academy.”

Prof Maseko is currently working with Professor Jeff Opland, co-editing a Literature Series that republishes works from Prof Opland’s private library collection. These include books and works from early newspapers that were historically stored in national libraries, to which black South Africans did not have access, as even libraries were segregated at the height of apartheid. “Jeff had the privilege of accessing them and collected as much as possible in his personal library,” says Prof Maseko. Prof Opland and Prof Maseko have collaborated with African scholars in translating and editing the writings of several early South African intellectuals and have published eight volumes to date.

The original works, especially the newspapers, have not been well preserved and the paper disintegrates when touched, but there

are processes in place to preserve it. “We want Nelson Mandela University and the Faculty of Humanities to position ourselves as a site for archiving the literary legacy of the Eastern Cape,” says Prof Maseko, adding that this would be an invaluable contribution to the revitalisation of the humanities.

“An important part of the archives will be to include the knowledge and historical writings of women. As we know, women have been marginalised for various reasons and their work has not been recognised and archived, compared to that of their male counterparts.”

Prof Maseko explains that it won’t be a traditional archive “where you put things in boxes and people page through the work with gloves on. We want it to be highly interactive, where people can see the physical archive but also have digital interaction with it. It will be linguistically diverse and feature all South Africa’s languages. The original works will have to be well protected against fire and water damage, given the fragility of the materials, as we saw with the fire that consumed the African Studies archive in Cape Town earlier this year.”

The archive will be part of the process of revaluing indigenous knowledge and at the same time revaluing the humanities and social sciences and placing them back at the centre of the academy. As Prof Maseko explains: “It’s the focal point of how we train our students as people who need to understand the origins of knowledge as power, to value themselves, their heritage and the importance of diversity. This is how we nurture graduates who respond in a humane manner to societal problems and challenges.”



Prof Pamela Maseko

“Prof Opland and Prof Maseko have collaborated with African scholars in translating and editing the writings of several early South African intellectuals ... ”



Reconnecting African sociology to the mother

“In the field of sociology, students have always been trained around the fathers of the discipline and we need to connect them to maternal sociological knowledge that was always a distinct feature of the African continent.” – Dr Babalwa Magoqwana.

“We need to re-train ourselves to connect with our matriarchal history, which was always a distinct feature of the African continent,” says Dr Magoqwana, senior lecturer in the Department of Sociology and Anthropology and Interim Director of the Centre for Women and Gender Studies (CWGS), established at Nelson Mandela University in October 2019.

One of the CWGS’s key academic projects is to research and foreground African women’s biographies, intellectual production and political histories. The absence and erasure of these voices is part of a bigger sociology of violence that tends to undermine women’s contributions to development of different societies. It also contributes to bodies of knowledge and university curricula that cannot be decolonised without foregrounding women.

“Why would you study violence in political theory only using the writings of Frantz Fanon when we have works like Ellen Kuzwayo’s *Call Me Woman* and Fatima Meer’s *Race and Suicide in South Africa*? If we are to define life away from patriarchal and discriminatory societies we need to pay attention to how women



Dr Babalwa Magoqwana

are represented in the curriculum and broader production of knowledge. This is why we need ‘balanced’ social science and humanities knowledges,” says Dr Magoqwana.



"The questions we need to ask are: 'What is considered knowledge?', 'How do we know what we know?' and 'Who is the producer of knowledge?' It is through our grandmothers (*ooMakhulu*), our aunts (*ooRagadi*, *ooMakhadzi*) and our mothers that we have shaped our intellectual foundations of knowledge. Through their stories, folktales, stories of origin, reciting of clan names (*iziduko*) our grandmothers have managed to locate our own histories and transfer this oral history, but without recognition."

In 2020, with a R800 000 grant from the National Institute for the Humanities and Social Sciences (NIHSS) Dr Magoqwana was able to continue her project to centre women in the definitions of African sociology by excavating the maternal legacies of knowledge in the Eastern Cape. As part of this work, with Prof Jimi Adesina of Unisa she co-authored "Reconnecting African Sociology to the Mother: Towards a Woman-centred Endogenous Sociology in South Africa", published in the December 2020 issue of *African Sociology*.

"The article's primary focus is the challenges that face African sociology in the 21st Century," Dr Magoqwana explains. "In pivoting around the elder mother, the paper introduced a 'matrifocal' sociological understanding of the discipline, shifting the centralising of 'fathers of the discipline'. The paper explores and integrates the language and values carried by African grandmothers in dealing with sociopolitical and economic challenges of their societies.

"By re-reading of historical texts, gathering oral knowledge from our grandmothers, reading of the arts, rituals, songs, rhymes, poems, proverbs (*amaqhalo*) and idioms (*izaci*) of the isiXhosa-speaking population in the Eastern Cape, we hope to generate an alternative perspective of the Xhosa archive which has mainly been defined by masculine storytelling."

Dr Magoqwana's project draws on the skills of historian, Dr Nomathamsanqa Tisani, those of cultural and indigenous religion expert Dr Nokuzola Mndende, and those of expert in Xhosa literary heritage Prof Pamela Maseko. Its aims are:

- to formulate a multidisciplinary approach in populating and challenging the Xhosa archive in order to give a gender sensitive historical account of Eastern Cape histories;
- to identify, curate and document the literary heritage of the Eastern Cape for the diversification of the Xhosa literary canon;
- to identify, study and archive the ritual speech (*ukuthetha*) that has been used by Xhosa women to challenge and access power in different spaces and times; and
- to establish digital strategies for the intergenerational transfer of women's knowledge systems, including digitisation of the oral archive to include stories of origin (*amabali emvelo*), folktales (*iintsomi*) and myths shared by different generations of women in the region.

"This project hopes to make a catalytic intervention in the fields of sociology, anthropology, African languages, gender studies and literature by centralising the intellectualisation of the Xhosa language while centring African women's everyday ways of knowing," says Dr Magoqwana.

"We have also decided to include my MA student Nomtha Menye's research on indigenous environmentalism, as many indigenous societies tend to link culture and nature in defining their knowledge cosmologies. Water, for example, is sacred, as are totem animals associated with clan names. The work of eco-feminists in Africa and the Global South emphasises that if we want to restore our relationship with the planet and the environment we need to go back to Mother Nature; we need to revisit the feminine principles of nature, and how to value the natural environment, because it is so much a part of who we are."

"Why would you study violence in political theory only using the writings of Frantz Fanon when we have works like Ellen Kuzwayo's *Call Me Woman* and Fatima Meer's *Race and Suicide in South Africa*?"



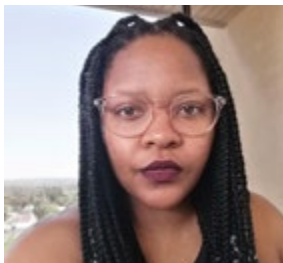
#Activist connexions in the CWGS

Students and postgraduates at Nelson Mandela University play a central role in the CWGS, advocating for the advancement of gender equality and anti-gender-based violence in higher education and society. Three of the student drivers in the CWGS are featured here.

Nangamso Nxumalo

Final year BCom Law, Nelson Mandela University and Operations Intern, DHL Express sub-Saharan Africa

I am interested in the economics of gender, in particular women and class. I draw on economic and legal analysis tools to research how women in the informal sector organise themselves, and how the developmental objectives of urban and rural women in the



Eastern Cape, and across the African continent, differ in terms of the communities in which they live. Ultimately, I want to use my degree(s) to contribute to policy that is appropriate to the informal sector, as this is where the majority of people in our country are situated.

Nomtha Menye

Sociology Master's student, Nelson Mandela University



My master's thesis is grounded in exploring the spiritual significance of water amongst the amaXhosa. I was born and bred in the Eastern Cape province, and at least once a year we used sea water and sacred rivers such as the *Isinuka* springs in Port St Johns as sites

of *Intlambuluko* (spiritually cleansing). South African historian, academic and educator Dr Nomathamsanqa Tisani explains in her work how this process is performed with the intention of healing the body and making whole the inner person.

I believe the traumatic experiences of women in this country need interventions that go beyond theories: practical interventions that are grounded in the ethnographical study of the Eastern Cape girl child. Research must start at home with the people at home.

Nobubele Phuza

Sociology PhD student, Nelson Mandela University

My doctoral study focuses on the mechanism and architecture of protests related to gender and sexual justice in South African universities. It traces the divergence of #RURenewal, #RapeAtAzania and #IAmOneInThree, as the most notable components of the #EndRapeCulture campaign, from the historical Silent Protest, motherist movements and androcentric #FeesMustFall movement. I want women's resistance to be taken seriously, on the ground and in the academic field.



Like every other woman, I feel suffocated by the requirements of conformity to socially acceptable femininity. I am glad to have spaces like the sports field which allow me to walk that line of athleticism which is neither masculine nor feminine. It would be great to have that feeling spill over into everyday life.

The Centre for Women and Gender Studies – Women's Power and Leadership in Society

"The CWGS' mandate is to resuscitate all African women's voices and histories – workers, rural women, women in business, politics, the arts ..." says Dr Magoqwana.

"We are partnering with other universities in the Eastern Cape, such as Rhodes University, in talking about women's liberation histories and popularism; how women in the liberation struggle were more than mothers and wives – they were essential to the revolution.

"Throughout the pandemic we have hosted weekly seminars, with presentations from scholars all over the world," says Dr Magoqwana. "We've featured more than 32 gender scholars and many postgraduates. The virtual space has given the CWGS the opportunity to increase dramatically and we adapted quickly. To actively collaborate globally is one of the most beautiful moments for us in this tragic time. We have literally experienced the centre going global."

The CWGS is currently working on a book on African women's intellectual histories co-edited with Rhodes

University's Dr Siphokazi Magadla and the University of Cape Town's Dr Athambile Masola. Due for publication in 2022, the book explores the voices of women in all spheres – from pop icon and activist Brenda Fassie to intellectual activist Charlotte Maxeke.

The CWGS is also exploring what it means to be 'Queer in Africa', based on the work of Professor Zethu Matebeni, the centre's first visiting professor, and DSI-NRF Research Chair in Genders and Sexualities at the University of Fort Hare. Her research focuses on gender and sexuality, and specifically, Black lesbian lives, LGBTQ rights and queer issues.

150 years of Charlotte Maxeke

In May 2021, a month-long programme celebrated 150 years of Charlotte Maxeke (7 April 1871–16 October 1939). Maxeke was the first Black South African woman to graduate with a university degree and remains a key historical figure as a female South African political leader. Her life and struggles epitomised women's struggles against the deprivation of basic human rights such as dignity, happiness, education, employment opportunities and property ownership.

"We've featured more than 32 gender scholars and many postgraduates. The virtual space has given the CWGS the opportunity to increase dramatically and we adapted quickly."



Africa's oceans offer the world cultural and heritage riches

As South Africa embarks on its oceans economy plans, it is essential that it includes social science-led research on human cultural and heritage contributions to ocean conservation and development.

"Given the history of South Africa and the continent as a whole, it is critical that vulnerable coastal and indigenous people's voices are heard and included in important decision-making processes within the ocean economy, and the Chair seeks to foreground this," says Professor Rose Boswell, holder of the SARCHI Chair in Ocean Cultures and Heritage. This bilateral chair between the DSI/NRF and Nelson Mandela University was officially launched on 8 July 2021.

In terms of its global responsibilities, South Africa is signatory to the UN Declaration on the Rights of Indigenous Peoples and the UN World Heritage Convention. Consequently, Prof Boswell

maintains, the state has an obligation to adequately conserve and manage both tangible and intangible heritages.

In a recently published article, "Including the Khoisan for a more inclusive Blue Economy in South Africa", co-authored with Dr Jessica Thornton, Prof Boswell discusses "the extent to which the current national government approach to the oceans is largely economic in its focus – looking at the ocean as an economic asset rather than an asset enjoyed by a wide range of stakeholders".

Continently, in the Chair's words, "the research is aligned with Africa Agenda 63, specifically the desire for Africa to be a more



Healer-Diviner in Tsitsikamma Storms River Village



Prof Rose Boswell

cohesive continent that recognises and draws on its cultural riches. The project emphasises the importance of Africa leveraging culture for sustainable human development, including ocean development. The conservation of cultural heritage can foreground the riches – the cultural ‘gifts’ passed from one generation to the next; songs, poetry, folklore, rituals, values, wisdom, artisanal livelihoods, learning and languages that Africa can offer the world.”

She says, “As the Chair, we are growing our national and global partnerships to explore, research and document ocean cultures and heritage in South Africa, Mozambique, Tanzania, Kenya and Namibia, with several postgraduate and postdoctoral researchers exploring different aspects of ocean culture and heritage and the necessity of including this dimension in ocean management.

“In Mozambique, for example, we are interested in researching illicit ocean economies and their impacts on social cohesion and culture in Mozambique. We are also looking at underwater cultural

Tangible, Intangible & Marine Heritage Sites

Heritage conservation remains largely focused on tangible heritage in the Global North. While there are more than 1000 World Heritage Sites on UNESCO’s World Heritage List, Africa has only 145 of these and three can be considered World Marine Heritage Sites. These are the iSimangaliso Wetland Park in South Africa, Banc d’Arguin in Mauritania and the Sanganeb Marine National Park and Dungonab Bay – Mukkawar Island Marine National Park in Sudan.

Marine heritage refers to the valued natural biodiversity of South Africa’s oceans and coasts.

Maritime heritage refers to the tangible artefacts associated with the nation’s naval and oceanic history.

Marine intangible cultural heritage consists of valued orature, rituals, beliefs and practices associated with the oceans and coasts.

heritage – shipwrecks and other tangible material found under the sea, such as sculptures that signify historic cultural heritage. Research is also being done on the impact of ocean mining on underwater cultural heritage. Meanwhile, in Tanzania, we are focusing on ocean rituals and tangible heritage site management in coastal communities, notably Stone Town in Zanzibar – a World Heritage Site.

“In Kenya we are working with the Institute for Anthropology in Nairobi, as well as independent researchers, researching issues of cultural heritage and the social impact of port development in Kenya, notably on Lamu Island. Lamu has an extraordinary

“ ... it is critical that vulnerable coastal and indigenous people’s voices are heard and included in important decision-making processes within the ocean economy ... ”





Nelson Mandela University Researchers funded by UKRI One Ocean Hub, and led by Prof Boswell. From left: Dr Jessica Thornton, Ryan Pillay and Qawekazi Maqabuka (social science researchers), Senzo Xulu, Francois du Plessis (filmmakers and photographers) and Thomas Terblanche (historian).

history in terms of seafaring trade and the Swahili culture. The deep-water port and other challenges such as pirates, are also impacting the livelihoods of small-scale fishers and local communities.

"In Namibia we are investigating the impact of the development of the oceans economy on small-scale fishers and coastal dwellers. While in South Africa we are researching local communities' engagement with the sea in areas such as the Wild Coast. Then there is research into port management, port efficiency and corruption and how this might produce particular outcomes for ocean management.

"Also in South Africa, over the past two years a group of researchers has focused on assessing Tsitsikamma's intangible cultural heritage, and has unearthed indigenous and longstanding

community engagement with the ocean. This contributes to a deeper understanding of coastal management and development. The project also serves to advance the research and project management skills of emerging researchers at Mandela University." This research is funded by the One Ocean Hub-funded UK Research and Innovation (UKRI) through the Global Challenges Research Fund (GCRF). It includes a consortia of research partners in South Africa, Namibia, Ghana and Fiji.

Prof Boswell is currently collaborating with colleagues in Ghana and Strathclyde, UK, to publish on the intersection of intangible cultural heritage and sea-based livelihoods. The Ghanaian colleagues are doing ethnographic research along Ghana's Cape Coast, including research on the canoe building and artisanal fishers there and the impact of major commercial fishers on their livelihoods.

" ... there is research into port management, port efficiency and corruption and how this might produce particular outcomes for ocean management."



Exploring the music of the Khoisan

In April 2020, Professor Alethea de Villiers, head of department in the Department of Music and Performing Arts was announced as one of five recipients of a prestigious international music education research grant.

Since joining the University in 2012, Prof de Villiers has been a member of the International Society of Music Education (ISME), affiliated with the International Music Council and the United Nations Educational, Scientific and Cultural Organization.

Prof de Villiers's research interests are music education policy, multicultural education and democratic citizenship. Her recently published article, "(Re) organizing the music curriculum as multicultural music education" in the *International Journal of Music Education* triggered Prof de Villiers's realisation that little

is being said about the people who call themselves South Africa's first nations – the Khoisan – in the music curriculum.

As a result, she responded to a call from ISME-SEMPRE (Society for Education, Music and Psychology Research) for applications to fund research on the music culture of first nations. Her successful proposal was awarded \$3000 (approximately R42 000) for a research project titled, "Rewriting the decolonising and indigenising narrative: A South African case study".

Prof de Villiers explains: "The indigenising project is looking at how music from the culture of all the South African people can be incorporated into the curriculum. And while I've been reading on this journey, it's almost been like being on a treasure hunt. You don't find all the information in one place because some of the people have died and there are also very few people who even speak these indigenous languages. So we cannot recreate what happened before because there isn't a generation passing something on to the next generation.

"But I discovered the Khoisan revivalist movement, so I am now speaking to revivalists, who like myself, are wanting to reclaim and learn about all of their ancestry. This research is almost saying 'what happened in the past?' and what can we include today to make it topical and also for people to be interested in it."

In her research Prof De Villiers says she has found that there is very little evidence of the music itself because when people started writing it there were no recordings. There are fragments of the music that exist and some



Prof Alethea de Villiers

instruments that existed in the past. She is, however, trying to weave something around what she has discovered.

"I find it so interesting because there are so many facets. There are musical instruments that one can recreate and there are people who look at the description of an instrument and actually make it using the kind of material and methods that people would have used in the past. I have somebody making such instruments."

She says, for example, that she has had two different types of musical bow made for her, one with a resonator and the other without one. She also has Springbok horns and leg rattles.

"I am using those as part of the research. To sing the music or perform the music in a group, one has to try and use traditional instruments to get the sound as it might have been," she says.

In July 2022, Prof De Villiers will present the findings of her research at the 35th ISME World Conference in Brisbane, Australia.

On the organisation's website, ISME president, Professor Achieng' Akuno, writes, "The conference theme, *A Visible Voice*, is a timely reminder of music's role in strengthening our aspirations and meeting our need for identity, affirmation and validation as individuals and communities. These fundamental needs unite our humanity and urge us to respect our differences. The conference theme encourages opportunities for dialogue and international collaborations and excursions into worlds that we know not, through music education scholarship and practice."

Echoing this, Prof de Villiers says: "The people I have interviewed for my research feel that they are getting a voice, they are being validated and they appreciate the efforts to actually be recognised".

"The indigenising project is looking at how music from the culture of all the South African people can be incorporated into the curriculum."



isiXhosa students publish poetry anthology

In a first for the isiXhosa section of the Department of Language and Literature, a prescribed coursework for third year students has been turned into a published anthology of isiXhosa poems.

Associate professor in the department, Dr Linda Kwatsha, who lectures third-year students of isiXhosa poetry and creative writing, says that part of the module requires students to write four poems, two of which have to be recorded into the spoken word.

Dr Kwatsha says she was impressed by the maturity and the creative level with which the students of the class of 2020 wrote their poems; she was convinced that it would be an injustice to allow the material to only end up in the portfolios. When she asked if any of them would be interested in writing for publication, 34 students put up their hands.

“So I took it upon myself to look for a publisher, because these students have a gift of creativity when it comes to poetry. I was

overjoyed when I saw their work. At Nelson Mandela University, students only start studying poetry at third-year level, and for them to have produced such quality work showed that they were able to grasp whatever I taught them,” explains Dr Kwatsha.

It was not difficult for her to find a publisher as she already had a working relationship with Limpopo-based Seulaula Publishers, who welcomed the idea and worked with the students in producing *Umphanda Wolwazi*, which means “barrel of knowledge”.

The students came up with the title and cover of the book, which was edited by Dr Kwatsha and Zandile Kondowe. Published in April this year, the anthology contains 82 poems, covering topics from COVID-19, Gender Based Violence to motherhood and womanhood.



In the foreward, the students write that the poems seek to demonstrate the “difficult times” the country finds itself in and also the conditions under which some people are living. It reads:

“Izinto ekubongwa ngazo zizinto esiphila nazo nezinto ezithe zavela zantsha ezimpilweni zethu. Lonto ithi yavusa umnyele kuthi babhali asakwazi ukuthula sagxeka, sancoma ezo zinto zithe zashiya amehlo ethu. Le mibongo ibhalwe ngenjongo yokufundisa uluntu nokuzama ukugcina ulwimi lwenkobe luhlale luhleli.

(These poems are based on things that we are living with and things that are new in our lives. Those things invoked something in us as writers and we could not keep quiet, we criticised and praised the things that shocked us. We have written these poems to educate people and to also keep our indigenous language alive).“

Dr Kwatsha says that what also impressed her about the poems was that all the students have a unique and authentic voice. “Several students wrote poems about the coronavirus, and yet the voices are different. They approach the same thing but in a different way. And then the choice of words, the choice of figurative speech to show some elements about COVID-19 – you find that they show the same thing but using different symbols. It makes for such a beautiful read.”

Dr Kwatsha says the book is “powerful” and that it can be used at any level. For example, she is using it in her honours class, where students are analysing the poems. She also hopes that the book

can be part of the school curriculum and believes that it can go a long way in motivating isiXhosa speaking learners to take pride in their language, especially on learning that the book has been produced by university students.

“I am also going to write an article about COVID-19, taken from those poems, because it is not only one poem that is about the pandemic, it is more than five of them. So, I will be able to extract ideas from this poem, from that poem and that poem and come up with a fully fledged article that can be published in an academic journal,” she says.

Dr Kwatsha says she has been getting emails from other students at the University wanting to know how they can get their work published. These are students who are not studying isiXhosa but can write and have an interest in having their work published. Because of these enquiries, she plans to extend the next project to the entire university community to afford everyone the opportunity to write and be published.

“isiXhosa cannot be allowed to die,” says Dr Kwatsha. She believes the language can be elevated from school level by having learners compete in storytelling, debate and writing poems. “It is so sad that we have to work hard for the recognition of isiXhosa but if needs be we have to make sure that our writers don’t write books that end up collecting dust on shelves because no-one is buying them,” she concludes.

The book sells for R220 and those wanting to purchase a copy can contact Ncedo Nikelo, one of the authors, on s2200099015@mandela.ac.za

“It is so sad that we have to work hard for the recognition of isiXhosa but if needs be we have to make sure that our writers don’t write books that end up collecting dust on shelves because no-one is buying them.”



The identity crisis we are experiencing today

African traditional religion activist, Professor Nokuzola Mndende, has joined Nelson Mandela University's Department of Sociology and Anthropology as an Adjunct Professor.

"My focus is to restore traditional African culture so that our young people are able to engage the world from a point of identity," says Prof Mndende, a qualified diviner or spirit medium (*igqirha*) with a PhD in African Traditional Religion and an extensive career in the areas of African culture, feminist and womanist theology, African spirituality, and indigenous knowledge systems.

"When we achieved our democracy we all agreed on freedom of religion, multilingualism and equality. As an African liberation theologian, I introduced the acceptance of African traditional religion or inkolo yeSintu (indigenous practices) as a religion in its own right, like all the others, as previously it had been interpreted the colonial way as an exclusive practice or culture of the diviners.

"In addition to this, the literature about African traditional religion is still predominantly written by academics who are not practitioners of the religion and who tend to use Christianity as a point of departure, and so, as a result, the religion on paper is not what the people are actually practising."

In African traditional religion, Prof Mndende explains, "we believe in the Creator and we communicate with the Creator through our ancestors, performing rituals using natural objects." The religion embraces language, beliefs, spirituality, ritual practices, history of events and naming identity. "Naming represents your identity and when the missionaries, colonisers and early anthropologists arrived, they introduced names that were easier for them to pronounce. At school you would get a Christian name – like Nelson instead of Rholihlahla, which is what his father called him.

"Another key issue is that historically we didn't have surnames, as we were clan based and used our clan name, but when the colonisers arrived they wanted to record us and they told us that we must come up with one name as a surname. So the amaXhosa used the personal name of their immediate grandfather or great grandfather as their surname, but your surname is not as important as your clan name. Mandela, for example is from the Madiba clan. The amaZulu, on the other hand, used their clan name, so if your surname is Zuma or Mkhize, that is your clan name."

Naming is all about identity and decolonising our minds, she continues, "When we invoke the ancestors in African traditional

spirituality, if we invoke them by their Christian or Jewish names who are we invoking? Another important issue is that when there are rituals today people use a lot of alcohol, particularly brandy, but this is not historical. How can you talk to your ancestors when you are drunk? *Amasi* was traditionally used in our rituals and subsequently *umqombothi*. Now people are using brandy as if it is tradition, but it is not, and these things are destroying us."

Prof Mndende says this is all part of the identity crisis that people are experiencing today. "Our young people have major problems because we are doing things the wrong way and if you propose the right way you are labelled as being archaic and not dynamic, and we are emphasising that liquor does not make you dynamic."



Professor Nokuzola Mndende

Another major area of misinterpretation, she says, is the assertion that it's taboo for women to discuss anything to do with male initiation as a rite of passage. "I wrote a paper about this. Women are traditionally there all the way, with the exception of the first week of the initiation period that is for males only. After this ritual of *umojiso*, girls do visit the initiation lodge but not for intimacy; even food is brought by the girl who is cooking for the initiate. So the initiation period as it is today is not our culture, it is made up by men and colonialism.

"There is so much confusion," says Prof Mndende. "People have one foot in Christianity and another foot in African religion and call themselves African Christians. It is their right and freedom of belief but they cannot represent African traditional religion. You can't talk to your ancestors on Friday and sacrifice an animal to them, and then on Sunday in church you have no relationship with the dead and Jesus is your saviour. We also have African traditional diviners singing Christian songs. To be a diviner is a call from your ancestors to heal. Then there are people from other religions who call African traditional religion the Antichrist. We need to clarify the confusion, address the stereotypes and move forward."

Adjunct Professors are awarded the honorary title in accordance with the institutional policy of conferring Honorary, Emeritus, Ad Personam, Visiting and Adjunct (HEAVA) professorial titles.

Dr Babalwa Magoqwana, department head of Sociology and Anthropology describes Prof Mndende as "a living archive of African knowledge. Her experience and scholarship significantly contribute to the intellectualisation of African knowledge systems, including African languages, while revitalising the humanities at Mandela University."

"We need to clarify the confusion, address the stereotypes and move forward."



Shifting how we think about gender power

The SARCHI Chair in African Feminist Imaginations is all about shifting how we think about gender power and women's contributions in the world.

"The Chair's work includes generating research on the archive of African women's intellectual and political work as key thinkers, theorists and figures in the liberation struggle, decoloniality and transformation," says Professor Pumla Dineo Gqola who took up her appointment with the Centre for Women and Gender Studies in May 2020. The Chair was officially launched on 5 June 2021.

The Chair is called 'Imaginations' because, as a professor of literature, Gqola is interested in how the creative genres and popular culture are sites of knowledge production and how they nurture ideas that are disruptive of patriarchal culture.

The Chair has collaborations with colleagues throughout South Africa, the continent and globe, such as the GendV Project based at Cambridge University in the UK.

The first book to come out of the Chair is Prof Gqola's, *Miriam Tlali, Writing Freedom*, about the novelist, playwright, author and activist against apartheid and patriarchy. In 1975, Tlali became the first black woman in South Africa to publish a novel in English, titled *Muriel at the Metropolitan*.

Gqola's next book, *Female Fear Factory*, published in June 2021, sets out to understand rape and rape culture, as she explains: "I came up with the concept of 'the female fear factory' as a way of describing how patriarchy uses fear to keep women controlled. Fear is a very important mechanism through which women and sexual minorities are socialised. We are conditioned to fear rape and to think about rape as a possibility or inevitability. We modify our behaviour to try and avoid being raped or assaulted but we know we cannot completely avoid it."

She uses the term "factory" because fear is an ongoing production in relation to rape, homophobic violence, femicide and policing. South Africa has one of the highest murder rates in the world, and a femicide rate that is more than five times the world average. Gqola explains that fear is pervasive and intrudes into the everyday lives of women worldwide.

"My argument as a feminist is that we have to undo fear because we can never undo rape culture without addressing the fear. So we

need to draw on our courage and hope, and continuously work to undo situations that instil fear, big and small. We need to keep opening the cracks until it collapses."

She offers the example of young women being harassed by men. "We see this happening in public all the time and we need to stop minding our own business. We need to scream at the men to stop doing this. We need our assailants and oppressors to know that women will not put up with this behaviour."



Prof Pumla Dineo Gqola

Exciting cohort of postdocs and postgrads

The Chair is attracting an exciting cohort of postdocs and postgraduates, for example:

Postdoctoral researcher Dr Viraj Suparsad is a film studies scholar interested in looking comparatively at how femininity and masculinity are portrayed in popular feature films from the Global South, notably films produced in African locations and films produced in south Asian locations. He analyses how independent film makers in southern and west Africa compare to Nollywood and Bollywood.

PhD student Aphiwe Ntlemetza's work is around cultures of violence (sexual harassment, rape, coercion, grooming) and gender based violence at different public higher education institutions, and how to dismantle them.

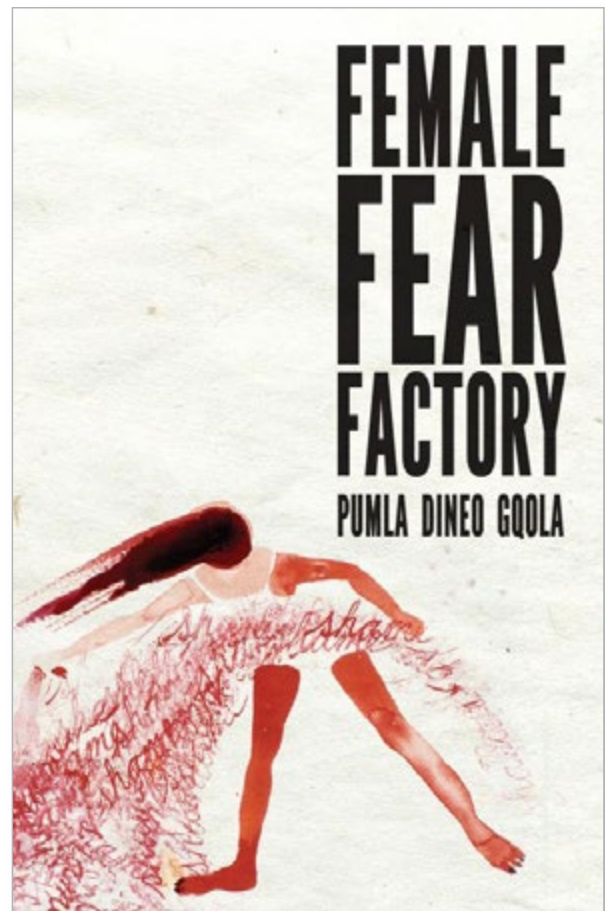
Master's student Khanyisa Sitoto is looking at women's arts and crafts projects in the rural Eastern Cape and how to read these as both spaces of artistic practice and economic productive processes that tell us about how women negotiate their position in gender societies.

PhD student Boitumelo Mampane is working on masculinities and femininities in television series, particularly soap operas, to see how different scripts of gender and of masculinities and femininities circulate in society in creative genres as cultural and generative sites of the larger South African gendered landscape. How they not only reflect attitudes towards gender – they also create them.

"We need to keep up the #TotalShutDown and #AmiNext campaigns against rape and murder of women in this country so that gender based violence is not treated as an event but as the pandemic that it is."

Gqola says despite the ongoing pandemic of violence, there is some hope. "We are starting to see a shift in consciousness and we are seeing women's capacity to work together across party political, race, culture and age lines. We are seeing this happening in South Africa and worldwide.

"Some of the successes are clear, we are seeing predators being fired and sent to jail; we are seeing some clear institutional change. In El Salvador, for example, for the first time they now have gender specialist judge-only courts dealing specifically with sexual violence and femicide."



First of its kind in Africa

New electron detector technology can study the dynamic behaviour of materials at the atomic scale in a fraction of the time.

The first big thing several years ago was the aberration-corrected Transmission Electron Microscope (ac-TEM) used by local and international scientists to investigate the tiniest components in materials, such as atoms.

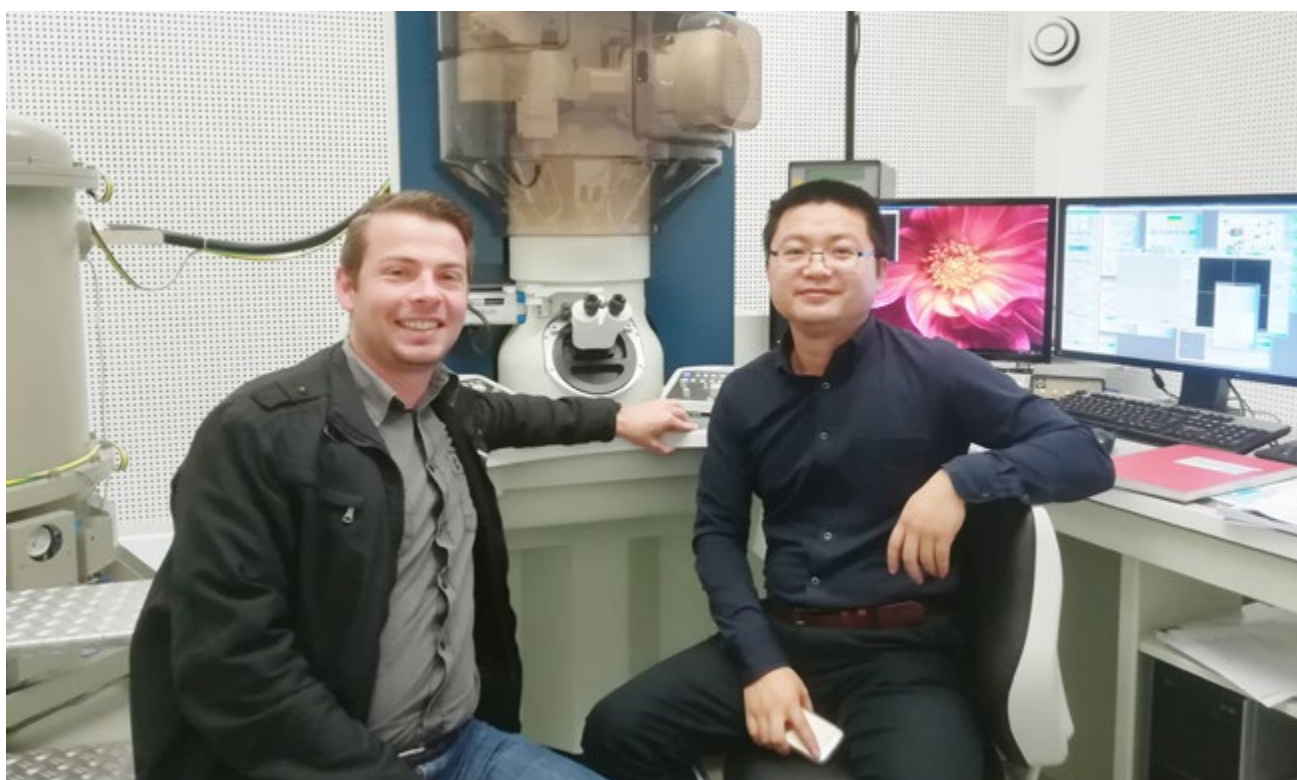
"The next big thing is direct electron detector technology that enables you to study, dynamically in a microscope, the behaviour of material components subjected to environmental stimuli, such as heating," says Dr Jaco Olivier, chief scientist, electron microscopist and postgraduate supervisor in the Centre for High Resolution Transmission Electron Microscopy (CHRTEM), Department of Physics.

"It gives you a correlated view of the material behaviour at the microscopic scale, exponentially speeding up the research process from a few weeks or months to a few hours or one week at most, depending on what you are investigating."

The CHRTEM recently acquired one of the world's best direct electron detectors, the Merlin for EM Hybrid Pixel Detector – in partnership with the NRF's National Equipment Programme (NEP). The NEP contributed two-thirds of the more than R6.6-million cost of the system, while Mandela University contributed the remaining third.

"It's the first of its kind in South Africa and Africa and it will further enhance the CHRTEM and Mandela University's standing as one of the world's leading electron microscopy research facilities, working at the same level as the best international laboratories," says Dr Olivier.

As a government-funded, national facility, the CHRTEM provides consultation and expert support in electron microscopy to scientists, postgraduates, and collaborative scientific projects in South Africa and globally. It has close ties with industry and does a lot of work with Eskom, Sasol, Hulammin and Element Six.



Dr Jaco Olivier testing out the new detector system in Stuttgart Germany in 2019, with research associate, Dr Yi Wang



CHRTEM building

Dr Olivier has worked with electron detector technology in the UK and Germany where it has been available for a few years. "I've been motivating for South Africa to invest in it as there is a huge demand here and internationally for this research. The new system, which includes a detector, holder and camera, is an upgrade in the technology of our aberration-corrected transmission electron microscope, which is still excellent and world-class but is getting older. The upgrade allows us to remain cutting edge."

Whereas previous cameras converted incident electrons to light to produce images, the UK-manufactured Merlin for EM detector can detect electrons directly, greatly improving sensitivity, without background noise. This produces a significantly improved signal and the speed with which it provides results is a dramatic enhancement.



Merlin camera

The pandemic delayed the arrival of the system, but it is finally here and there is huge excitement at the CHRTEM as Dr Olivier and the CHRTEM team set it up and start testing it.



Double aberration corrected transmission electron microscope

Centre a Critical Research Hub

"My main role as scientist at CHRTEM is overseeing research and the operation of our aberration-corrected Transmission Electron Microscope (ac-TEM)," explains Dr Jaco Olivier, chief scientist, electron microscopist and postgraduate supervisor in the Centre for High Resolution Transmission Electron Microscopy (CHRTEM), Department of Physics. "I also supervise PhD students at Mandela University and nationally, and provide support to all the students who use the facility."

The Centre published 30 articles in 2020 in a variety of material science and physics journals, all internationally peer-reviewed. One of these was an article by Dr Olivier in the Journal of Nuclear Materials on nanostructural characterisation of materials working on the study of fission product transport in TRI-structural ISOtropic (TRISO) particle fuel (a robust nuclear fuel) in collaboration with nuclear research facilities in the United States.

TRISO particles are made up of a uranium, carbon and oxygen fuel kernel. The kernel is encapsulated in three layers of carbon- and ceramic-based materials that prevent the release of radioactive fission products. It is far safer than fuel rods because it stops radioactive material from getting out. "There is a worldwide effort

to implement this technology," says Dr Oliver. "China already has a commercial reactor using this technology and the US is actively researching and testing this within a reactor environment. The business case will be determined by complex economics worldwide."

Another paper published in 2020 in Chemical Physics, with then PhD student Bruce Mastoroudes as first author, and Dr Olivier as collaborator (South African Nuclear Energy Corporation, or NECSA) looks at the development of synthesis methods for derived titanates. "These are titanium-based nanosheets that can be used for a variety of applications – in our case we were investigating synthesis for the removal of heavy metal contaminants from water or aqueous solutions," Dr Olivier explains.

"Much of the water from mines and the nuclear industry contains radioactive elements or heavy metals – uranium and palladium – and the titanates can be put into the water to adsorb the radioactive elements or heavy metal, which is then removed from the water when you retrieve the titanates."

This collaborative project between Mandela University, North-West University, and NECSA is also the focus of MSc candidate Aluwani Guga's dissertation.

"The Centre published 30 articles in 2020 in a variety of material science and physics journals, all internationally peer-reviewed."



Novel research conceived at traffic light

Novel research doesn't always need to be big science with expensive programmes and high-profile partners, says marine biologist Professor Nadine Strydom, Department of Zoology.

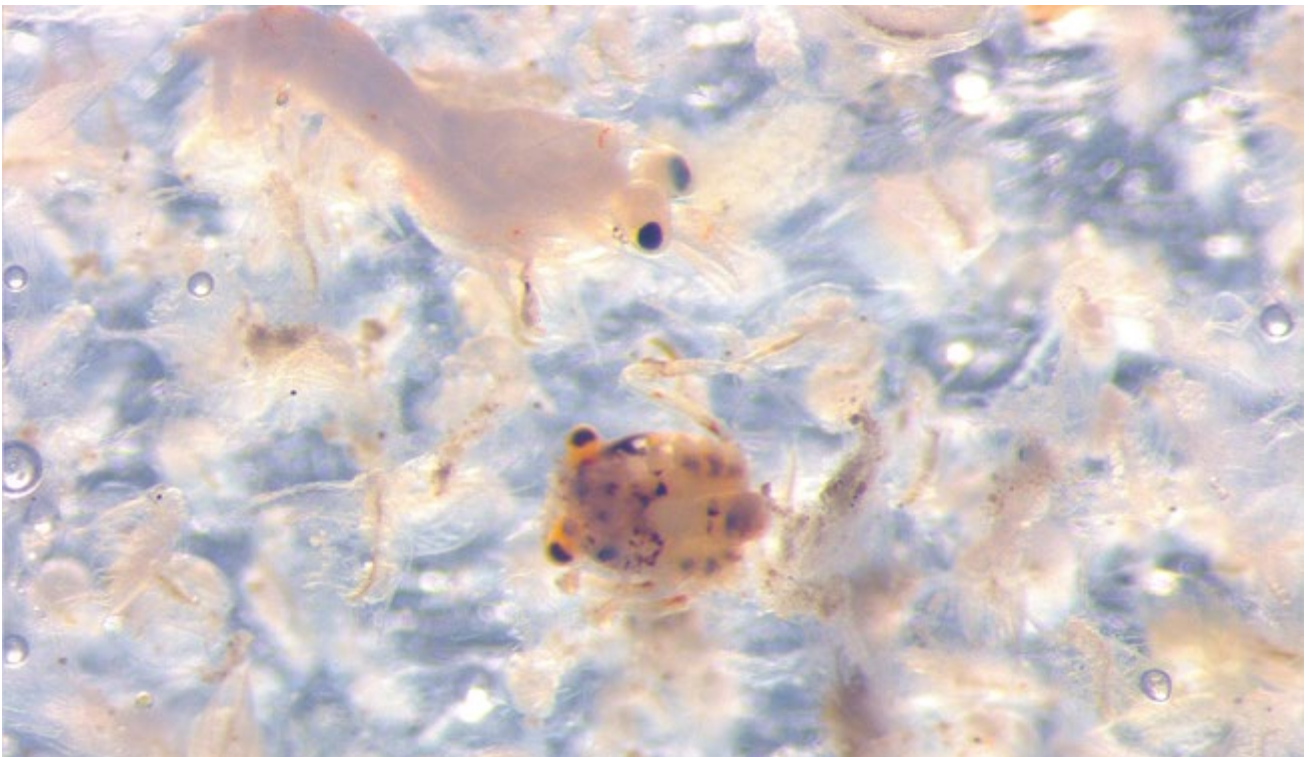
Prof Strydom was in her motor vehicle at a traffic light in Nelson Mandela Bay when she heard the news on radio station Algoa FM about the devastating plastic nurdle spill in the ocean in Durban harbour in October 2017, and how nurdles in their millions were washing onto beaches along the coast. In the programme, citizens were being asked to collect and report on these 3.5mm round plastic pellets (used in the manufacture of plastic products) wherever they found them. The dispersion ultimately extended over 2000km of the South African coastline in a period of eight weeks.

"In that moment I realised we could use this nurdle spill event to run a free dispersal experiment on ocean connectivity between KwaZulu-Natal and the southern Cape coast and apply this to the manner and speed in which fish eggs and larvae of various species

move between the subtropics and temperate waters," says Prof Strydom.

Straight away she called oceanographer Dr Eckart Schumann, at the Department of Geosciences, in the Institute for Coastal and Marine Research, to ask if he would collaborate and model the transport of the nurdles down the coast. Working completely in their favour is that the spill happened in October – the same period in which the fish are spawning in these waters, which presented a unique research moment. Dr Schumann was immediately on board.

"The research cost nothing, just ideas and expertise," says Strydom. It culminated in two papers on this being published in peer-reviewed journals, one in 2019 in the *South African Journal*



Plankton mix



Prof Nadine Strydom

of *Science* titled “Nurdle drifters around South Africa as indicators of ocean structures and dispersion”, and the other in 2020 in *Estuarine, Coastal and Shelf Science*, titled “Nurdle drifters as indicators of egg and early-stage larval fish dispersion and transport on the south-east coast of South Africa”.

Describing the rationale for their research, Prof Strydom says: “Many of our fish species migrate to KwaZulu-Natal to spawn and it has always been a conundrum for scientists about what happens to the eggs and larvae in the Agulhas Current as there is very little information about this.” Over the years, scientists have released drift cards from various places with telephone numbers for citizens along the coast who pick them up to call in the location.

In the *South African Journal of Science* paper the authors write: “Using known oceanographic current structures, satellite imagery, wave data and surface wind drift values of between 5% and 8% of wind speed, good agreement was found between the modelled dispersion and nurdle sightings. In particular, it was found that nurdles remained in specific sections of the coast for long periods, and that sporadic wind events were required to move them into new coastal areas.”

“What we didn’t know is how fast this can happen if the winds are favourable. The timing was confirmed by this free drifter experiment from the pollution spill,” says Prof Strydom.

The modelling showed that anything spawning in Durban harbour could be in the Agulhas Current off Durban within three days if the wind is blowing offshore. Within a week, if the winds turn to onshore, surface water moving from the Agulhas Current can return to shore off the Eastern Cape carrying the fish larvae, which can then swim into estuaries.

In the *Estuarine, Coastal and Shelf Science* article, the authors surmise:



Nurdle spill

“It appears that the transport of eggs and fish larvae run a wind-driven gauntlet of either entrainment in southward edge flow that links to coast nurseries or dispersal via the Agulhas Current core into unfavourable Southern Ocean waters.”

The main migrant species are our most popular angling species, such as spotted grunter, dusky cob, elf/shad and common breams. Other migrants are species like sardine.

As a rule of thumb, only 0.1% of a spawning batch of most fish species will survive to adulthood. There is also excessive fishing in the nursery areas – shallow water areas and estuaries – that are targeted by recreational fishers and anglers.

South Africa is facing a situation where the populations of many of our important coastal fishes have collapsed, meaning there is less than 20% left from what scientists back-calculated as being pristine stock before major fishing took place.

The *African Journal of Aquatic Science* published a paper of Prof Strydom’s in April 2020, titled: “Review of fish life history strategies associated with warm temperate South African estuaries and a call for effective integrative management”.

“There is huge value in establishing Marine Protected Routes in addition to Marine Protected Areas to create a series of corridors to protect the spawning migrations of various fish species, as many are caught during their migrations,” Prof Strydom explains, in reference to her article.

“What we also need to look at is the manner in which various fish species gather before migrating, often in estuaries. The social behaviour of fish has not been taken into consideration with regard to migration and it’s essential. What is also key is that the older the fish get the more eggs they produce – they are the best spawners – and protecting the mature fish is absolutely critical.”

Largest ever southern ocean seabird and marine mammal tracking data project

The largest research project ever undertaken by multiple nations using tracking data of seabirds and mammals over the entire Southern Ocean, calls for conservation areas to be established urgently.

The abstract of a paper published in the journal *Nature* on 18 March 2020 titled “Tracking of marine predators to protect Southern Ocean ecosystems”, reads:

The integration of more than 4000 tracks from 17 bird and mammal species reveals AESs [Areas of Ecological Significance] around sub-Antarctic islands in the Atlantic and Indian Oceans and over the Antarctic continental shelf. Fishing pressure is disproportionately concentrated inside AESs, and climate change over the next century is predicted to impose pressure on these areas, particularly around the Antarctic continent. At present, 7.1% of the ocean south of 40°S is under formal protection.

One of the co-authors, Professor Pierre Pistorius, head of Mandela University’s Marine Apex Predator Research Unit, gives the

background: “For many years we have been deploying tracking instruments on seabirds and marine mammals – small, easily removable GPS or satellite transmitters that we attach either with waterproof tape to birds’ feathers, or with epoxy glue or darts on seals and cetaceans. For this large international study, we only incorporated tracking data from species that have a distribution across the whole Southern Ocean region, such as the wandering albatrosses, macaroni penguins and southern elephant seals.”

“We have been studying the at-sea distribution of these marine predators as they are highly efficient at locating areas of high productivity and rich in food for their survival. These areas are what we call Areas of Ecological Significance. They are productive from the bottom of the food chain to the top, with nutrient enrichment that stimulates phytoplankton growth activity, which leads to zooplankton biomass that moves up the food chain.”



Photo: Chris Oosthuizen



The data reveals that the identification and protection of multiple AESs at ocean scale through the mechanism of multinational Marine Protected Area (MPA) expansion is urgently needed to mitigate the pressure of large-scale resource exploitation on Southern Ocean ecosystems.

"We started using this approach, of using tracking data to identify important habitat for conservation purposes, in 2015, when one of my postdoctoral students at Mandela University, Ryan Reisinger, who is a co-lead author in the *Nature* paper, focused on tracking data from the Prince Edward Islands that make up South Africa's sub-Antarctic territory," Prof Pistorius explains. "We collated all the historical tracking data by various South African researchers for these islands and through modelling we identified important habitats to feed into the South African government's MPA expansion strategy.

"This was then followed up with the global initiative involving multiple nations, where we used tracking data from seabirds and mammals across the entire circumpolar Southern Ocean – across the Indian, Pacific and Atlantic Oceans – in other words, all the water south of 40 degrees. Reisinger led the analysis of all this tracking data."

Hydro-acoustic ship-based surveys can be used to study the distribution of fish and squid biomass, but because of the massive expanse of the Southern Ocean this becomes logistically and financially prohibitive. Using marine predators as indicators of these biologically rich areas is now well recognised as a feasible alternative with such information guiding marine spatial planning initiatives.

The findings from this large international collaboration that were published in *Nature* are intended to inform spatial management across the entire Southern Ocean, to recommend where MPAs should be expanded or new MPAs created in areas of national jurisdiction as well as in the high seas where there is no national jurisdiction. The goal is to maximise biodiversity conservation in areas of ecological importance.

Compliance is a major issue that has to be improved: "Our project is linked to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) which is responsible for the management of the water south of 60 degrees," Pistorius explains.

"CCAMLR is in a strong position to recommend MPAs for multinational management which would help to enforce compliance. The information we have gathered has sent clear guidelines to CCAMLR about the need for these MPAs to ensure the long-term sustainability of marine resources, and to prevent overfishing. Another major challenge we are facing here is that climate change is having a huge impact on Southern Ocean ecosystems. With changing climatic conditions, we are also seeing changes in the distribution of important habitats and these shifts ideally need to be catered for in marine spatial planning initiatives.

"What is encouraging is that the results of our study have attracted massive media coverage globally. There is also strong involvement among the authors of the paper within the Scientific Committee on Antarctic Research, which reports to CCAMLR which – in turn – is well positioned to execute conservation-based management recommendations."



Prof Pierre Pistorius

Sustaining our marine resources through spatial planning

We have to work out how to share our oceans between the mounting number of stakeholders in a manner that values and conserves our rich marine resources.

The year 2020 was an incredibly successful one for Professor Mandy Lombard. She received a Research Excellence award from the Vice Chancellor, was given a B2 NRF rating, her SARChI Chair in Marine Spatial Planning (MSP) was renewed for a further five years, her NRF Communities of Practice grant for MSP in Algoa Bay was also renewed for a further two years, she was awarded the ACEP (African Coelacanth Ecosystem Programme) grant to work in the newly proclaimed uThukela Banks Marine Protected Area, and she was asked by the Nairobi Convention to write the marine spatial planning strategy for the Western Indian Ocean.

"This recognition is very valuable to me; it gives my projects sustainability and my postgraduate students continuity and security," says Prof Lombard.

Over the next five years her goal is to complete her current Chair's projects, make sure the research is written up and published and that all her students graduate and have their papers published.

Prof Lombard explains that the Chair applies a transdisciplinary and trans-institutional systems approach to marine spatial planning, looking at all the different sectors that use or have a stake in Algoa

Urgent protection for our sharks and rays

With funding from the Leonardo DiCaprio Foundation, the SARChI Chair is partnering with WILDOCEANS to campaign for marine protected areas (MPAs) for sharks and rays. These top predators are being decimated by fisheries; if they are wiped out, the whole marine ecosystem is threatened. "We are working to bring about South African legislation to protect them as much as possible," says Prof Lombard. "The project started in August 2020 and ends in April 2022. We will provide recommendations for additional MPAs to add to those in the current portfolio, which make up only 5% of our continental marine area."

" ... the Chair applies a transdisciplinary and trans-institutional systems approach to marine spatial planning, looking at all the different sectors that use or have a stake in Algoa Bay ... "





Students on board the Angra Pequena

Bay – from industry to conservation – and working with them to come up with management recommendations in order to zone areas for different activities.

“We partner with Rhodes University’s Professor Rosemary Dorrington, who holds the SARChI Chair in Marine Natural Products, and we are now working with resource economists, notably ecological and environmental resource economist Professor James Blignaut from the University of Stellenbosch, to value marine ecosystem services.

“There are so many marine ecosystem services, from the obvious one – fisheries – to the phytoplankton that produce oxygen, to marine tourism, including diving and whale watching, to the cultural activities of diverse groups that value the ocean in different ways.

“We are developing a case study in Algoa Bay to show how system dynamics models can be very effectively used in marine spatial planning. A PhD candidate, Estee Vermeulen from the Faculty of Science, focused on the development of these models for the bay; it’s the first time anyone outside of the USA has applied these models specifically to marine spatial planning.”

Unique biodiversity area with prized marine resources

The three year NRF ACEP (African Coelacanth Ecosystem Programme) grant awarded to Prof Lombard through the South African Institute for Aquatic Biodiversity (SAIAB) is for research in the uThukela Marine Protected Area (MPA) between Richards Bay and Durban, proclaimed in 2019.

Prof Lombard explains that the reason for choosing this MPA is because it is located in a highly significant and unique biodiversity area, influenced by powerful physical processes (the Tugela River and the Agulhas Current), prized for natural resources that underpin thriving line fishing activities and support small-scale fishers and rural communities, and for the mineral resources that have attracted significant mining and oil and gas interests.

“We have oceanographers and fish and reef people all working together and collaborating with the South African Wild Trust’s WILDOCEAN programme, in partnership with Oxford University. We have funding for 11 master’s students and we were able to select five suitable candidates, all of whom were black – four women and one man – as equity is an important part of the programme.

“We started this project at the beginning of 2021 and completed our first research cruise off the east coast of South Africa in June this year on WILDOCEAN’s marine research vessel, the *Angra Pequena*. We collected plankton water column samples, as our goal is to establish baseline surveys all the way from plankton to coral to the top predators, such as sharks. This way, we can go back in a few years’ time and assess how everything is looking compared to the baseline studies, and this will give us a good idea whether the MPA is making a difference or what further action is required.

“Of course another important element is to ensure that the MPA is protected from exploitation,” says Prof Lombard, “and we have funding from the Blue Action Fund to help equip the authorities with the personnel and patrol boats to enforce the MPA regulations.”



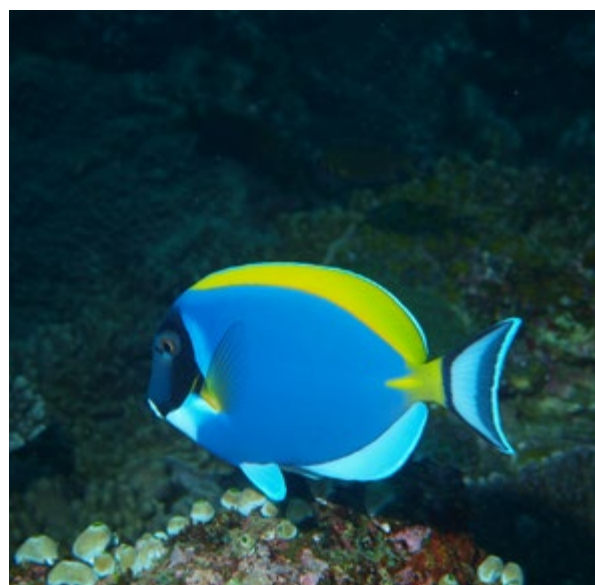
Strategy to address fisheries multi-crimes and piracy

In 2020, the secretariat of United Nations Environment Programme (UNEP) approached Prof Lombard to write a regional marine spatial planning strategy for the Western Indian Ocean (WIO) region – along the east coast of Africa – as part of a team from Mandela University and universities in Australia and the UK.

Ten African countries are signatories to the Nairobi Convention – a partnership between governments, civil society and the private sector, working towards creating a prosperous WIO region, with healthy rivers, coasts and oceans. The signatories are Comoros, France (Réunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa and Tanzania.

The strategy took the team a year to develop, and recommends an ecosystem approach – as opposed to an industry-driven approach – to develop an enabling policy environment for marine spatial planning. This approach would be based on collaboration across geopolitical boundaries, particularly important in dealing with fisheries multi-crimes and piracy, which have a considerable economic impact on countries in this region. Ecosystems first is considered the best practice globally, as the sustainability of the ecosystems is non-negotiable to maintain healthy oceans, healthy communities and sustainable economies.

In November this year, the team's recommendations, based on consultations with all member countries, will be presented to the Nairobi Convention Conference of Parties for endorsement.



From top: 2019 annual Introduction Day tour of the Research Vessel RV Angra Pequena; Lorient Pichegru, Mandy Lombard and Gwen Penry and powder blue surgeon fish.

We have to shock people and governments into facing reality

“It’s imperative to alert the world to the impending disaster in the Western Indian Ocean,” says Professor Mike Roberts, head of the South African Research Chairs Initiative (SARChI) in Ocean Science and Marine Food Security.

“During the past five years of the SARChI Chair in Ocean Science and Marine Food Security we’ve done enough research to expose and determine the seriousness of the impending food security, ecosystem and livelihoods disaster in the Western Indian Ocean (WIO), which extends from South Africa all the way up the east coast of Africa. The WIO is also warming faster than any other part of the global ocean,” says Prof Roberts, whose Chair has been renewed for another five year cycle from the beginning of 2021.

“We are facing the continuous superheating of the WIO – about four degrees Celsius by 2035. Sixty million people in the WIO directly depend on the ocean for food and livelihoods, and fish abundance projections clearly demonstrate that the amount of fish

in the region, as well as species diversity, is rapidly declining as a result of overfishing, ocean warming and pollution.

The Chair’s research in the oceans off the Kenyan and Tanzanian coast reveals that within the next 80 years the commercial fisheries, artisanal fisheries and the biodiversity of marine species will be reduced by about 70%. This scenario applies throughout the tropical WIO which extends from the Mozambique-Tanzanian border to the Red Sea.

“At the same time, populations in the WIO are rapidly rising,” explains Prof Roberts. “In 80 years’ time the current rate of population growth in Mozambique, for example, will increase



Mozambican woman gleaning. Ocean warming directly impacts the livelihoods and food security of communities in the WIO region, who depend on the shallow coral reefs for their food source. Photo: Credit Garth Cripps

from 30 million to 120 million. We are looking at widespread starvation in the WIO by 2035.

"It is the duty of the Chair to shock people and governments into facing the reality of this very serious situation, backed by considerable research. The models we use are instructive of the direction that needs to be taken. They are showing that by 2035 the tropical WIO's marine heatwaves, which would normally last from a few days up to about ten days will extend to anything from two weeks to 12 months, with devastating consequences for the ocean."

These marine heatwaves create a partition, or thermocline, between the warm upper and cold lower layers of the ocean. This suppresses the process by which nutrients that come up from the deep levels of the ocean infuse with the upper layers to produce phytoplankton – a process that is vital for food production across the entire food chain.

Another consequence of extreme ocean warming is coral bleaching, which is increasing so much in the WIO that the coral reefs will be destroyed and all the ecosystems that depend on coral. This directly impacts the livelihoods and food security of artisanal fishers in the WIO region, who depend on the shallow coral reefs for their food source.

"With part of the Newton Prize money we are developing a policy brief to put on the 2021 agenda of the UN World Food Security Committee in order to catalyse planning and action. We probably have about 15 years before things get very serious. It is not a lot of time if you think how slowly things move in terms of politics," says Prof Roberts.

Also with Newton Prize funding, the Chair is currently researching how the oceans are changing off the coast of Mozambique, and the impact of this on the ecosystems and coastal communities. "One of the work packages for this project is to retrieve seven underwater temperature recorders that I deployed here 20 years ago. We have retrieved five; they are still working and have recorded hourly water temperatures. We are busy analysing the data from the recorders but the satellite data already clearly shows the resource-rich Mozambique channel is warming as rapidly as the rest of the WIO. WIO governments and the international community urgently need to collaborate on mitigation measures. Time is running out."

2020 Newton Prize and SARChI Chair renewed

The 2020 Newton Prize worth R4-million was awarded to Professor Mike Roberts. It recognises "teams of people making an essential contribution", in this regard for the SARChI Chair in Ocean Science and Marine Food Security research in the Western Indian Ocean (WIO).

The Chair, renewed for another five years from 2021, is jointly hosted by Nelson Mandela University in Port Elizabeth, the University of Southampton and the Southampton-based National Oceanography Centre in the United Kingdom; all leading marine science research and technology institutions. It is jointly funded by South Africa's Department of Science and Innovation's National Research Foundation (DSI/NRF) and the United Kingdom's Newton Fund, administered by the British Council.

"Finding solutions to address the WIO's problems requires intensive transdisciplinary research. This encompasses research in physical oceanography, biogeochemistry, plankton, trophic ecology, fisheries and food resources, quantified by end-to-end ecosystem and socio-economic modelling," says Prof Roberts. To take this forward, the Chair has established the 'Innovation Bridge and Regional Hub' to build partnerships between institutions in Africa and the Global North to tackle ocean science challenges in the southern hemisphere.

Another of the Chair's key roles is to increase the number of master's and PhD students in ocean sciences throughout Africa. As Prof Roberts says: "Without top researchers you cannot build the research capacity required to innovate Africa's solutions on food security and other ocean challenges and opportunities."

The Chair's research on marine ecosystems in the WIO includes:

Two sites in South Africa:

- The Agulhas Bank chokka/squid fishery. Research will be featured in 23 papers published in a special issue of the international journal *Deep Sea Research* in 2022.
- The eddies and turbulences in the Agulhas current and the impact this has on the Transkei/KZN ecosystems.
- Research off the coast of Madagascar, Kenya, Tanzania and the latest work in Mozambique, investigating ocean changes in the area, and the impact of this on the ecosystems and coastal communities.

Regrettably, as a result of the COVID-19 pandemic, the UK has curtailed its current international development assistance funding. This has worrying implications for the Chair's work in the WIO and for the 'one ocean' approach on which the partnership was founded.



“It is the duty of the Chair to shock people and governments into facing the reality of this very serious situation, backed by considerable research.”



Windows into life's earliest habitat

Living microbialites and stromatolites in coastal pools provide a glimpse into the early conditions that allowed complex life to evolve on Earth.

Along the coast of South Africa, extensive distributions of unique habitats called Supratidal Spring-fed Living Microbialite Ecosystems (SSLiME) and their layered forms, stromatolites, have been discovered and described since the early 2000s.

In 2012 they were discovered along the southern Nelson Mandela Bay coastline (close to Nelson Mandela University's South Campus) by Professor Renzo Perissinotto – then holder of the SARCHI Chair in Shallow Water Ecosystems – as well as Professor Tommy Bornman from the South African Environmental Observation Network (SAEON) – a coastal and marine research partner of Mandela University – who started mapping them.

"SSLiME occur along other parts of the South African coastline but the Nelson Mandela Bay area is the hotspot for them globally by far," says Dr Gavin Rishworth, senior lecturer in the Department of Zoology, who has focused his research on these ecosystems.

"Microbialites and stromatolites resemble the first types of living ecosystems we have in the fossil record on earth – they first arose 3.45 billion years ago and they have been continuous in the fossil record since," says Dr Rishworth. "Half a billion years ago they started to decline in the world's oceans and the reason could be that when animals developed 540 million years ago they started burrowing into and disrupting the calcium carbonate biofilm layer that forms these microbialites.

"They are seen as evidence of the first life on Earth and are windows into understanding life's earliest habitat and how it changed and evolved into what it is today. They are also a proxy of past and present sea levels because one of the unique features of the South African microbialites is that they only occur in the supratidal coastal zone at the convergence of emergent groundwater seepage."

Because they only form where fresh groundwater flows into the SSLiME pools along the South African coastline, microbialites



Underwater photograph of the microbialites at Cape St Francis. Photo: Gavin Rishworth



Microbialite pools along the Seaview coastline near Gqeberha

are flagships of freshwater sites. Any modern human utilising the coastline for food resources would have needed a reliable source of freshwater to survive, so was likely to have relied on these pools. The value of these systems was described in an article, "Peritidal stromatolites as indicators of stepping-stone freshwater resources on the Palaeo-Agulhas Plain landscape", published in a special issue on the region's Palaeo-Agulhas Plain in the *Quaternary Science Reviews* in 2020.

Similar supratidal coastal zone SSLiME habitats have subsequently been documented in southwestern Australia, Northern Ireland and the Scottish Hebrides, as recently as 2018, revealing that supratidal microbialites have a global distribution. To further this research, Dr Rishworth is part of an international team of researchers called the Extant Peritidal Stromatolite Network (EPStromNet) that received a grant at the end of 2020 through UKRI - the United Kingdom Research and Innovation (UKRI) government-funded body. The other recipients are Ulster University and the University of Essex in the UK and the University of Wollongong in Australia.

Dr Rishworth leads the overall SSLiME research project on these habitats to understand what their drivers are, their local and global importance and how meaningful they are to the scientific understanding of the coast. These findings were published in 2020 in a paper he co-authored in one of the top international geosciences journals, *Earth-Science Reviews*, titled *Modern supratidal microbialites fed by groundwater: functional drivers, value and trajectories*.

"The current SSLiME forming are about 6000 years old and they appear to grow two to five mm per year. Some of those in Nelson Mandela Bay are up to a metre thick but they can start and stop growing depending on sea-level or groundwater conditions," Dr Rishworth explains. "They only form when pH conditions are towards the alkaline extreme – the calcium carbonates on which their growth depends only precipitates at that point. Half a billion

years ago the ocean would have had a much higher calcium carbonate level and so they would have been forming in most shallow seas, hence current ocean acidification is a threat to them."

Their position at the convergence of groundwater seepage is also critical as they are efficient at absorbing the nutrients in groundwater and they therefore form a pollution buffer for the coastline. They also function similarly to estuaries along the coast, attracting estuarine-dependent fish into their vicinity, which might help to connect important biological populations up and down the coast. Their connectivity value along the coastline is an important area of knowledge that is a future SSLiME research priority.

To support this research, in 2020 Dr Rishworth applied for and received an NRF CSUR (Competitive Support for Unrated Researchers) grant of R686 812 for 2021 – 2023. He received his PhD at Nelson Mandela University in 2017 and will apply for an NRF rating in 2021.



Dr Gavin Rishworth at the Schoenmakerskop microbialites, close to the Nelson Mandela University's South Campus

The smart city has many faces

During her PhD on smart cities, Dr Anthea van der Hoogen put herself in the position of a citizen, worker and student to see how the smart cities of Gqeberha and East London should function.

"Cities in South Africa are classified as 'smart', but who gains value from the initiatives, who are the stakeholders and are smart city initiatives designed with all the users in mind? I set out to research this," says Dr van der Hoogen from the Department of Computing Sciences, who attained her doctorate in July 2021. She was the recipient of an NRF Black Academics Advancement Programme (BAAP) grant from 2019 to 2021.

The title of her dissertation is "A Value Alignment Smart City Stakeholder (VASCS) Model" in which she uses this model in Gqeberha and East London to establish the success factors of their smart city initiatives.

"The BAAP grant gave me the opportunity to focus on my research, as lecturing full time and trying to do research between was not giving me enough time," says Dr van der Hoogen. "Through the BAAP, I was able to attend conferences in 2019 where I was exposed to experts in the smart city field worldwide. The Americas' Conference on Information Systems (AMCIS) held in Cancun in Mexico in August 2019, for example, was a once in a lifetime opportunity and I was able to get an international expert review of the model I was proposing for my study; they validated it and guided me where I could improve.

"What stood out for me when engaging with the experts is they said that smart city solutions don't need to be Tesla-scale or mega

solar solutions; they can be a small solution that helps a community to survive. While the Internet of Things (IoT), cloud, mobile and web applications, WiFi hotspots and Internet are key smart city initiatives, so are initiatives such as using recycled material to build community halls and schools. This adds to communities learning to use what they have at their disposal."

When lockdown happened in 2020 it was a curveball for Dr van der Hoogen, whose approach was to experience the cities first-hand and to engage with a wide range of communities. She had to change her data collection to online interviews, which sped up the process. "I did, however, miss out on meeting users and citizens who don't have access to online facilities, and with whom I would have engaged in person to see how the smart city does or doesn't play out in their lives and how COVID-19 affected them."

For example, one of the projects that was shut down in Nelson Mandela Bay during lockdown was the ReTrade recycling initiative in the Walmer Heights community where citizens help to keep their environment clean by taking recyclable items to a recycling site where they trade them for goods, including food and toiletries.

"COVID-19 exposed how many people are instantly excluded from smart city initiatives in a crisis; how many people do not have connectivity and access to data and how the digital and physical divide impacts decision-making. For other citizens, the pandemic

" ... smart city solutions don't need to be Tesla-scale or mega solar solutions; they can be a small solution that helps a community to survive."



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has accelerated digitalisation, as those with the capacity to do so harnessed the ability to work and learn remotely. This has certain benefits, such as travel and accommodation cost savings, which also contribute to our collective responsibility towards our environments and carbon footprint.”

Dr van der Hoogen’s research revealed how certain applications can be designed for a specific function but the users then take it to a different level. “For example, East London introduced an app where the community could report power outages but they started using it to report every single problem,” she explains.

In terms of successful smart city initiatives, there are several from the automotive industries, where artificial intelligence and smart solutions are part of the workplace; another example is Nelson Mandela University’s solar farm initiative.

The evidence from her interviews indicated that technologies related to IoT sensors, cloud solutions and fibre optic internet in smart cities, if ubiquitous, are important for bridging the digital divide across different communities. They also provide important access to data for the health sector, to improve security for citizens, to improve access to traffic information and to engage with citizens.

“The practical contribution of my study is the potential use of the VASCS model by practitioners, city management, researchers and other stakeholders, who can use the model and template for planning and evaluating smart city initiatives,” says Dr van der Hoogen. “The model can be used to classify digital activities according to a smart city’s success factors while evaluating the value created by these activities. Smart cities can have a great impact but they have to be steered by stakeholder involvement and involve all the stakeholders at every level.”

How day zero could have been prevented

Catchment management could have prevented the 2020/21 build up to the Day Zero water crisis in Nelson Mandela Bay and the Kouga Municipality.

"Most of the Eastern Cape's Nelson Mandela Bay (NMB) Metro and the adjacent Kouga Municipality will soon run out of water," says emeritus professor of ecology, Richard Cowling.

"Two-thirds of the NMB's water and 85% of Kouga's water (including all the water needs of the productive irrigation farming in the Gamtoos Valley) are provided by three dams fed by the water courses and wetlands in the 561 000 ha combined catchments of the Kromme, Kouga and Baviaanskloof rivers.

"These dams are near empty and have been so for more than a year. Over half of the catchments are degraded by alien tree invasions, overgrazing and wetland destruction. This has compromised their ability to provide water, especially during droughts.

"Ecological-economic modelling predicts that removing alien trees and restoring overgrazed land in the catchments would increase water yield and baseflow by 11 and 14 million cubic metres per annum, respectively, and reduce sediment loads by 22 million cubic metres per annum," says Prof Cowling. "The increase in yield alone amounts to 16% of water drawn each year from the dams on these catchments by NMB."

Like most dams in South Africa, the three in the Kromme-Kouga-Baviaanskloof catchments are dependent on stormflows after floods to fill them up. It's been ten years since a dam-filling rainfall event occurred in this region. Disaster has been averted largely through the contribution of small rainfall events and baseflows (the portion of the streamflow that is sustained between rainfall



A concrete capped gabion weir on the Kromme River near Kareedouw. It was built by Working for Wetlands in the early 2000s under the supervision of the renowned wetland specialist, Japie Buckle. The weir was established to prevent headcut erosion of the palmiet-dominated wetland upstream. Photo: Japie Buckle

events). These dry-period flows, the lifeblood of drought-stricken catchments, are pivotal for maintaining water security.

In tandem with clearance of invasive alien vegetation, reversing the destruction of wetlands, with their well-adapted indigenous plant species, is an important solution to water conservation efforts. A 2020 journal article, “Water-use characteristics of Palmiet (*Prionium serratum*), an endemic South African wetland plant”, co-authored by Prof Cowling, described the potential benefits of restoring the habitat of this often misunderstood species.

In precolonial times, the entire length of the Kromme floodplain was covered in palmiet wetlands; today, they cover barely 15%. Palmiet is a sedge-like plant with an extraordinary capacity to trap moisture, silt and organic matter, accumulating as massive (up to 6 m deep) peatlands. Runoff is held in this natural sump, or ‘supersponge’, seeping slowly downstream and persisting, even during prolonged droughts, as baseflow that ensures low but significant flows into water storage areas. So trapping run-off in palmiet wetlands makes perfect sense for water conservation.

Spekboom too has an important role in water conservation. West of the Kromme lies the Kouga River catchment. A major tributary of the Kouga – the Baviaans River – drains the iconic Baviaanskloof,



The Kouga River, winding through wilderness on its way to the distant Kouga Dam. The wetlands and floodplain are densely invaded by black wattle, a thirsty tree that can deplete baseflows during dry periods. Photo: Richard Cowlings



A dense stand of water-thrifty palmiet on the Kromme River. Photo: Richard Cowling

a spectacular intermontane valley. The valley walls, which once supported dense spekboom thicket, have been denuded by livestock overbrowsing. Where once there was a dense, green canopy that absorbed rainfall and slowly released clean water into the Baviaans River, there is now eroded earth that allows precious rain to run unabated in silt-laden flows. Restoring degraded thicket by planting spekboom cuttings (or ‘truncheons’) is known to reduce erosion and improve baseflows, while also restoring biodiversity and sequestering unusually large amounts of carbon dioxide for semi-arid vegetation.

In a recently published journal article, “Herbivory and misidentification of target habitat constrain region-wide restoration success of spekboom (*Portulacaria afra*) in South African subtropical succulent thicket,” Prof Cowling and his colleagues highlighted some of the key elements required for the successful reintroduction of the species to degraded landscapes.

Prof Cowling explains: “We were particularly interested in the relative role of factors related to human actions (e.g. location of plot in target habitat, protection of plots from herbivores, influence of the restoration contractor) and those related to factors beyond the control of managers – such as rainfall patterns after planting – and the role of soil physical and chemical factors.” He continues: “Adopting a region-wide approach and evaluating an experiment replicated across the full extent of environmental variability in spekboom thicket vegetation, has provided insights that will benefit future spekboom restoration projects. Our principal conclusions are that sites must be protected from browsing, especially by wildlife, and that every effort must be made to ensure that they are located in the appropriate spekboom thicket habitat.”

Prof Cowling concludes: “While state-funded restoration programmes have made some progress, these have been inadequately supported and have faltered in recent years. Reducing the risk of running out of water and compromising the capacity of municipalities to foster economic growth and development will require radical action to restore the functioning of these catchments.” Avoiding another Day Zero depends on our efforts to conserve water in these critical source areas, as well as reducing wasteful consumption.

A year on Marion Island

A new three-year project focuses on major future changes that will happen on South Africa's Marion Island in the sub-Antarctic. It will collect baseline data on birds before the eradication of predatory invasive mice.

"House Mice are the only invasive mammal on Marion Island. They were introduced in the 1800s from sealing vessels. As small as the mice are, they attack and kill birds, even large adult birds like albatrosses," says Dr Maëlle Connan, a research fellow in the Department of Zoology and the Marine Apex Predator Research Unit (CMR) since 2017. In 2021, she secured a R1 510 000 DSI/NRF South African National Antarctic Programme (SANAP) grant for a three-year Antarctic research programme – together with Professor Peter Ryan (FitzPatrick Institute of African Ornithology, University of Cape Town). This builds on their previous SANAP research project which ran from 2018 – 2020.

In the 1950s, cats were introduced on Marion Island to control the mouse population but predation by cats had a major impact on seabird populations. Thus cats were removed from the island by 1991. Without natural predators, and under warmer and

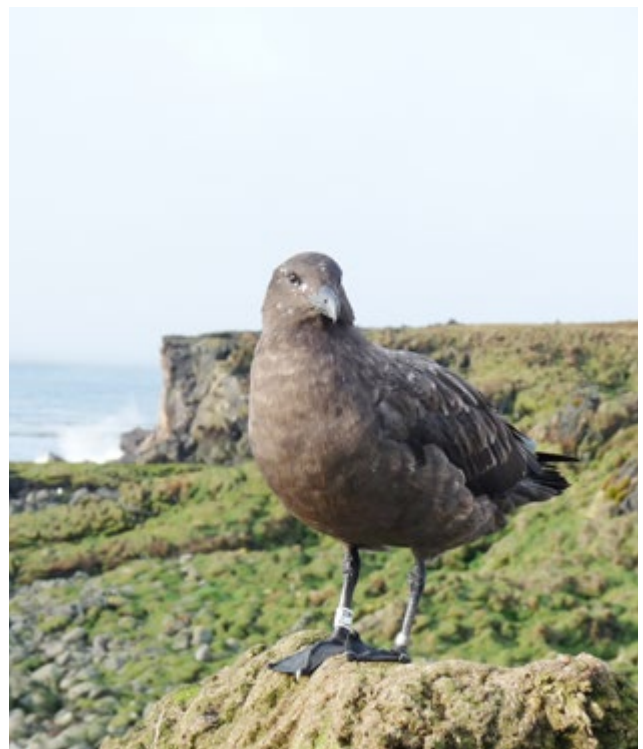
drier conditions due to climate change, the mouse population exploded. In addition to birds, the mice also impact plants and insects, destabilising the whole island ecosystem.

A new project, Mouse-Free Marion (MFM) (<https://mousefreemarion.org/>) is working towards eradicating mice at the island. It is a partnership between BirdLife South Africa and the Department of Forestry, Fisheries and the Environment and various researchers. Eradication will be by using bait and following strict protocols, as has successfully been done on a number of sub-Antarctic islands.

The new SANAP project will feed the MFM project with crucial data to best plan the eradication, while protecting scavenging birds on the island, notably the sub-Antarctic Skuas, Kelp Gulls and Black-faced Shearwaters. "The eradication period needs to avoid



Greyheaded Albatross showing injuries from being preyed on by mice. Photo: Stefan Schoombie



Sub-Antarctic skua. Photo: Maelle Connan



Greyheaded Albatross being preyed on by a mouse. Photo: Stefan Schoombie

summer when the skuas are breeding as they would likely eat mice that may contain poison. Then, a compromise needs to be found between good weather days when baiting can happen and true winter, when many bird populations are mostly absent. We will also collect baseline data on a number of bird species to follow changes in the whole ecosystem as it recovers in the absence of mice,” explains Dr Connan.

“To undertake this new SANAP, a research field assistant, Eleanor Weideman, will be based on Marion Island until April 2022 to collect data. Another field assistant will replace her to continue the work after that,” says Dr Connan. A team of about 20 people stays on Marion Island for a full year, including field assistants (often future Master’s and PhD students), base personnel and meteorologists.

“Team members undergo a psychological test as part of the selection since they need to cope with a year of isolating with a small group of people,” Dr Connan explains. “We select very practical, emotionally calm people who are able to work under any conditions. I spent a year on Marion Island ten years ago, doing long-term monitoring of albatrosses and giant petrels for the FitzPatrick Institute, and it was my best time ever.”

For the 2018 – 2020 project, Dr Connan and Prof Ryan partnered with colleagues from the Centre d’Etudes Biologiques de Chizé (France) and the Royal Society for the Protection of Birds (UK) to undertake research on numerous seabirds on not only Marion, but also Gough and Kerguelen islands, using them as indicators of plastic pollution and climate change.

“We looked at the birds’ stomach contents and regurgitations. They mistake plastic particles for food and these take up space in their stomachs. Since the birds feel full, they feed less, and may die, or they feed regurgitated food with plastic particles in it to their chicks, that may also die. The pollutants associated



Skua pellets with plastics. Photo: Maelle Connan

with the plastic can also affect the physiology of predators,” says Dr Connan.

While travelling to Kerguelen Island with colleague Dr Ben Dilley (FitzPatrick institute), they took the opportunity to record observations of marine litter from the research vessel supplying the French sub-Antarctic islands. Very few ships travel to these southern seas. These observations are presented in a paper by Dr Connan and collaborators, titled “The Indian Ocean ‘garbage patch’: Empirical evidence from floating macro-litter”, which was published in the Marine Pollution Bulletin in June 2021.

“While travelling back from Kerguelen Island to Durban, we encountered a garbage patch south east of Madagascar. For two days in the middle of nowhere, we were surrounded by litter; it was sad to see. These patches exist in all oceans and result from marine currents that concentrate floating litter originated from both mismanagement of waste on land and illegal discards at sea,” explains Dr Connan. More research results from this first SANAP project will be released this year.



Dr Maëlle Connan. Photo: Chris Oosthuizen

Garden Route Gateway is one of six selected nationally

A proposal in 2020 for the Garden Route Gateway landscape was one of six ecosystem research sites selected from 57 proposals throughout South Africa.

A Nelson Mandela University-led consortium put together the Garden Route Gateway proposal for the Expanded Freshwater and Terrestrial Environmental Observation Network (EFTEON) – a large landscape-wide research initiative being developed under the South African Research Infrastructure Roadmap (SARIR) programme of the Department of Science and Innovation (DSI).

“Mandela University’s director of Research Management, Dr Kwezi Mzilikazi coordinated the proposal together with researchers from the Sustainability Research Unit (SRU), George Campus,” says Professor Hervé Fritz, head of the International Research Laboratory IRL REHABS (Reconciling Ecological and Human Adaptations for a Biosphere-based Sustainability) partnership in the SRU.

The consortium partners include South African National Parks Garden Route NP, the Gouritz Cluster and Garden Route Biosphere Reserves and Rhodes University. A number of researchers from the SRU, including Prof Fritz, Professor Christo Fabricius, SANParks’ Professor Dirk Roux (an adjunct professor in the SRU) are the scientific coordinators.

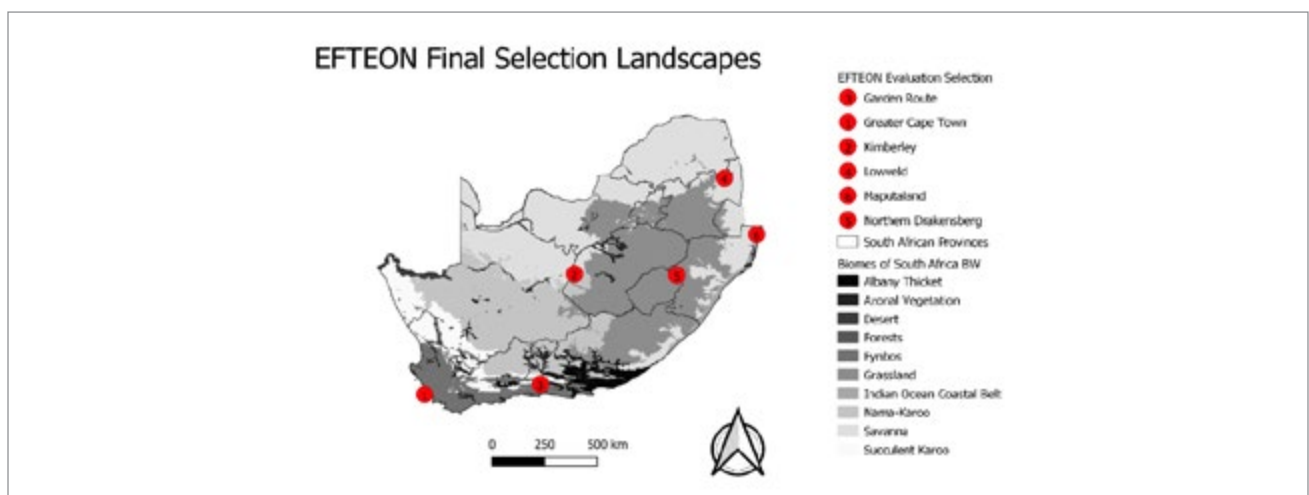
The focus of the EFTEON programme is on ecosystem processes, the state of the environment and the quality and quantity of ecosystem services. Social systems, including economic systems,

fundamentally rely on their ecological contexts to sustain life and improve human well-being.

Prof Fritz explains that each of the proposals are led by academic institutions and a further five sites will be selected in the next round. Each of the sites represent a large landscape in one of South Africa’s major biomes, including human-transformed areas, such as cities and farms. “It’s basically long-term monitoring of terrestrial ecosystems, including freshwater. An important dimension is that it includes monitoring of the societies that depend or coexist with these ecosystems.

“We selected the Garden Route Gateway, with ‘gateway’ as the operative term, as it looks at how the Garden Route ecosystem connects with other landscapes such as the more arid Little Karoo ecosystems.”

The description of the Garden Route Gateway is summarised as follows: The landscape provides access to a large number of biomes such as Fynbos, Southern Afrotemperate Forest, Succulent Karoo and Coastal Thicket. Hydrologically this landscape has river systems draining the Karoo region and short-course high-energy systems draining the Cape Fold Mountains. This area is home to coastal wetlands and exhibits an excellent source-to-



sea opportunity. The area is undergoing rapid urbanisation and agricultural intensification. Strong links have been developed to a number of satellite sites, extending the footprint of the infrastructure into the surrounding biomes.

"A group of researchers will be based on the George Campus and a flux tower that will be installed here that will measure the amount of gas such as water vapour, carbon dioxide and other gases," Prof Fritz explains. Flux towers collect data on carbon dioxide exchange rates between the earth and atmosphere and are used in microclimate analysis. This data will be complemented with automated measuring sites across the landscape for long-term monitoring of a range of aspects, including climate variables, water quality and soil parameters. This will give us insight into climate change effects on basic ecosystem processes, and will be correlated with other long-term surveys on biodiversity change and human practices.

South Africa's investment in EFTEON is a major advancement towards improving our national capacity to understand critical ecological processes and how they support and respond to the societies depending on them," says Dr Molapo Qhobela, Chief Executive Officer of the NRF.

EFTEON manager, Dr Gregor Feig says: "The long-term impact of EFTEON will be through sophisticated people-nature observations and experimentation to clarify the complex relationships between societies and ecosystems in diverse environments under climate change as a pervasive driver of change."

The other five selected EFTEON Landscapes are:

- **Greater Cape Town** (Western Cape): This Landscape links the Atlantic Ocean to the peaks of the Boland Mountains Strategic Water Source Area, covering steep climate gradients and a hyperdiverse mix of lowland (strandveld and renosterveld) and upland (mountain fynbos) major vegetation formations of the Fynbos Biome, interspersed with pockets of Southern Afrotemperate Forest.
- **KIMTRI** (Kimberley area, Northern Cape and Western Free State): This is the most arid of the landscapes selected and is located in the transition zone between the Nama Karoo, Arid Savanna and Grassland Biomes.
- **Northern Maluti-Drakensberg** (Cathedral Peak and surrounds, KwaZulu-Natal): This landscape lies in the northern sections of the Maluti-Drakensberg escarpment in the headwaters of the Tugela River where complex socio-ecological issues are emerging.

International research partnership

Prof Fritz has been instrumental in putting together the IRL-REHABS partnership. Launched in December 2019 this is a consortium of leading research institutions: the French National Centre for Scientific Research (CNRS) – the largest state research institute in France, with 26 000 staff members and 14 000 researchers in 10 institutes – Nelson Mandela University SRU and the Natural Resource Management Cluster, and the University of Lyon 1 (UCBL).

The IRL-REHABS' focus is to produce original research on ecological and socio-political processes underlying the future of ecosystems and human well-being in the Anthropocene (the current geological period during which there is significant human impact on the Earth's geology and ecosystems, including climate change).

Funding of R13-million over five years is provided by the three partner institutions, and is predominantly for PhD candidates and postdoctoral fellows, but some master's students are considered. Two new senior French scientists from CNRS will join the IRL-REHABS on the George campus in December this year.

- **Maputaland** (Northern KwaZulu-Natal): This is the most tropical of the selected landscapes and is an important region for observing changes in the impact of tropical meteorological systems.
- **Lowveld** (Mpumalanga): The landscape comprises conservation lands use (Kruger National Park and private conservation areas) that are well studied, with adjacent lands under traditional authority management and with villages that are well studied through the SAPRIN Agincourt Research infrastructure. The landscape is bisected by a number of rivers that pass through the different land use systems.

100 000 years ago humans were smart

We tend to underestimate the intelligence of early modern humans who were highly innovative and capable of creating exceptional geometric patterns.

Humans delight in creating patterns in the sand, and over 100 000 years ago it seems we were no different. People were drawing triangles in the dunes along South Africa's southern Cape coast. They had also mastered how to draw circles compass-style and sculpted something that closely resembles a stingray between 70 000 and 158 000 years ago.

"We don't always think of early modern humans or hominins as being smart but there is so much evidence of their innovations found on this coast," says Dr Jan De Vynck, Director of African Centre for Coastal Palaeoscience (ACCP) at Nelson Mandela University. "Consider that they had already mastered the use of fire in a sophisticated way to make heat-treated stone tools at least 130 000 years ago."

"Our most recent finds in this same area are two large triangles on loose slabs of cemented Pleistocene dune surfaces," says the ACCP's Dr Charles Helm. "These examples of palaeoart, or what we call ammoglyphs – carvings, images or symbols made in



Dr Jan De Vynck

dune sand that are now cemented into rock known as aeolianite – indicate that early modern humans were capable of creating exceptional geometric patterns."

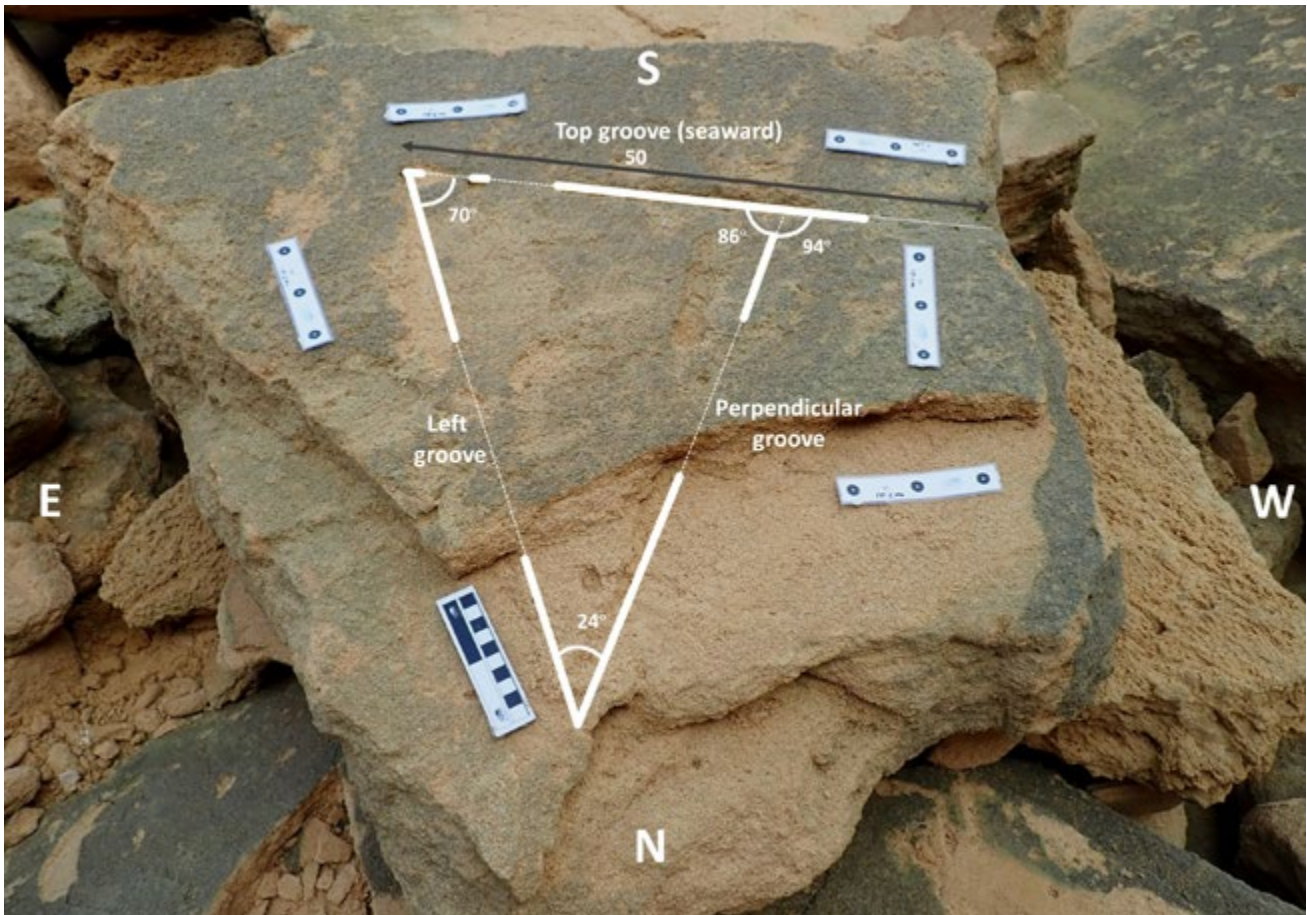
Each side of the larger of the two triangles is about a metre long and remarkably straight. One possibility the scientists are considering is that very straight sticks or reeds were used to create them. "This wasn't random, it was a well-executed pattern, and it is extremely difficult to create something so perfect in the sand," says Helm.

Part of the triangles' uniqueness is that sand was the original canvas and Helm says the scientists he is working with are not aware of anything like this from the period anywhere else in the world .

This discovery by Helm, De Vynck and Helm's wife, Linda Helm, is one of the most profound artefact finds of our species worldwide, created between 80 000 and 140 000 years ago. They chanced upon the triangles while covering a very rugged stretch of the coast near Still Bay in search of fossil track sites. Over the past



Dr Charles Helm



fifteen years they have discovered over 300 fossilised vertebrate tracksites, including four sites with human footprints from the same era on the southern Cape coast.

The burning question about the triangles and circle is why these early modern humans would have created geometric drawings. De Vynck and Helm are extremely cautious about interpreting the 'why' but venture that hominin appreciation of pattern and symmetry could have been derived from the natural world around them. Another notion is that the triangle may be a female fertility symbol.

"A key indication of human cognitive development is self-expression through symbolism such as art, adornment and body painting," says De Vynck. "Another of our most provocative finds to date is the 'stingray'. If our speculation is correct, then this is the oldest example ever found of a human creating an image of another creature." They are currently having all these works precisely dated at Leicester University in the United Kingdom.

De Vynck explains that pre-1990, modern human culture was thought to have developed in Europe some 40 000 years ago, but there is far earlier evidence of this on South African shores from the

"If our speculation is correct, then this is the oldest example ever found of a human creating an image of another creature."



middle to late Pleistocene era, approximately 158 000 to 70 000 years ago.

"We know people were doing 'palaeoart' engravings in this area," says De Vynck, "For example, at the world-renowned Blombos Cave, about 30km to the west of the triangles site, Professor Christopher Henshilwood has made a series of finds since the 1990s, including engraved ochre and drawings dated to 77 000 and 73 000 years ago respectively, and other finds such as deliberately perforated shells used to make necklaces, as well as bone awls and a paint processing kit all made by hominins."

Possibly the oldest examples of cognitively modern human beings are at Pinnacle Point Cave near Mossel Bay. Here Dr Curtis Marean, honorary professor at Nelson Mandela University and international director of the ACCP, and his team have evidence that humans started to forage from the sea 164 000 years ago.

Marean explains that the vast deposits of discarded shells in middens in the cave indicate that humans of that time had been harvesting shellfish in the intertidal zone, which is only viable for shellfish harvesting during a limited period around the spring tide. This evidence of early humans' knowledge of the lunar cycles, combined with the nutritional benefits of shellfish for brain growth and fertility may well indicate that the revolution in humanity's cognitive development started on the shores of southern Africa.

Helm, C. W., H. C. Cawthra, J. C. De Vynck, C. J. Helm, R. Rust and W. Stear, 2021. 'Large geometric patterns from the Middle Stone Age in aeolianites on the Cape south coast, South Africa', *Rock Art Research* 38 (1) pp 10–22.

Astonishing finds by dozens of researchers

With a multi- and transdisciplinary international collaboration with researchers from over 40 universities in Africa, America and Europe, the ACCP team has made numerous astonishing finds from the Palaeo-Agulhas Plain, a submerged landscape spanning 85 000 km², lying off the southern Cape coastline. Humans roamed this landscape, exposed when ice ages caused sea levels to drop, from at least 164 000 years ago.

In May 2020 the journal *Quaternary Science Reviews* published a special edition called *The Palaeo-Agulhas Plain: a lost world and extinct ecosystem*. It includes 23 papers from global contributors, many being ACCP authors and co-authors.

"It is a beautiful example of research between the disciplines as it includes, amongst others, ethnobotany, ichnology (the study of tracks and traces), geology, human behavioural ecology, palaeobotany, archaeology, ethnography, and experimental archaeology," says De Vynck. "It features research we have undertaken over the past ten years, which has had a profound impact. We are openly sharing what we know as it is an asset to the South African and world community."



At the core of the democratic township transition

At the core of the democratic township transition are new models of sustainable human settlements.

The Climate Justice Charter for South Africa envisages a just transition in respect of where and how people live — what our government terms “sustainable human settlements”. This encompasses housing as well as services and facilities for living a “good life” in a healthy environment.

While government spends a considerable amount of money in townships, it is yet to adopt models of sustainable human settlements. Towards addressing this, Nelson Mandela University is engaged in eco-based pilot models in townships and informal settlements in Nelson Mandela Bay and other parts of the Eastern Cape that will hopefully be adopted on a national scale.

“Eco-estates and alternative building technologies are not new to South Africa but, to date, they have been confined to the affluent sectors of our society. It makes no sense why they haven’t been expanded to all human settlements,” says Professor Janet

Cherry from Development Studies, who collaborates with the Co-operative and Policy Alternative Centre (COPAC), the South African Food Sovereignty Campaign linked to Prof Vishwas Satgar at Wits University, and other civil society organisations that developed the Climate Justice charter and are committed to seeing through the development of sustainable human settlements in low income environments.

“There are several creative eco-social alternatives to the current RDP housing model that have been explored, using a circular layout of houses built with local materials around a common infrastructure to provide integrated energy, water capture, gas from waste, food gardens and ‘minimum flush’ toilets using greywater,” Prof Cherry elaborates.

Making this transition involves a fundamental rethink of how living and working spaces are designed and constructed, how services



Saltuba tunnel garden

are provided, and most importantly, how these are done, so that the majority of people benefit economically and socially from the transition away from fossil fuels. The principle of such models is that the quality of life of residents must be significantly improved and not compromised by the use of alternative technology.

“One of these models is a pilot project called the Saltuba Cooperative in KwaZakhele township in Nelson Mandela Bay, which we started in 2016, initially engaging in community mobilisation in KwaZakhele and recruiting a community participatory research team who decided on the location of the first pilot,” says Prof Cherry. “Engaging with communities is a long-term process and in 2019 we finally established the first renewable energy pilot on the gap tap between Sali Street and Tubali Street.



Professor Janet Cherry

CSUR funding for impactful research

Prof Cherry received R282 960 in Competitive Support for Unrated Researchers (CSUR) funding from the NRF to help support her seven Master's and five doctoral students. Two of the doctoral students are researching aspects of the KwaZakhele Saltuba Cooperative project, others are looking at food sovereignty in the transition township model and the circular economy and technology in KwaZakhele.

“It includes all the components for sustainable township development. It has renewable energy in the form of PV solar installed as a freestanding solar array on a gap tap in a public open space between the houses. Support for this installation came from the Ezethu Trust, and we are partnering with local renewable energy businesses Energyworx and Rubicon. We are using the array for generating electricity with the longer-term plan of feeding into the municipal grid, which will be income-generating for the residents, as they own the array.”

This will enable working-class townships to become producers, rather than consumers, of electricity. South Africa's legislation has changed to accommodate local small-scale producers feeding into the grid and the project is at the forefront of testing this new mechanism. “We have support from the municipality's economic development department and they have provided us with funding to expand this model to another two gap taps and an additional 50 households in KwaZakhele,” Prof Cherry explains.



From left: Saltuba erection of PV Solar array. Saltuba Cooperative water capture system

Human rights

Prof Cherry has authored numerous articles and book chapters on targets highlighted in the Sustainable Development Goal (SDG), including the right to adequate housing and affordable, reliable clean energy, and how the University is actively engaged with communities in achieving this. Her latest chapter based on her research is in a forthcoming book titled: *Emancipatory Human Rights and the University*, edited by Professor André Keet and Professor Felisa Tibbitts from the Chair for Critical Studies in Higher Education Transformation (CriSHET) at Nelson Mandela University.



Saltuba PV solar array connected

"The problem is that although the municipality has promised that they can buy electricity from township cooperatives, there is no institutional mechanism for them to get paid. They assured us this would be resolved by July 2021 but we are still waiting."

Another part of the pilot is water harvesting: four houses have a water harvesting system that leads rainwater from the gutters into storage tanks – one for rainwater and another for grey water that they re-use from their washing machines.

"We also partner with Trevin van der Walt of Urban Gardens in Nelson Mandela Bay, who works with the Saltuba Cooperative for establishing vegetable gardens grown in tunnels on a permaculture

system. We partner with the Centre for Integrated Post-School Education & Training (CIPSET) at the Missionvale Campus and other food garden organisations at other township sites in the bay, in KwaDwesi and Motherwell. The food gardens are all part of the SA food sovereignty campaign linked to COPAC."

The pilot project will expand to include aquaponics, producing fresh fish and vegetables in partnership with the non-profit international humanitarian development organisation INMED, and create markets for fresh produce. These models have the potential to meet the food, water and energy needs of millions of households, and to provide income to working-class households right where they live.

"There are several creative eco-social alternatives to the current RDP housing model that have been explored, using a circular layout of houses built with local materials around a common infrastructure to provide integrated energy, water capture, gas from waste, food gardens and 'minimum flush' toilets using greywater."



The transgenerational African family business

In August 2020, Nelson Mandela University's Family Business Unit, together with African Family Firms (an international organisation), co-hosted the first virtual African Family Business Research Conference.

"People are hungry for Africa-specific research on African family businesses. Up until now, most of the research on the family business has been based on the European, American and Asian context," says Dr Tony Matchaba-Hove, head of the Department of Business Management in the Faculty of Business and Economic Sciences. He has been doing novel research on the African family business for a number of years.

"The conference was a Zoom event for like-minded individuals from throughout Africa and the rest of the world, and we are now growing the platform into an annual event. Meeting online removes the cost element of physically meeting. Having said that, we appreciate the value of connecting face to face and are considering smaller local events to facilitate this."



Dr Tony Matchaba-Hove

The conference theme was "Celebrating Research-inspired Family Business Management Advancement in Africa", and it covered responsible family business management; indigenous African family businesses; succession; values; innovation; and women and governance in family business.

In his paper, "Ensuring Transgenerational Potential and Success of Indigenous African Family Businesses", Dr Matchaba-Hove highlighted the great need for deeper insight and increased understanding of the practices implemented among indigenous African family businesses that have survived across the generations, and of the context in which these businesses operate.

"My paper looked at what we can learn from existing successful indigenous African family businesses that have passed on from the first to the second generation. I focused on these businesses because the majority of indigenous African family businesses in South Africa, Botswana and Zimbabwe are currently in the second generation, and looking to passing them on to the third generation.

"One of the major differences between the Western and African concept of the family business is the former is often more nuclear but the latter takes in the extended family – and a lot of responsibility comes with this. Funds have to be put aside for various obligations, such as, 'my brother's son needs to go to university'; it's regarded as part of the African family business's corporate social responsibility.

"I also looked at the multidimensional nature of performance among indigenous African family businesses. When we talk about performance, we look at three aspects: entrepreneurial performance – is the business growing and developing new products and services or diversifying; financial performance – that's your traditional concepts of profit and sales turnover; and social performance – is the business contributing to the community, does the business have a good name, is the business able to support the

family. This aspect of social performance is closely tied to Social Emotional Wealth (SEW) theory and focuses on one of the key outcomes of my research – ubuntu. It is a key factor, because if the family business invests in the community then the community in turn invests in them.”

One of the businesses Dr Matchaba-Hove researched is a petrol dealership and convenience store in Mqanduli in the Eastern Cape. He explains that it was started in the 1960s and passed on to the second generation, who now run the business. Most of the employees are from that area, and the business has contributed to the development of schools and other local infrastructure. The community has supported the business, including through tough times, which has contributed to its survival.

“Another key outcome is understanding the role of women in the success of African family businesses,” says Dr Matchaba-Hove. “Traditional African culture tends to be paternalistic but mothers and wives in the family business play a strong advisory and supervisory role. In some cases they work in the business; in others

they don’t, but advise on all business matters. They are the glue that unites the family and the business.”

The majority of the second generation, men and women, in the African family businesses he researched have formal education, usually tertiary education, and they are professionals. In many cases, the founding generation did not have a formal education and when the business passes to the second generation, they continue to play an important advisory role.

“In the most successful businesses, the next generation has been involved since they were young and the person who will take over is identified at an early stage. When the time comes for them to take over, they are well equipped and qualified to do so, and often educated in the specific field of the business.”

Dr Matchaba-Hove says his research resonated with many of the conference delegates, which has opened more doors and future opportunities for research. The second online African Family Business Conference took place in August 2021.

“One of the major differences between the Western and African concept of the family business is the former is often more nuclear but the latter takes in the extended family – and a lot of responsibility comes with this.”



Addressing the digital gap in Africa

Understanding the digital gap, what it means and how to bridge it, is essential to a more equitable future for all people in Africa.

"Access to the internet, digital devices, data, connectivity, and the ability to use them is taken for granted in this era of the Internet of Things where everything is online," says the Acting Head of Department: Economics, Professor Syden Mishi.

"It is a significant issue, because many people in African countries and globally do not have online access and cannot afford it. This then creates other inequalities, including access to education, employment and business opportunities, which the COVID-19 pandemic has fast-forwarded."

Postdoctoral fellow in the Department of Economics, Dr Godfred Anakpo, adds: "If not addressed, the digital and inequality gap between the well-to-do and the poorer will continue to widen. We set out to contribute research that can inform policy on how to deal with this imperative. It's not an option, it's a social good in the same way that running water and electricity is."

Based on their research, Prof Mishi and Dr Anakpo have written a book chapter titled "Digital gap in global and African countries: inequalities of opportunities and COVID-19 crisis impact",



N2 Makodisini telecommunication tower Transkei 2

which will appear in *Digital Literacy, Inclusivity and Sustainable Development in Africa*, to be published in 2021/22.

The book seeks to provide answers to a number of important questions, such as, the current status of digital literacy in African nations; the level of digital skills development and digital inclusion for different strata in African societies; the future of work in Africa connected to digital literacy skills; how the COVID-19 crisis has impacted the digital gap globally, particularly in developing countries and how libraries can support digital literacy.

"In our research, we reflected on COVID-19 and lockdown, and how this affected students and workers who were confined to their homes, some without a computer in their household. At our university and several others, these students were supplied with laptops, but another issue was lack of access to the internet. In normal times, many depend on their local internet café, community library or place of study for internet access, and this was not available during lockdown," says Prof Mishi.

The researchers say that COVID-19 should be used as an opportunity to redress these inequalities, especially in rural schools with no internet and no devices. "During the pandemic, learners were told to learn from home, but so many of them do not have digital devices, access or electricity. Compare this to a learner with a device, internet and electricity; the learning advantage and lack of it are totally different worlds."

Dr Anakpo adds: "When learners lose learning time over the course of a year or more, the gap becomes even more pronounced, not only now but also into the future when their lack of digital literacy and the associated access to opportunities will continue to haunt them.

"There is also a massive digital gender gap and if we talk about inclusive economic growth we have to address this, starting with education," says Prof Mishi.

They refer to the eReady ICT Maturity Assessment Tool that the Centre for Community Technologies (CCT) at Nelson Mandela University helped to develop. In 2020 this easily downloadable app was used to assess and evaluate the e-readiness of



Prof Syden Mishi



Dr Godfred Anakpo

government schools in South Africa. Dr Anakpo says: "We strongly recommended a coordinated effort between government and the private sector to address the challenges highlighted in the e-readiness reports, where government provides a supportive policy environment, financial commitment, digital opportunity and infrastructure, in partnership with the private sector."

In their book chapter they write: "We need to connect the unconnected people. For instance, in the last decade China has made it a major priority to connect all villages to the internet. This was achieved through a collaboration between the central government, local government and telecommunications industry. Africa could achieve the same in several ways, such as harnessing television white space technology to provide universal access to the internet, public-private partnerships, technology budgeting and government subsidies, where internet connection and its related services are made affordable."

Prof Mishi adds: "It's very important to re-assess how the SETAs' professional and vocational training budgets are being used, to make sure every rand is being spent on the right things, such as digital literacy. TVETs and academic institutions can also play a key role here and ensure that every student is digitally literate, in order to produce graduates with the skills required in the workplace."

The researchers conclude that while there is no silver bullet, we have to conscientiously address the digital gap now and develop a system of digital literacy and fair access for all – or suffer the consequences of deeper inequality and even more unemployment.

""If not addressed, the digital and inequality gap between the well-to-do and the poorer will continue to widen. ""



Blue economy in need of reassessment

“Humans have always engaged in a version of the oceans economy, with people fishing and foraging throughout time.” – Prof Ronney Ncwadi

“While humans have always engaged in a version of the oceans economy, with people fishing and foraging throughout time, our findings to date indicate there are barriers to entry for the small business sector,” says Prof Ronney Ncwadi, Director of the School of Economics, Development and Tourism in the Faculty of Business and Economic Sciences. “These could be linked to lack of appropriate skills related to this sector and also lack of access to capital to operate in this space. We also cannot turn a blind eye to sociocultural belief systems that might prohibit some people from entering the oceans working environment.”

Employment-wise, there is seasonal employment for fishers but these are not ‘sustainable, decent jobs’. They don’t own boats and they cannot access loans from the banks because they are not formally employed. The businesses that exist, such as fishing companies, marine tourism and shark diving, are beyond the reach of working class people in the townships.

“The Operation Phakisa Oceans Economy model needs to be seriously reappraised,” says Prof Ncwadi. The model estimates that the oceans economy has the potential to contribute up to R177-billion to Gross Domestic Product (GDP) by 2033 (compared to R54-billion in 2010) and to create approximately one million jobs (compared to 316 000 in 2010).

According to Operation Phakisa’s 2019 progress report: “To realise a GDP contribution of R177-billion by 2033, South Africa would require a real growth rate of approximately 1.82% per annum from 2015; and to realise the creation of one million jobs by 2033 South Africa would require a real employment growth rate of approximately 4.9% per annum from 2015.”

“None of this has happened, quite the opposite,” Prof Ncwadi explains. “Projections that the oceans economy will grow South Africa’s GDP by $\pm 4.4\%$, as stated in 2014, with the associated growth in jobs, have not materialised. We are now in 2021 and instead of growth we see a decline. Sectors operating in the ocean economy show a general decline to approximately 2% of GDP, 1% less than in 2005.



Prof Ronney Ncwadi

“There are investments flowing into the ocean economy but we need to dissect the source of these investments as to whether they are from government or the private sector and what their impact is.”

Prof Ncwadi says another critical area of research is skills supply and demand: “We need an advisory board comprising the private sector and the academic sector to look at what our universities are offering in maritime studies – are they responding to the skills that are needed in this sector? And are the TVET colleges teaching anything related to maritime skills in their syllabus; what are they covering? Practical skills related to boatbuilding or boat and engine repairs are the kind of hard skills that we need.



"From here we need to assess the demand side. What demand is there for marine and maritime skills? There is no point training up a whole cohort of young people who then have to look for work outside of this country."

Prof Ncwadi says there is so much more that South Africa, and the Eastern Cape in particular, can do all round to develop the marine and maritime sector, and to increase opportunities for the small business sector. He highlights areas that need to be closely investigated and rectified, including the ease of doing business, lending rates and access to capital for small

businesses in the ocean economy sector in order to increase the participation of working class and township businesses, as well as comprehensive relevant skills and entrepreneurship development.

"Innovations are possible in this sector, including fisheries, coastal management, water desalination, ports and harbours, ship repair, marine mining and manufacturing, marine biotechnology, marine robotics, and so on. We need to start implementing the big, fast-results methodology on which the Operation Phakisa Oceans Economy model is supposed to be based."

"Projections that the oceans economy will grow South Africa's GDP by $\pm 4.4\%$, as stated in 2014, with the associated growth in jobs, have not materialised. We are now in 2021 and instead of growth we see a decline."



H♥PES – the community school as a beacon of hope

A National Research Foundation project is documenting the community school as a place of hope, growth and well-being based on critical, evidence-based, collaborative research.

The NRF-funded community engagement project, *Reimagining school improvement: A collaboratively constructed framework of schools as beacons of hope that promote social cohesion in working-class communities*, is located in the University's Centre for the Community School (CCS) in the Faculty of Education.

"When we applied to the NRF for a grant through the Faculty of Education, the primary focus was to develop an understanding of how community schools can become beacons of hope within their community," says Dr Bruce Damons, principle investigator of the three-year project.

"We had done a lot of work in the CCS in the form of demonstrating the potential of schools to be beacons of hope," says Dr Damon. "However, we needed to back this up with critical, collaborative,

evidence-based research to develop the intellectual, conceptual, theoretical and methodological work in partnership with the schools and communities."

Part of the exploration is a move away from the default definition of a community school in the South African context, that is, just a school within a township. "Our argument is that a community school is so much more; it encourages a rich complementarity that motivates and encourages individual, relational and collective growth and well-being of all the stakeholders," says Dr Damons.

Instead of referring to the project by its lengthy formal title, the research team is calling it "H♥PES": H- Humanising; O-♥ (written in the form of a heart to represent people and their connectedness within the project); P-Pedagogy; E-Engagement; S-Schools. Dr



Damon explains: “Hope as a relational and contextual psychological construct exists on a collective level when all members of a community collectively strive for a better future for all.”

The grant includes bursaries for two PhD and three master’s students for inter- and transdisciplinary research. The ‘inter’ includes the Faculty of Education and the ‘trans’ includes the Social Development Professions in the Faculty of Health Sciences and a broad range of stakeholder communities.

PhD fellow Silindele Malangen’s study title is: *A community school model to reconceptualise basic school functionality and quality education in low-income South African communities.*

PhD fellow Noluvo Rangana’s study title is: *Exploring the application of a Participatory Action Learning and Action Research (PALAR)*



Prof Veonna Goliath

approach in developing and implementing school improvement plans in community schools.

“A key output of this project is to see the next generation of African and global scholars emerging, using this project as a springboard,” explains Professor Veonna Goliath, head of the Department of Social Development Professions, and who is a co-investigator for the grant, together with the Faculty of Education’s Dr Deidre Geduld and Dr Heloise Sathorar.

“The three-year grant started in 2019 when we held several capacity-building working sessions with associates and stakeholders – we call the collective groups action learning sets (ALS),” says Prof Goliath. “HVPES consists of postgraduate students and their supervisors. The students are from a cross-section of academic disciplines. HVPES has also opened its space to include education and social work practitioners who have expressed an interest in

Leading courageously

Charles Duna Primary in New Brighton is one of the schools with whom the CCS partners in collaboration with the Manyano network of community schools. It has 1063 learners from Grade R to Grade 7, courageously led by Principal Nombulelo Sume since 1998. Many of the learners come from informal settlements where their lives are hard; unemployment is rife, as are gangs, violence, single parent homes, orphans and HIV/AIDS. Despite this, over the past 15 years they have turned the school into a place of optimism, with 27 parent volunteers on site, a well-managed library and reading clubs, science labs and a computer lab, all from funding they raised.

“We had done a lot of work in the CCS in the form of demonstrating the potential of schools to be beacons of hope ... however, we needed to back this up with critical, collaborative, evidence-based research ... ”





Charles Duna Primary and HOPES researching together

pursuing postgraduate studies. In addition, each study has their own ALS, which includes parents, community members, school teachers and principals who have an interest in the topic under study. The space is open to everyone who is interested, as we are committed to the principle of generative learning."

Until the March 2020 lockdown, writing retreats, which included personal wellness sessions, were held with the postgraduates to conceptualise and work on their research topics and articles in a co-generation of knowledge between the supervisors and students.

The COVID-19 pandemic interrupted this community engaged project as the key methodological approach requires face-to-face interaction with the different stakeholders. Sadly, the impact of the pandemic meant that instead, students and participants were faced with the dual challenge of a lack of adequate

resources to engage virtually and responding to new, complex multidimensional realities.

In honouring the research participants' request to meet in person, observing all safety protocols, doctoral fellow Malangeni made a special appeal to the Department of Higher Education for an exemption to the stipulation of virtual engagement. The participants are all in the Nelson Mandela Bay Metro, including two high schools and two primary schools in New Brighton, Kariega and Booysen Park. The request was approved and the group managed to have its first engagement.

"My doctoral research invites the action learning set to take ownership of the research," says Malangeni. "They support the rationale, namely that the community school can be improved, not only by the educators but by the whole community contributing

" ... the element of hopefulness came to life, and ... the research participants asserted their views on the types of research methods they would feel comfortable with."



Sustainable Development Goal 4

The HVPES project speaks to the United Nations Sustainable Development Goal 4: access to quality education, including contributing meaningfully to scholarship on school improvement and evidence-based practices in education. It builds on this by enabling a deeper understanding of the community school's role and value in a South African context and offering practical suggestions on how hopeful schools might be fostered in poor working-class communities.

to the improvement and functionality of the school and its surrounding environment.”

Prof Goliath (who is Malangeni's supervisor, with Dr Damons as co-supervisor) says: “What I observed and experienced from the ALS is how the element of hopefulness came to life, and how the research participants asserted their views on the types of research methods they would feel comfortable with. They showed a preference for co-constructing collages where they could jointly develop their views, as opposed to doing individual journaling. Furthermore, the role of small businesses as important stakeholders in a community school, also came to the fore. What is emerging across all the research engagements is the importance of this form of positive activism.”

Current education realities

Since 2011, the Centre for the Community School (CCS) has initiated projects to strengthen and support the work of schools in the Eastern Cape, with an emphasis on empowering those in poor working-class communities faced with severe socio-economic challenges. The school improvement programmes span 25 schools (primary and secondary), organised into four networks. These involve multi-stakeholder communities of practice (CoPs) who explore responses to the various challenges confronting the schools within in their network.

“We argue that to adequately address the current education realities in the country, schools need to re-evaluate their role within communities, and how they can best serve these communities by opening up possibilities for a better future for all,” says Dr Damons. “The CCS firmly believes that to advance teaching and learning effectively, attention needs to be given to the multiple socio-economic challenges facing school communities. Therefore, it is critical to move away from the notion of getting schools ‘back to the way they were’, and instead to imagine new ways of dealing with current and future challenges, as well as redefining school success and functionality.”



Dr Bruce Damons



Silindele Malangeni

Indigenous knowledge in the teacher education curriculum

Student teachers need to be exposed to a curriculum that includes indigenous knowledge in order to develop into multiculturally conscious educators.

"If knowledge refers to how individuals and societies construct and interpret realities based on their lived experiences, histories, belief systems and ways of knowing, a new curriculum underpinned by multiple knowledges will have to be collectively constructed," says Associate Professor Nokhanyo Mdzanga in the Faculty of Education.

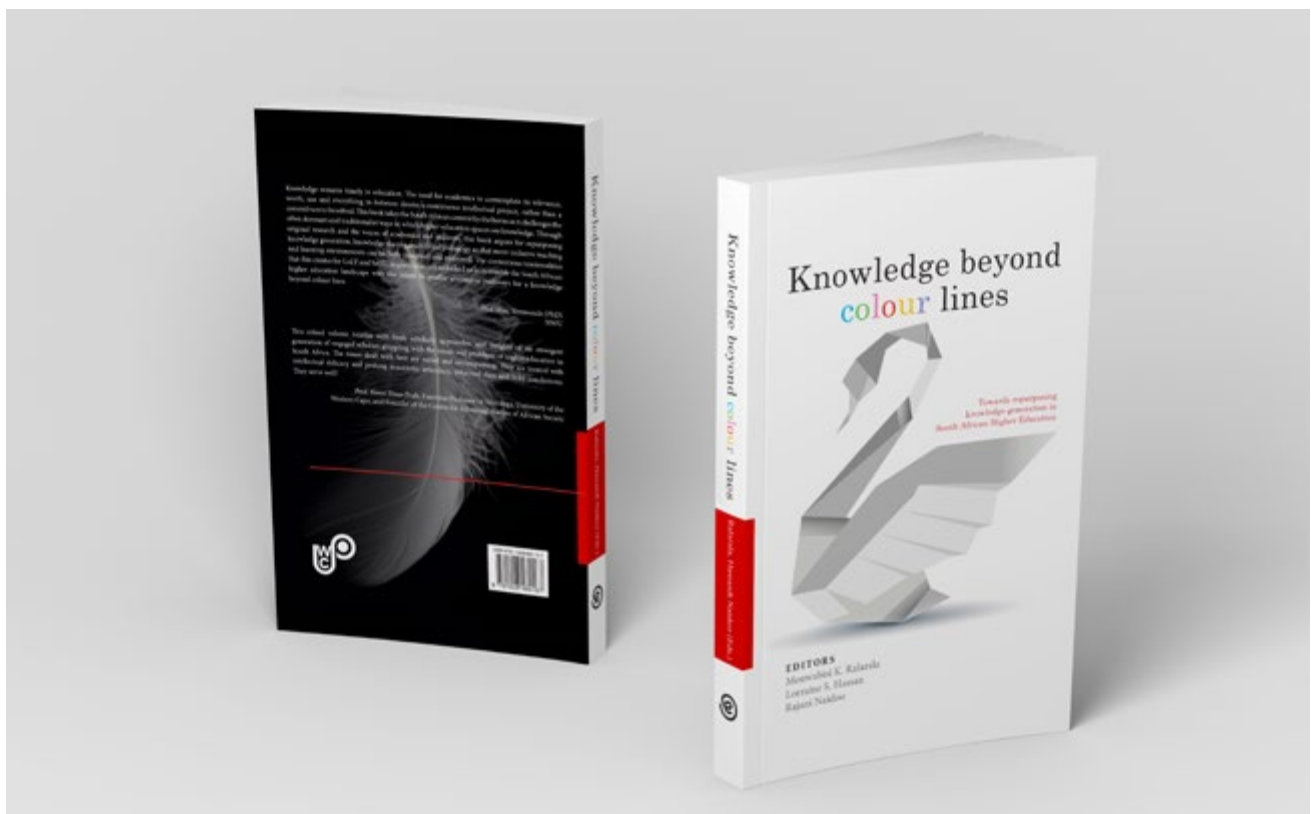
She contributed a chapter about this in a book published by the University of the Western Cape Press in 2021 titled *Knowledge beyond colour lines: Towards repurposing knowledge generation in South African higher education*.

Prof Mdzanga's chapter is titled 'Locating Indigenous Knowledge in a teacher education curriculum'. "In this chapter, I use Professor

Zodwa Motsa's definition of the terms 'indigenous knowledge' and 'indigenous knowledge systems' to denote the knowledge that had been in existence in indigenous African societies before colonisers set foot in their communities." (Prof Motsa is the Executive Director: Leadership and Transformation at UNISA.)

"My research calls for prescribed texts, pedagogies, language usage and the academic theories, philosophies and values that underpin the curriculum to recognise, in dialogue with other forms of knowledge, the importance of indigenous knowledge in teacher education preparation."

It's a complex process, she explains, and teacher educators and curriculum designers must be mindful of the complexities and



tensions generated by embedding indigenous knowledge in teaching and learning because it is not just about adding a new knowledge area it requires instilling a whole new critical indigenous consciousness.

She quotes curriculum specialist Dr Hollie Kulago from the Faculty of Education, Pennsylvania State University, whose research focuses on critical indigenous curriculum and pedagogy, who says: "Indigenous knowledge cannot be easily embedded without disrupting Eurocentric hegemony in the content of the curriculum."

Given the multicultural and multilingual nature of South African classrooms, we need teachers who are conscious of mediating learning and knowledge in diverse classroom contexts. Hence, the whole teaching and learning space needs to encourage students to question their assumptions and beliefs about knowledge. "Perhaps

Language as a social justice issue

"Drawing on the views of Brazilian educator and philosopher Paulo Freire, who was a leading advocate of critical pedagogy and the non-neutrality of education, we believe that the curriculum is a space of power, political contestation, caring and debate, and therefore should be taken into consideration in thinking about language as a social justice issue. Furthermore, we highlight the dangers of reproducing inequalities through the curriculum and the complexities surrounding the issue of language as a tool for social justice and social change." – Prof Mdzanga and Dr Muki Moeng (Executive Dean of the Faculty of Education) from the February 2021 webinar *Critical perspectives on language as a social justice issue in postcolonial higher education institutions*.

Prof Mdzanga and the Faculty of Education redesigned the isiXhosa module of the Foundation Phase teaching degree so that from 2019 it has been taught over the full four years instead of only in the first year. She says: "If education in general is to embrace a decolonised, humanising pedagogy, we are compelled to foreground African languages in the Foundation Phase teacher preparation curriculum in order to develop a new generation of teachers who use African languages in the classroom. This is all the more critical given the growing number of English and Afrikaans-speaking student teachers who will teach in multilingual classrooms."



Professor Nokhanyo Mdzanga

the starting point should be for students to define what they count as knowledge and how they grapple with locating the concept in their teacher preparation curriculum," says Prof Mdzanga.

"The desired goal would be a curriculum that enables student teachers across all disciplines to be critical educators. Such a curriculum, I argue, would empower teachers to critique the epistemological issues that exist in teacher education and enable them to effect change in what, how and why they teach.

"These critical issues and challenges in education need to be addressed using a multidisciplinary approach. It would be interesting to learn how different faculties think about locating indigenous knowledge in the curriculum and how they address the decolonisation of the curriculum as a student project area in the course."

Prof Mdzanga quotes Zimbabwean educators Lincoln Moyo and Lillie Beth Hadebe who say: "Teacher education preparation programmes should take into consideration the philosophies that underpin their curriculum. It is common knowledge that African philosophy is barely used to raise consciousness about issues of identity, culture, thought and civilisations. It is questionable whether teaching and learning approaches used in teacher education make it explicit that skills and values, such as respect and work ethic, are bolstered by African philosophy."

Teaching Grade 1–3 learners maths in isiXhosa

For her master's research project, Zintle Bangiso-Fihla has chosen to focus on pre-service teachers' perceptions of their preparedness to teach mathematics in isiXhosa foundation phase classrooms.

"I was accepted into the master's programme in April this year and my research proposal is currently being reviewed by the Faculty of Education," says Bangiso-Fihla, who is part of the Nurturing Emerging Scholars Programme (NESP).

"It would be very challenging to do my master's without NESP and I really appreciate the assistance and support I have received during the COVID-19 pandemic, including enabling me to access online workshops, which are critical for my research.

"My supervisor, Professor Nokhanya Mdzanga, and Dr Priscilla Mensah, the Director of Research Development at Mandela University, have been especially supportive. They organised a laptop for me and I am forwarded links to workshops, such as one on literature reviews, joining with scholars from other universities in South Africa. We get to share our research and critique each other's work."

Bangiso-Fihla did her honours at Rhodes University, looking at theories in English language teaching in the foundation phase in an isiXhosa classroom context. "What really attracts me to the Faculty of Education at Mandela University is its strong engagement with community schools. I grew up in the township in Komani [formerly Queenstown] and I know the challenges of being a learner and teacher in the township."

For her research she is looking at isiXhosa foundation phase classrooms (Grade 1 to 3) at schools in KwaNobuhle and other townships in Nelson Mandela Bay. "I'll be interviewing student teachers who are first language isiXhosa speakers to find out whether they were taught to teach mathematics in isiXhosa, whether they teach foundation phase mathematics in English or in isiXhosa during their teaching practice and whether the isiXhosa first language learners engage with and understand what they are learning."

Bangiso-Fihla says she was motivated to pursue this research after standing in as a foundation phase educator at a school in



Zintle Bangiso-Fihla

KwaNobuhle: "The children would be counting in English – why is this? Another example, is a learner gave the correct answer to a specific mathematics question and I asked him how he got to the answer. His reply: 'The teacher told me'. Too often children are not engaging with the content and I think it's very important



that isiXhosa first-language speakers are taught foundation mathematics in isiXhosa to properly understand it, and that teachers are well prepared to be able to teach it well. The literature shows that children taught in their home languages in the first three years of schooling develop good self-esteem and confidence about learning.”

However, she says, it’s not simple or straightforward. “Many teachers have expressed difficulty teaching mathematics in home languages. Part of this difficulty results from the limited lexical capacity of home languages for mathematics and science terms.

In response, the National Education Evaluation and Development Unit says that terminology has been developed in South Africa for mathematical entities and operations in African languages. However, educators seem to find these unfamiliar and confusing.”

Another issue Bangiso-Fihla wants to reflect on is that “even when you are teaching in isiXhosa, the workbooks and teacher guides are either in English or they are in isiXhosa but the language is not the same isiXhosa we speak and use in class. Also, one word in isiXhosa can mean so many things. Perhaps it’s an issue of dialect and this is part of what I want to research.”

“Too often children are not engaging with the content and I think it’s very important that isiXhosa first-language speakers are taught foundation mathematics in isiXhosa to properly understand it ... ”



Towards a green transport strategy for SA

The national uYilo e-Mobility Programme is one of ten recipients of a £3-million (R60-million) grant in the South Africa-UK Partnering for Accelerated Climate Transitions (South Africa-UK PACT) programme funded by the UK Government.

“UK PACT is funded by the United Kingdom’s Department for Business, Energy and Industrial Strategy, where they work with partner countries to help reduce national carbon emissions and foster sustainable and inclusive economic growth,” says Edem Foli, uYilo’s Programme Manager.

“Our project is within the portfolio of projects confirmed at the end of 2020 for capacity development interventions in South Africa. The grant is divided between implementing partners nationally, and uYilo is working with a number of government departments and entities to build their capacity in the electrification of road transport, which will assist the country in the implementation of the National Green Transport Strategy.

“Our interventions are implemented in three phases, all online because of COVID protocols. They are mostly over a two-day

period and our first phase, which started in March 2021, includes helping various government departments and entities to develop capacity in electric vehicles, showing how electric transport works in different modes, including public transport, privately owned vehicles and micro-mobility (electric bicycles, scooters and three-wheelers).

uYilo has partnered with the Low Carbon and Fuel Cells Centre of Excellence (Cenex) – a UK-based, independent, non-profit research and consultancy centre. Cenex shares international best practice examples of the electrification of transport and what the UK and Europe have done, as they are far more advanced in the roll-out of electric vehicles than South Africa. It’s an invaluable opportunity to learn from them – what has worked and what hasn’t – and to adapt best practice to suit the South African environment and the African context.



uYilo Vehicle-to-Grid



Edem Foli

"As part of the second phase we are hosting online international webinars with Cenex, and specific gender equality and social inclusion webinars to inform women about electric transportation and to get far more women involved," says Foli. "We are engaging women's organisations, such as the Businesswomen's Association of South Africa."

Foli explains that there is a tendency to exclude people from marginalised and vulnerable communities, particularly women, whose representation in leadership positions in sustainable transport is low, and whose voices and needs are therefore often not heard. "One example is in micro-mobility where the electric bicycles, scooters and three-wheelers need to be designed to carry at least one passenger – usually a baby or child – as women are still predominantly the caretaker at home. The vehicles also need to have a compartment for groceries and personal belongings."

The uYilo e-Mobility Programme

The national uYilo e-Mobility Programme was established in 2013 as a multi-stakeholder collaborative programme focused on enabling, facilitating and mobilising e-mobility in South Africa. uYilo is an initiative of the Technology Innovation Agency, a public entity of the Department of Science and Innovation. The programme is hosted within eNtsa, an engagement entity at Nelson Mandela University.

Huge opportunity for lithium-ion battery manufacturing in SA

Foli authored an occasional paper commissioned and published in December 2020 by the South African Institute of International Affairs (SAIIA) – an independent, non-government think tank. SAIIA's occasional papers present topical, incisive analyses on key policy issues in Africa and beyond.

The title of the paper is: *SADC e-Mobility Outlook: Accelerating the Battery Manufacturing Value Chain*. "This is key to my research as it looks at how the SADC region with all its raw materials can fast-track industrialisation and seize the huge global opportunity in the lithium-ion (Li-ion) battery manufacturing chain for renewable energy and electric vehicles (EVs). South Africa has the world's highest reserves of manganese, an important component in Li-ion batteries."

Recommendations to develop Li-ion battery manufacturing in SADC include: member states aligning their policies to the SADC Industrialisation Strategy Roadmap and SADC Vision 2050 to fast-track the adoption of EVs in the region; forming a regional battery alliance; instituting capacity development interventions in the private and public sectors and establishing a regional body for the testing and accreditation of Li-ion cells and batteries.

Future employment opportunities within EV battery manufacturing are predicted to surge, and battery energy storage has been identified as an untapped opportunity for the SADC owing to the increasing global demand for EVs.

In addition, we need to consider the safety issue of micro-mobility in South Africa. The advantage is that it provides a far more affordable electric mode of transport than passenger vehicles, which the majority of the population cannot afford."

In phase three, uYilo will hold workshops with the various government departments and entities to develop reference documents for charging infrastructure and green procurement, such as the procurement of electric vehicle fleets. "A draft Auto Green Paper published in 2021 by the Department of Trade, Industry and Competition has been issued for public comment," says Foli. "The Auto Green Paper promises to be a game changer for the automotive industry, including a lower- and zero-rated duty for identified, unique electric vehicle components."

The most ancient sites along the Eastern Cape coast

A lot more work needs to be done to acknowledge the wisdom and science of the first indigenous people of southern Africa.

The Spirit of Water: Practices of cultural reappropriation. Indigenous heritage sites along the coast of the Eastern Cape-South Africa, is the name of the book published in 2021 by Firenze University Press, Florence University, authored by Dr Magda Minguzzi from the School of Architecture, in co-authorship with the Khoisan chiefs of Nelson Mandela Bay.

"The whole project was a partnership with twelve Indigenous leaders from the greater Nelson Mandela Bay area. Started in 2015 by my NRF Community Engagement Programme research group, its scope was to investigate methods and procedures that could help re-establish the link between the Indigenous communities and their 'forgotten' heritage sites. The representative chief for the Cape Khoi at Cape Recife, Chief Xam ≠ Gaob Maleiba of the



Research collaboration on the early developmental stages of fish larvae in the stone walled fish traps, Cape Recife Nature Reserve. From bottom left to right: Dr Francesca Porri (SAIAB), Dr Magda Minguzzi, Chief Xam ≠ Gaob Maleiba, Damasonqua tribe, Dr Paula Patrick (SAEON).



Dr Minguzzi interviewing Jean Burgess, First Indigenous Peoples leader of the Ghonaqua people, Eastern Cape coast. This interview and those with the Khoisan chiefs of Nelson Mandela Bay are featured in the book, "The Spirit of Water".

Damasonqua tribe, told us, 'We are finally able to write our own history from our point of view.'

Research started with precolonial fish traps along the greater Nelson Mandela Bay coast, including at Cape Recife, with the first-ever drawings of them featured in the book: "We refer to them as 'precolonial' because they cover a wide time frame; we know they were there more than 2000 years ago and that they were built and used by people along the coast. These are the most ancient sites, culturally and architecturally, along the Eastern Cape coast. The Khoisan chiefs performed ancestral rituals to honour their heritage and spoke about how the history of oppression affected and still affects their lives."

In 2021, Dr Minguzzi also published a paper on this work in the journal *Architecture SA*, titled: 'Practices of Cultural Reappropriation. A project on Khoisan heritage in the Eastern



The fish traps are over 2000 years old; they are hand-made rock walls strategically designed to work with the currents and tides and trap fish at high tide.

Cape'. The paper was approved by the Khoisan chiefs, who are acknowledged as co-researchers: Chief Thomas Augustus; Chief Jean Burgess; Chief Margaret Coetzee; Chief William Human; Chief Daantjie Japhta; Chief Brato Malgas; Chief Xam ≠ Gaob Maleiba; Chief Deon Spandiel; Paramount Chief Gert Cornelius Steenkamp; Chief Wallace Williams and Chief Michael Williams.

There is a deeply poignant element of time and tide in their work. Fish traps surveyed in the Cape Recife Nature Reserve in

2018/19 are no longer visible as they were completely covered in sand during a storm in 2020. The same storm revealed new fish traps and Dr Minguzzi had to quickly complete the site surveys in collaboration with colleagues from the School of Architecture, Lucy Vosloo and Hansie Vosloo.

Dr Minguzzi and the chiefs further collaborated at the new sites with ocean sciences researchers Dr Paula Patrick of the South African Environment Observation Network (SAEON) and

“ ... we know they were there more than 2000 years ago and that they were built and used by people along the coast. These are the most ancient sites, culturally and architecturally, along the Eastern Cape coast.”





Cover of the book "The Spirit of Water Practices of cultural reappropriation. Indigenous heritage sites along the coast of the Eastern Cape-South Africa", submitted in 2020 and published in 2021 in co-authorship with the Khoisan chiefs of Nelson Mandela Bay.

Dr Francesca Porri from the South African Institute for Aquatic Biodiversity (SAIAB).

"We started investigating and sampling the early developmental stages of fish larvae living in the stone-walled fish traps at Cape Recife," she explains. "According to Dr Porri, some of the fish traps appear to have been deliberately kept as fish nurseries where the fish larvae could develop, indicating the sustainable practices of the community."

It would appear that the fish traps were also used as live 'fridges'. This same practice happened all along the Mediterranean where the inhabitants built artificial pools near the sea and kept their captured fish there.

Dr Minguzzi has studied ancient fish traps in Australia, England and Japan and says that all over the world precolonial people used fish traps in a very clever, sustainable way. "All the fish traps have similar dimensions and positioning, clearly designed to take into account the currents, tides and changing levels of water."

The three researchers are co-authoring a paper on the subject, which they aim to publish in 2022.

"In addition to the book, I was supposed to do a travelling exhibition but the latter is impossible in these times and so in 2020 I started making a documentary instead, featuring all the chiefs who have been co-researchers over the past five years. They talk about heritage and heritage places that are particularly meaningful to them; that are representative of their own place of belonging but that was taken from them in the land occupation tyranny of this country."

The 40-minute documentary was launched during Heritage Month (September) this year at an open air function outside the Nelson Mandela Metropolitan Art Museum. "We aim to show it around South Africa and internationally," says Dr Minguzzi.

Her multifaceted work addresses the power of indigenous lessons from the past – how human beings can enhance natural biodiversity instead of destroying it. And at the same time, as SAIAB's Dr Porri puts it: "Magda is courageously tackling the much-needed – and delicate – question of the reappropriation of their heritage values by Indigenous groups in South Africa; values that were forgotten during the apartheid regime and post-apartheid era. She is bringing back the voices of the previously unheard."

" ... some of the fish traps appear to have been deliberately kept as fish nurseries where the fish larvae could develop, indicating the sustainable practices of the community."



eSchools are the future but are they ready?

The organisational and infrastructure enablers for ICT readiness in South African schools are lacking in the majority of provinces.

"eSchools are the future, especially in a world full of uncertainty and where households have limited resources," says Professor Darelle van Greunen of the Centre for Community Technologies (CCT) at Nelson Mandela University. In pursuit of this goal, the CCT helped to develop the eReady ICT Maturity Assessment tool, an easy to download app to assess and evaluate the e-readiness of all government schools in South Africa.

The app was developed in collaboration with the Department of Science and Innovation and the Technology Innovation Agency,

with input from the Department of Basic Education (DBE). "In 2020 we used the tool in order to understand the level of intervention required to enable ICT-based education in government schools."

The CCT's research, titled *eReadiness Assessment Tool for Schools* and authored by Prof van Greunen and Johan Botha (CCT Senior Project Manager) was presented and published as part of the proceedings of the *IST-Africa 2020 Conference* – a virtual international forum to showcase research, innovation and ICT4D* activities and capacity in support of the Digital



Prof Darelle van Greunen and CAT teacher, Afikile Sikwebu



Transformation Strategy for Africa (2020–30) and the UN Sustainable Development Goals.

The necessity for e-readiness and ICT capacity in our schools has been emphasised for years, with pledges from government in 2013 to deliver free broadband access to 90% of South Africa by 2020 and 100% by 2030 through its SA Connect campaign. The goal of South Africa's 2004 White Paper on e-Education was for every learner in the country to be ICT capable by 2013, and for teachers to use ICT to enhance teaching and learning. Neither have been achieved.

Now, with the advent of the pandemic, the urgency for e-readiness has been re-emphasised as learners need to be able to continue learning at home or wherever they are.

"Regrettably we are not there yet in the majority of South Africa's approximately 26 000 government schools, so this digital tool is a critical step forward to help our schools transition to a new era," comments Prof van Greunen. "Dedicated and adequately trained ICT educators have to be identified and supported to strengthen the ICT readiness of a specific school and as such embed digital technology in the educator sector of South Africa."

"Supportive policy environments and vibrant technological innovations and implementation are required to achieve access to and use of ICTs in all South African schools. This would significantly contribute to the basic and higher education landscape and ultimately to employability. In many of our rural areas and townships, it will bring technology to communities where there is no technology."

"Supportive policy environments and vibrant technological innovations and implementation are required to achieve access to and use of ICTs in all South African schools."



“It’s no good handing out laptops and tablets to schools or introducing coding from Grade 1 as the DBE has done, when the teachers are not ICT trained or the schools don’t have connectivity or electricity ... ”



“Learners will be introduced to knowledge-based information through the internet and online resources, as well as accessing career guidance and applications for higher education. In addition, computer digital literacy training could be offered to community members who would also be able to access information and applications for employment.

“If the DBE and other government stakeholders take the assessments seriously and proactively address the challenges highlighted in the e-readiness reports then we can begin to make significant progress,” Prof van Greunen concludes.

e-Readiness Levels

“In identifying the e-readiness levels at the schools, based on international best practice we opted for a mobile solution,” says Prof van Greunen. “At each school, the principal or an appointed teacher downloaded the app, which includes a range of Yes/No questions we developed for the e-ready assessment. This can also be done in an offline mode for areas with no or low connectivity. The questions determine the ICT readiness in terms of the school’s leadership culture, infrastructure, teaching and learning competencies and digital competencies.”

Five e-readiness levels are assessed according to each school’s ICT infrastructure, connectivity, curriculum and digital content, e-administration, teacher ICT readiness and teacher development and support. The levels are:

- Level 1 Underdeveloped ICT capacity (digitally unaware)
- Level 2 Poor ICT capacity (digital beginner)
- Level 3 Moderate ICT capacity (digitally competent)
- Level 4 High ICT capacity (digitally advanced)
- Level 5 Advanced ICT capacity (digitally mature).

The idea is that, ultimately, every school should achieve a high degree of e-readiness and every single learner in our schools should have a device or tablet – as per the President’s statement a year ago – but teaching capacity is often an issue.

“It’s no good handing out laptops and tablets to schools or introducing coding from Grade 1 as the DBE has done, when the teachers are not ICT trained or the schools don’t have connectivity or electricity,” says Afikile Sikwebu a CAT (computer application technology) teacher at Linkside High, a Quintile 4 School in Gqeberha. Sikwebu was formerly a member of the CCT, where he did his master’s in IT and was part of the team that collected data for the development of the tool.

Prof van Greunen adds: “Schools are expected to be able to use ICT, but consider that it takes an average of four to five years for most teachers to reach a level of technological proficiency at which they can use computers fluidly and effectively.”

She continues, “There are several other parameters that affect the implementation of new technology in the school environment. For example, the opinions and attitudes of principals with regard to ICT adoption significantly influence e-readiness of their school. Two schools with the same infrastructure, same human resources and same students can have very different results. There are concrete cases in which a mere change of the school’s principal has generated striking results in a short time. It is therefore especially important at the school level for the principal to have a vision of what is possible through the use of ICT, and to be able to work with others to achieve that vision.”

**ICT4D – Information and communications technology for development*

Building our own marine research assets

The Marine Robotics Unit has designed a prototype surface autonomous vessel that is currently being tested for operational conditions.

"Instead of purchasing expensive equipment on the international market, we are building our own marine research assets that we can make available to scientists and the market," says Andrew Young, manager of the Marine Robotics Unit (MRU) and engineering director of eNtsa in which the MRU is situated.

eNtsa is an internationally recognised innovation hub within the Faculty of Engineering, the Built Environment and Technology (EBET). Research activities within marine robotics include projects related to machine learning and the integration of control systems as part of Industry 4.0.

A transdisciplinary group of researchers from the schools of engineering, physics and zoology have come together in the MRU, and developed a prototype surface autonomous vessel (SAV), designed to survey the little-researched shallow reef and estuarine environments.

Young explains: "The SAV has multiple uses – from measuring temperature, depth and salinity and potentially the growth rate of perlemoen [abalone], to other non-marine uses such as inspecting the structural integrity of dam walls. It includes WiFi, GSM and GPS communications systems and the Li-ion battery and power



Autonomous research vessel

management system is supplemented with an onboard solar array. Lake and sea trials are underway, including a trial in collaboration with the University of Cape Town to measure how much power a vessel would use in extreme temperatures, notably in Antarctica at -60°C."

MRU researchers are collaborating with the faculty's Advanced Mechatronics Technology Centre to build an ocean glider to replace the use of research vessels. The drone carries sensors that measure water temperature, salinity and fluorescence. It is also used to calibrate satellite data. The ocean glider can cover hundreds of kilometres at sea using very little energy from its rechargeable battery pack.

The MRU researchers are also collaborating with the South African Institute for Aquatic Biodiversity (SAIAB) on video data analysis – developing a computer model that can identify fish species, count them and create a numerical model of what the abundance is. This would replace physically counting them and naturally save significant amounts of research time. Additionally, a Memorandum of Understanding with SAIAB is in the Mandela University approval process. SAIAB's list of projects require marine robotic support and the institute offers significant bursary opportunities for EBET PhD, master's and final year projects.

"Each project in marine robotics is unique and includes complex coupled systems of mechatronics, materials science, physics, advanced manufacturing processes and design," says Young. "The MRU also contributes to creating competence in designing and optimising solutions in support of maritime sciences using sophisticated software, advanced hardware, data management and communication systems."

Since its launch in 2019, the MRU has secured several partnerships and support, including funding from the South African International Maritime Institute (SAIMI). SAIMI was established in 2014 by Operation Phakisa for the Oceans Economy to focus on building, research and innovation, skills development and advocacy in the maritime environment.

The Executive Dean of EBET, Professor Ben van Wyk, introduced the MRU's research to Montpellier University in France, which led to collaborative funding agreement through which a researcher from Montpellier will be placed at the Nelson Mandela University for a year. Engineer Karen Godary-Dejean is the selected researcher and she will join the team at Mandela University as soon as the pandemic permits.



"Each project in marine robotics is unique and includes complex coupled systems of mechatronics, materials science, physics, advanced manufacturing processes and design."



Sustainable low-income human settlements

New technologies for building methods, energy, water and sanitation systems are essential for the establishment of sustainable low-income human settlements in South Africa.

"Based on the work we have done on sustainable low-income settlements over the past five years, including our EcoSUN Green Village project at Kenton on Sea's Ekuphumleni township in the Eastern Cape, the Technology and Innovation Agency (TIA) asked the University to partner them in leading a Community of Practice (CoP) on Science, Technology and Innovations for Sustainable Human Settlements," says Professor Sijekula Mbanga, Department of Buildings and Human Settlements, and Chair for Sustainable Human Settlements in the Faculty of Engineering, the Built Environment and Technology.

The CoP started in 2020 with a view to the future establishment of a Centre of Excellence in Human Settlement Innovations. It leverages partnerships and relationships with key local and international institutions researching housing and human settlements sustainability, and with private innovators who are designing prototypes for appropriate low-income settlements in South Africa. The Department of Science and Innovation (DSI), the

Department of Human Settlements and the Council for Scientific and Industrial Research are all part of this emerging CoP.

"The CoP comprises a transdisciplinary team because you cannot be discipline bound in research and innovation for sustainable human settlements," says Prof Mbanga. There is a steady increase in the number of postgraduate students researching and publishing articles on this area of innovation.

"We know the challenges with electricity supply and there has to be focus on a renewable energy hybrid system at household level to supplement the Eskom supply. Low-income settlements completely rely on Free Basic Electricity; some municipalities give 50 kWh free electricity and some give 100 kWh; and once this has been used, many people are left in the dark."

Sanitation is yet another huge issue, as waterborne systems in urban areas are not sustainable, given the amount of water they



PV solar system at Ndlambe EcoSUN Green Village in Ekuphumleni Township, Kenton on Sea



Professor Sijekula Mbanga

use, the water shortage the country is facing, and the rapid rate of urbanisation. The ventilated, improved pit latrines in the informal and rural areas are also proving to be a major challenge as they require routine suctioning but they are not maintained by the municipalities. This poses health risks, such as cholera, when there is excessive rainfall. “We need to mainstream and popularise water-wise sanitation technology methods that already exist, while inventing other eco-friendly dry-sanitation systems,” says Prof Mbanga.

“In terms of housing construction materials, we are talking with TIA and DSI about collaborating in a project with Furntech – a South African company in the furniture industry – to develop a low income timber-frame housing prototype that would use local materials, boost the forestry industry and create more green jobs. The discussion includes colleagues from our School of Architecture and from Wood Technology on the George Campus. Similar talks are underway with the National Housing Finance Corporation and the MTO Group near Tsitsikamma about adapting the MTO timber-frame prototype to the government housing subsidy framework.”

Property economist and postdoctoral research fellow, Dr Emmanuel Kabundu, in the Department of Buildings and Human Settlements, and a researcher in the CoP initiative, is looking at the affordability of new technologies for government and individuals.

He says, “I’m focusing on a life cycle cost analysis for low-income human settlements because new and supplementary technologies and systems for sustainable building, energy, water and sanitation require higher capital costs, but the benefits in the medium and long term make economic sense. It also makes sense in terms of climate change, particularly since South Africa is committed to reducing its carbon footprint.



Grey water pre-filter chamber



Grey water system

“Part of our mandate is to guide government in making the right choices. We are developing policy briefs on all the areas covered and linking the technologies to other areas such as carbon footprint reduction and carbon tax.”

In August 2021, the CoP team, with TIA and DSI, is hosting a seminar as its ‘soft launch’. The purpose is to discuss all the aspects of sustainable human settlements and to create space for researchers from other institutions to present papers and case studies on sustainability research. Participating are planners and researchers from the metros and municipalities in all nine provinces, the Provincial Departments of Human Settlement and human settlement entities.



The EcoSUN Green Village

The Chair is partnering with the University of Potsdam, Germany and the DSI in the EcoSUN sustainable 'Green Village' project at Kenton on Sea's Ekuphumleni township, a science and technology initiative for new types of settlements.

"The Ekuphumleni demonstration site comprises ten attractive, innovative RDP homes, which are linked to a grey water recycling facility hosted by a multipurpose community centre (MPCC)," Prof Mbanga explains. "Solar panels power the MPCC, while the houses have a hybrid of solar energy and electricity. The MPCC is also making use of an alternative sanitation system. In September 2021, with our German partners, we will be training youth in the community to be technicians for the maintenance of the community's green technologies, so that all maintenance and repairs can be done locally both in the MPCC and the ten homes. Skills transfer to the communities is an important component of sustainability in technology transfer.

"As a medium to long term agenda, we are currently strategically mobilising resources with our German partners to explore another EcoSUN Green Village demonstration site in the Eastern Cape. This development will be undertaken in collaboration with two TVET colleges in the Eastern Cape – the East Cape Midlands and Iqhayiya Campus (PE TVET College) and the Berlin-Brandenburg Vocational Institute in Germany, supported by the University of Berlin. Key among its outcomes is to introduce appropriate green artisan qualifications in South Africa."

The intention of this demonstration site is to influence the South African government policy in sustainable human settlement nationally through engaged research that does not end with research findings, but rather tangible and observable eco-friendly and liveable human settlements whose design can be replicated in other comparable environments in South Africa, southern Africa and the continent.



Social distancing and the everyday life of the urban poor

The Chair for Sustainable Human Settlements includes researching and assessing the impact of the coronavirus pandemic on low-income settlements and how to improve spatial planning for the future.

Flattening the COVID-19 Curve: The socio-economic and cultural challenges of COVID-19 social distancing on everyday life of the urban poor in South Africa, is the title of research conducted by Professor Paul Makasa from the Department of Architecture, Dr Ayo Adeniran from the Department of Buildings and Human Settlements and Professor Sijekula Mbanga.

Prof Makasa explains: “Given that a significant part of this study was conducted in December 2020 and January 2021 under COVID-19 protocols, there could be no meeting with groups, so we changed our study approach to structured direct observation by doing drive-throughs in Walmer E Township and then parking the car at the market and observing from there.”

From the car, for two hour stretches at a time, they observed how people related to and interacted with each other. “The drive-through and market observation followed up the transect walks we had conducted in March 2019, before the pandemic,” Prof Makasa explains. “During the pre-COVID visit, all evaluators walked with a group of community leaders through the Walmer E and Vistrus settlements; it was important for us to derive visual and locational information. It also helped us create a deeper understanding of the environment.

“In Walmer E, we asked key informants to point out and discuss areas of concern, such as where methane gas seeps through from the ground, which is an issue in this township. The data we collected during these transect walks was used as baseline information for the observational study on Walmer E, which we supplemented with informal surveys, literature searches in daily tabloids and other electronic and print media.”

The Walmer E ground-up empirical data was required to inform the Department of Human Settlements’ plans to upgrade three selected townships; Walmer E, Vistrus and Chris Hani in Gqeberha (formerly Port Elizabeth), Eastern Cape. The upgrade was put on hold because of the pandemic, but the process was geared towards decongesting, greening and therefore subtly social-distancing housing units by strictly enforcing adherence to legal building lines, which does not happen currently.

The researchers gathered, analysed, and reported relevant information for decision-makers to evaluate the socio-economic and cultural challenges of COVID-19 social distancing on the everyday lives of the urban poor. Everyday life involves the daily or routine aspects of how individuals behave, act, think and feel. For most of the urban poor this behaviour is dictated by their desire to survive to the next day.

“The researchers gathered, analysed, and reported relevant information for decision-makers to evaluate the socio-economic and cultural challenges of COVID-19 social distancing ... ”





"The poverty level in informal settlements is evident in the space constraints, overcrowding, lack of outdoor space, and overlapping or clustered house designs," says Prof Mbanga. "These features make physical distancing and self-quarantine impractical, and are a conducive environment for the rapid spread of communicable diseases."

They observed that many people in Walmer E did not have masks on and mandatory distance of 1.5–2.0m between people was not adhered to at all. "At the market we observed 'a business as usual' atmosphere, with close to half the people not wearing masks," says Prof Makasa. "They were transacting on the street, selling whatever merchandise they had. These included apples, vegetables, bananas, pears, potatoes, nail polish, wigs and hats. A group of bus drivers waiting to load passengers were clustered together smoking cigarettes, which they shared freely. They wore no masks."

"We then observed that out of the ten buses that loaded in our presence, about four drivers drove off without putting their masks on. Most passengers arrived at the bus station either with their masks in their hands or pockets. Some even had their masks under their chins. We observed that very few people wore their masks properly as they approached the buses. They only did this as they embarked on a bus, so at least every passenger had a mask on as the bus drove off. Generally, bus stops and the buses themselves were still as crowded as in pre-pandemic days. This makes them clear incubators and COVID-19 hotspots."

The study has highlighted that handling pandemics in countries with high rates of urban poverty is very complex and can end up being ineffective. This calls for the need to formulate and implement bespoke strategies and innovative policies.

"The COVID-19 pandemic has spotlighted the numerous deficiencies in our informal settlements," says Prof Mbanga. "It triggers bigger questions about the character of the South African democracy – that at times tends to forget about the needs and circumstances of its financially impoverished constituencies when faced by crises. To effectively mitigate the effects of the pandemic, requires a complete transformation of the way the South African everyday life of the urban poor is played out."

3 200 recorded informal settlements

South African government reports suggest that between 2002 and 2016 informal settlements in South Africa have increased from 300 to 2 225. By May 2020 assessed and recorded informal settlements in South Africa were said to be around 3 200, and still growing in number. However, it is not easy to confirm how many informal settlements exist in South Africa, as shacks spring up on a daily basis. Based on existing knowledge, about 1,3-million households, translating to almost five million people, live in informal settlements in the highly dense urban settlements in and around the major metropolitan cities of Cape Town, Johannesburg, eThekwin, Buffalo City, Nelson Mandela Bay and Mangaung.



Primary healthcare is the ethos of our new Medical School

The Chair for Sustainable Human Settlements includes researching and assessing the impact of the coronavirus pandemic on low-income settlements and how to improve spatial planning for the future.

In line with the University's Vision 2030, the new Medical School operates within a paradigm of medical education geared towards developing graduates who are oriented towards being in service of society. The school has been deliberately placed within precarious communities, and is poised to make a tangible impact on healthcare in this region. It opened its doors to the first cohort of medical students in March 2021 with the aim of producing medical doctors trained with a strong focus on primary healthcare.

Tagged as a potential flagship for the Faculty of Health Sciences and the University, the new programme has generated a lot of interest regionally, nationally and beyond. Partnerships are key, and agreements have been signed with the Eastern Cape Department of Health and Walter Sisulu University, among others, to foster further collaboration.

Human Biology Department

The Medical School houses the interdisciplinary Human Biology Department, which has an integrated approach to the basic medical sciences. The department's long-term goal is to develop an interprofessional research hub on the Missionvale Campus, addressing healthcare concerns with a high impact on the surrounding community and the Eastern Cape. This hub will integrate chemistry, medical biochemistry, cell biology, human physiology, pharmacology and human anatomy, offering services that have previously not been available to disciplines in the Faculty of Health Science.

Developing effective strategies to address healthcare burdens is dependent on understanding genetic, epigenetic, physiological,



and anatomical contributors to pathology. The Eastern Cape, already facing challenges with important determinants of health like poverty, HIV and TB, was one of the hardest hit provinces in South Africa during the COVID-19 pandemic. The long-term effects of infectious diseases on health, particularly regarding metabolic dysfunction, warrants research, and the dearth of knowledge on these conditions in African populations needs to be addressed.

The Human Biology Department's approach to research takes into consideration biochemical, physiological and anatomical drivers of disease. Efforts have already begun to establish research activities on the Missionvale Campus as well as working towards establishing a consultation centre for community-based research.

A study investigating neurovascular anatomy to identify possible secular anatomical trends in various population groups in Missionvale is being initiated. This will evaluate premature vascular

ageing in the community to identify risk factors associated with adverse health outcomes. Physiological and anatomical findings can be further substantiated by evaluation of biochemical, genetic and epigenetic markers in this population, producing high impact studies that are relevant to the community.

Departmental staff currently comprise a medical biochemist, two anatomists and two physiologists, with more staff due to join within the next year.

Cell culture facility a first

Our cell culture facility is a first for the Faculty of Health Sciences. In the facility, various cell types, including cancer cells, can be cultured for novel drug testing, toxicity testing and studying molecular mechanisms of disease. This provides benchmark data that can be extended to studies in animal or patient studies.



“The Human Biology Department’s approach to research takes into consideration biochemical, physiological and anatomical drivers of disease.”





The first 50 Medical students were welcomed at their oath-taking ceremony in May 2021.

The facility will be used by other departments in the faculty for postgraduate research and training. Furthermore, equipment to process and store patient samples, such as blood and tissue, has been procured.

Technology-intensive approach

The technology-intensive approach at the Medical School differentiates this programme from other universities. The use of the Anatomage Table – a virtual dissection table – and virtual or augmented reality visualisations of structures from biomolecules to skeletons, offers a unique opportunity in medical education research. The resources available for anatomy will be used for both research and teaching.

Long term, the department has a multifaceted approach to setting up research units. Firstly, the establishment of a molecular medicine lab is in the works, with equipment to quantify gene expression, and a proteomics lab being the next objective. For the future, partnerships may be formed with nearby radiology practices, to produce anatomical research that speaks to the needs of the community. This approach will take molecular and cellular understandings of disease and translate them to structural and pathophysiological features of disease.

Currently, however, there is no postgraduate programme linked to the Department of Human Biology, which limits research capacity.

Medical Education Unit

A Medical Education Unit is being set up to promote integration across and between the different study years, delivering a spiral curriculum that builds on foundations laid in the early years. Key staff for this unit have been appointed.

Starting a Medical School is challenging: starting one in a pandemic takes this challenge to a different level. It has called for innovation and an immense investment of resources, not the least of which are financial. However, it may also open additional sponsorship and funding streams, and heralds the dawn of a new era of medical education, with primary healthcare in the Nelson Mandela Bay area as a central focus.



Improving water, sanitation and hygiene for healthier children and communities

“Across South Africa, there are a total of 23 400 Early Childhood Development Centres, housing over 1 030 000 children. Flushing toilets and piped water are only available in 53% of them. Eight per cent have no flush toilets or piped water.”¹ – Prof Eric Atmore

Assessing water, hygiene and sanitation (WASH) practices at the Bay’s most under-resourced Early Childhood Development (ECD) centres and primary schools – and creating awareness strategies to help improve them – is much more than a research project. It’s about improving children’s lives and empowering communities to take control of their own health.

Prof Paula Melariri, an Associate Professor in Mandela University’s Department of Environmental Health, has always been interested in public health research, and especially neglected tropical diseases

(NTDs), which typically affect the poorest communities and have not received as much attention as other diseases.

In 2016, she ran a workshop with nurses from public clinics and staff from the National Institute of Communicable Diseases to create awareness on NTDs and to establish the extent of the cases being reported in Nelson Mandela Bay.

“The workshop was really an eye opener,” said Prof Melariri. “Workshop delegates indicated various NTDs as experienced



¹ Atmore, E. (2013). Early childhood development in South Africa – progress since the end of apartheid. *International Journal of Early Years Education*, 21(2–3), 152–162. doi:10.1080/09669760.2013.832941



Prof Paula Melariri

or presented in the clinics, including those commonly caused by intestinal parasites, geo-helminths (parasitic worms) and bilharzia.”

Since many of these preventable diseases are linked to unsafe water and poor hygiene conditions, and because these diseases mostly affect children under five, often stunting their growth or even causing their deaths, Melariri and her research team received approval to visit ECD centres in Mandela Bay’s poorest areas to assess their WASH status and practices.

“Children under five have not yet acquired much immunity. So it is a concern if the environment where they spend most of their day is not adequately protected or clean.”

During the initial assessment phase, Melariri’s team visited 46 ECD centres with more than 2 400 children – and were alarmed by what they saw. “It was so disheartening when I saw very young children, less than three years old, using the open bucket system. Such a system is very risky, health wise.”

More than 20% of the ECD centres used the bucket system, while in 60% of centres, many children shared too few potties.

They also found that only 11% of the study population washed hands hygienically under running tap water or under tippy taps*, while children in 79% of these centres took turns to wash their hands in a

communal plastic bowl. “So if a person’s hands are not only dirty but contaminated with a communicable disease, chances are that another person will get contaminated while washing hands in the same bowl.”

The study observed that many of the ECD schools were not registered with the Department of Social Development, as they lacked the financial means to meet the registration criteria – but failure to register meant they were unable to access any government funding to improve their WASH facilities.

After assessing the ECD centres’ WASH status, the researchers came up with an intervention strategy that would lead to immediate and extensive impact.

“We felt we could start with enhancing the teachers’ and caregivers’ awareness around how these diseases are transmitted, and also provide WASH messages to help them wash hands hygienically.”

Prof Melariri and her team developed child-friendly WASH messages – so that the practitioners would understand how to teach these little ones, who in turn could share these messages with their families, to improve hygiene in their homes.

“Our team came up with a song which will enhance assimilation of the WASH processes.

“Children are good transmitters. They can actually take these messages back to the communities and, as the community adopts these messages, we’ll start seeing improved health in the community. That is an integral part of the aim of this project, to enhance the understanding of not only the practitioners, but the participation of the communities.

“That first study made us realise there is a huge need to enhance the WASH status at ECD centres and primary schools. Starting in Mandela Bay, we plan to extend this project across the entire Eastern Cape and turn it into a sustainable programme.”

The team is currently assessing more than 80 ECD centres in Nelson Mandela Bay, using a pre- and post-intervention assessment strategy.

“The intervention phase is very important because we provide the ECD centres with educational materials with age-appropriate illustrations and images, as well as hand-washing liquid and a water-dispensing heating bucket.”

The baseline assessment and intervention phases of the project have since been completed. The post-intervention phase will be carried out later to evaluate the success of the intervention phase.

**Tippy Taps are simple and economical hand-washing stations, made with commonly available materials and not dependent on a piped water supply*

From a small seed to an international network

“This is about how a small seed can grow into a large network to ensure medicine and treatment are optimally and cost-effectively managed for each and every patient.” – Distinguished Professor Ilse Truter

Pharmacy professor Ilse Truter’s many years of exceptional work were rewarded in 2020 and 2021. In 2020 she was inducted as a Fellow of the International Society for Pharmacoepidemiology (ISPE). This is the largest, most distinguished society of clinicians and researchers in the world, and in terms of her research credentials it’s the apex recognition.

At the same time she was appointed as an Associate Editor (Asia-Africa-Middle East Region) of the journal *Pharmacoepidemiology and Drug Safety* (the journal of the ISPE), which is the most influential journal in this research field.

Also in 2020, she was appointed as the Director of the School of Clinical Care and Medicinal Sciences in the Faculty of Health

Sciences and received the Faculty of Health Sciences’ Researcher of the Year Award in 2020. In 2021 she was made a Distinguished Professor in Pharmacy.

The leader of the Drug Utilisation Research Unit (DURU) and an expert member of the WHO International Working Group on Drug Statistics Methodology, Prof Truter describes “how a small seed planted in 1994 to start DURU and the research linked to it at our University, has gained international recognition”.

Drug utilisation research, she explains, “was introduced to academia in South Africa by Professor Ian Wiseman – head of the Department of Pharmacy at the University of Port Elizabeth, now Nelson Mandela University. It is an amazing research field, ranging



Prof Ilse Truter

from high level research on opioid usage, to Vitamin D, to our National Health Insurance, to pharmacoeconomics, to Attention Deficit Hyperactivity Disorder (ADHD)”.

As a master’s student Prof Truter was appointed by Prof Wiseman as a contract researcher in DURU in 1994 and a full-time lecturer in pharmacy in 1995. “In 2015, with funding from Sweden, the inaugural meeting of the Medicine Utilisation Research in Africa Group (MURIA), took place in the University’s International Office boardroom,” she explains. “We hosted the first MURIA meeting with about 20 people and subsequently started publishing in African groups – with five to ten authors.”

Today there is a network of approximately 150 researchers and clinicians in Africa involved in research within MURIA. An African Regional Interest Group of the ISPE was also established and the first joint conference of MURIA and ISPE was held in June 2021.

DURU at Nelson Mandela University is also thriving. “Pharmacoepidemiology is inherently a multi- and trans-disciplinary field, spanning, inter alia, clinical pharmacology, management, economics and biostatistics,” Prof Truter explains. “DURU’s research contributes to innovation and the digital economy, with specific reference to Big Data and the establishment of databases in Africa for drug utilisation research to examine how institutions, policies, regulations and human skills can be transformed to keep up with the quickening pace of digital transformation in Africa.”

In 2020 three PhD students graduated from DURU:

- Dr Neelaveni Padayachee, whose research topic was: “Utilisation of over-the-counter medicines in medical schemes in South Africa”. Prof Truter co-promoted with Wits University, where Dr Padayachee graduated.

The other two PhDs from Nelson Mandela University both looked at adult ADHD:

- Dr Ashmitha Munasur-Naidoo’s PhD topic was: “Evaluating the extent of diagnosis and treatment of adult Attention-Deficit/Hyperactivity Disorder (ADHD) in South Africa”.

“We still don’t know enough about the diagnosis and treatment of adult ADHD since ADHD research has predominantly focused on children,” Prof Truter explains. Munasur-Naidoo did a standalone survey of all the literature published on adult ADHD and then did a survey on its diagnosis and support systems. She found that the diagnosis of adult ADHD is not always formalised and sufficient support systems are not always in place for adults with ADHD.

- Dr Judith Regnart’s research topic was: “Substance use disorder in adult patients with co-morbid Attention-Deficit/Hyperactivity Disorder and mood disorders: a psycho-pharmacological analysis”.

Regnart’s research looked at people who are treated for various psychological conditions, to see how many of them have undiagnosed ADHD. If diagnosed at a younger age, it is feasible that many of the problems people experience later in life could be avoided or reduced in severity. Adults with ADHD generally tend to be disorganised, hyperactive, prone to substance abuse, demonstrate impulsive behaviour and may struggle to concentrate and maintain jobs or relationships.

Truter started focusing on ADHD 15 years ago when she was researching Ritalin – a medication used to treat ADHD. She works in collaboration with Professor Anneke Meyer, a retired psychologist from the University of Limpopo and a research associate in DURU. Their research – and that of their postgraduates – feeds into the International Collaboration on ADHD and Substance Abuse (ICASA), based in the Netherlands: another example of how far the DURU has reached out from its small beginnings.

“Pharmacoepidemiology is inherently a multi- and trans-disciplinary field, spanning, inter alia, clinical pharmacology, management, economics and biostatistics.”



Live among the people, learn from them

Dr Busi Lujabe, a postdoctoral fellow in the Department of Social Development Professions, lived in the township and informal settlement of Wells Estate in Ward 60 to engage first-hand with the community for her research.

"I thought, let me start where I am," says Dr Lujabe. "I stay in Blue Water Bay in Ward 60 adjacent to Wells Estate – a low income human settlement area with a combination of RDP houses and shacks. It was created to accommodate informal settlement dwellers from all over Nelson Mandela Bay but there is so little employment in the area that it has created widespread food insecurity."

For her NRF-funded postdoctoral research project she chose to contribute towards solutions to addressing food insecurity in low-income households, so she moved to Wells Estate in March 2019 for a year, renting an RDP house.

"My move to the community to engage in participatory action research was inspired by 20th century Chinese educator Dr James Yen who said 'Go to the people, live among them, learn from them, love them, serve them, plan with them, start with what they know, build with what they have'," explains Dr Lujabe, whose research is co-hosted by Prof Veonna Goliath, head of the Department of Social Development Professions and Prof Blanche Pretorius, a Mandela University research associate.

"The first thing I did was to start listening to the stories of the people in the community, and consulting with the Ward 60 councillor and community development worker in Wells Estate to find out what was happening in the area," Dr Lujabe explains.

"Most households frequently go to bed without food and there are very few job opportunities. Many people are getting grants but these don't cover much in terms of a sustainable livelihood. Many people sleep on the floor in overcrowded homes and in the morning they roam the streets because there's no space and they need to find something to eat. There is a lot of drug abuse and the atmosphere is volatile with a high incidence of mugging. When someone dies they often remain in the state mortuary for months because there is no money to bury them.

"At the same time I encountered so many people who have a passion for their community. They are concerned that young



people are jobless and I observed a strong sense of ubuntu. People without enough money would make *umngqusho*, or mielie meal pap or vetkoek and share with people who do not have."

An important part of the participatory action research process was to identify priorities. "We identified what assets people have



Household food garden started by a woman in Wells Estate

that they could use, and what they wanted to happen in their community. Many said they wanted to continue sharing food with those who don't have, and they wanted to develop food gardens and start a soup kitchen. They also said they wanted to be skilled or to use their skills to open their own businesses, but that they did not know how to go about this.

"Starting with what they know, community members who know how to grow vegetables were happy to share this knowledge with others who wanted to create food gardens, which they did; other community members offered a shack for the soup kitchen; someone offered a small stove for the soup kitchen, and so it started."

Dr Lujabe also trained the members of the food kitchen to conduct a household food security survey at Wells Estate, using questionnaires. The data obtained from the questionnaires is currently being analysed by a statistician.

"Wells Estate household members have skills and strengths which can be strengthened to promote sustainable livelihoods," she explains. The questionnaires reveal a variety of skills and levels of skills in the community.

"Whatever research we do has to have a practical solution. Yes the research findings can certainly contribute to policy, but I strongly feel it needs to inform implementable projects that the community can take up, that can help enhance food security and sustain the community going forward."

Says Professor Blanche Pretorius: "The work Dr Lujabe is doing doubles as a living classroom where we have been able to bring on students and postgraduates from other departments. It gives real meaning to the kind of theory that we teach students, notably the asset-based approach through which communities own the process and develop a real sense of their own value.



Dr Busi Lujabe



Young people in Wells Estate learning to prepare the ground for growing crops

"It is also very important research in terms of the government's resettlement policy," Prof Pretorius adds. "In resettling people in Ward 60 from all over Nelson Mandela Bay, the government did not look at people holistically. So it didn't actually create a better life for people. Dr Lujabe's pioneering research can greatly inform an improved resettlement process."

Steps to eliminate all forms of racial discrimination

In October 2020, Prof Joanna Botha was one of twelve global experts to offer input at a seminar addressing state obligations in terms of the International Convention on the Elimination of All Forms of Racial Discrimination.

The International Convention on the Elimination of Racial Discrimination (the ICERD) was adopted in 1965 and enforced in 1969. It is the oldest of the nine core UN human rights treaties and commits all states who are party to it (currently 176, including South Africa) to take steps to eliminate all forms of racial discrimination and to promote understanding amongst all races.

"Our recommendations for the ICERD to consider included new obligations and normative standards to guide states on how best

to combat all forms of contemporary racism, including incitement to racial and religious hatred," says Prof Botha, who was supposed to travel to Geneva for the seminar but which instead had to be held virtually, because of the pandemic.

"The purpose of additions to the main treaty would be to clarify for countries what is expected of them in their domestic law, as racism, hate speech, racial cybercrime and discrimination have become so prevalent in society that we may need a more specific

protocol to deal with these matters and to clarify state obligations. Racial cybercrime and mass migrations from war zones and areas hit by climate disasters, for example, did not exist when the ICERD was first enacted.

"The convention is particularly important from a South African perspective given our history of racial discrimination and the current problems of inter-group and racial hatred in our society."

Prof Botha's research addresses the regulation of hate crimes and hate speech in the South African context as well as the prohibition of unfair discrimination. It also encompasses the immensely complex issue of how this regulation intersects with freedom of expression, equality and dignity for the individual and for groups.

"The relevant standards for how our law should respond to incidents of hatred is informed by international law (the ICERD is an international convention and the jurisprudence developed thereunder creates international law). My research is aligned with these standards, and it is a privilege to be working with other global experts in the field by contributing to the development of international law."

The experts attending the virtual seminar addressed the following four key issues:



Prof Joanna Botha

1. Dissemination of hate speech and how we should criminalise this.

Hate speech ranges from personal name-calling to calls to destroy a group of people. It is all unacceptable, but the debate is about which types of hate speech we criminalise. The boundary has to be tightly defined to avoid criminalising speech that is merely hurtful. It needs to refer to the insidious types of hate speech for which the perpetrators should be criminally sanctioned. An example would be if a prominent person with a large following were to suggest killing or rooting out a particular group of people, which might lead to significant harm and death as well as being a threat to society in general.

2. Racial cybercrime

Racial cybercrimes occur where people use internet systems specifically to disseminate hate speech and discrimination based on race, religion or belief and xenophobia. The big problem with cybercrime is it is disseminated very quickly and across jurisdictions through social media and multiple internet service providers. All parties have to be compelled to regulate racial cybercrime and universal standards need to be set. In the absence of these, companies like Facebook are deciding what is or is not acceptable.

3. Whether the definition of racial discrimination should include discrimination based on religion and belief in terms of ICERD.

This has become an increasingly prevalent debate in our society, mainly because of issues of migration, including where people have had to flee from war in their own countries. In recent years, for example, this has led to large numbers of people of Islamic descent migrating to Europe, which has triggered hate speech and various forms of racial discrimination. Whilst other treaties address religious discrimination and acts of hate, ICERD is limited to racial discrimination and hate speech.

4. Preventative measures that need to be taken to combat racist and xenophobic discrimination and hate speech.

To offer a South African example, the Promotion of Equality and Prevention of Unfair Discrimination Act 4 of 2000 was enacted in 2000, but the chapter containing preventative measures has not been put into place yet. Despite this, another bill has recently been proposed that would extend South Africa's definition of discrimination and also clarify the type of measures that need to be taken to combat discrimination and promote equality, but, says Prof Botha, "I believe it has been badly drafted. The Bill places onerous obligations on different organisations and organs of state. It is a very detailed and complicated amendment to the legislation that they are proposing that I think will be difficult for people to understand and implement. The law needs to be clear so that people know what is expected of them."

"All these issues need to be dealt with in terms of recommending concrete standards to guide states as to what is required of them," Prof Botha explains. "It's effectively a balancing act as you want to make sure the standards are clear and at the same time you have to take into account that certain parts of the world will take a very different approach to civil and political rights."

"I believe that I played a significant role in these deliberations," she continues. "I was honoured to represent Nelson Mandela University, South Africa and Africa at an international level and particularly in relation to the development of UN standards on an issue which impacts so profoundly on the well-being of our society and the integrity of the South African constitutional democracy."

"I have always wanted the work I do to make a difference to the lives of South Africans in this country that I really love. Getting this call from the UN to be one of two African experts to provide legal advice on hate speech and racial discrimination was really inspiring and gave me the impetus to work even more actively in this field."

"The purpose of additions to the main treaty would be to clarify for countries what is expected of them in their domestic law as racism, hate speech, racial cybercrime and discrimination have become so prevalent in society ... "



Africa's first fisheries law enforcement academy turns five

FishFORCE was established in 2016, supported by the Norwegian Ministry of Foreign Affairs, to improve fisheries law enforcement through training, research and innovation.

From its outset, FishFORCE has strongly advocated that fisheries crimes be addressed as a priority organised crime and prosecuted as such organised under the Prevention of Organised Crime Act, with severe penalties of 25 years to life.

The multi-crimes affecting the global fisheries sector range from illegal fishing and extraction of marine resources to human and drug trafficking, forced labour, fraud, forgery, corruption, money laundering and tax and customs evasion.

"Much of the global fisheries crime activity linked with fishing is happening off the coast of South Africa, Namibia, and the east coast of Africa," says Prof Hennie van As, professor in Public Law and Director of the FishFORCE Fisheries Law Enforcement Academy at Nelson Mandela University.

"The fishing vessels that illegally fish in our Exclusive Economic Zone (EEZ) don't need to visit our harbours, they make their

Governments need to prioritise the Port State Measures Agreement (PSMA)

Port State Measures are recognised as an effective tool to combat IUU fishing as it can prevent the use of South African ports by foreign distant water fleets which engage in IUU fishing. FishFORCE offered PSMA training in collaboration with Operation Phakisa to improve inspections in ports. Such inspections, undertaken as multi-agency efforts, are key for addressing illicit activities in fishing in a cost-efficient manner. The number of port inspections must be increased. The best results will be achieved if states collaborate by developing regional arrangements for collaboration on port state measures training for inspections.



A World Leader in Fisheries Law

In March 2020, a publication titled *FishFORCE – A World Leader in Fisheries Law Enforcement Training* was published by Nelson Mandela University. It provides an overview of the fisheries crime context and of FishFORCE's work. It can be downloaded from the FishFORCE website: fishforce.mandela.ac.za

transshipments offshore, but we don't have the capacity to deal with it. There are far too few patrol vessels and fisheries control officers for South Africa's 2800km coastline."

Adding to this, many fisheries crimes – officially referred to as Illegal, Unreported and Unregulated (IUU) fishing – continue to be dealt with as a fisheries management issue, resulting in less severe penalties that are not having a deterrent effect.

The only cases that could have a deterrent effect if they became the norm are major abalone (perlemoen) racketeering cases in South Africa that have been prosecuted as organised crime, with sentences of 18 to 20 years.

FishFORCE is further appealing to the South African government to put pressure on landlocked countries such as Lesotho and Zimbabwe to adopt laws against the export of poached marine produce.

"Corruption is a serious, pervasive problem," says Prof van As. "Recently, nine FCOs who were employed as compliance officers by the Department of Agriculture, Forestry and Fisheries (DAFF – now DFFE) were arrested by the Directorate for Priority Crimes Investigation ("the Hawks") on charges of being directly involved in organised crime syndicates pertaining to abalone poaching.

"While this and other evidence demonstrates the presence of active organised crime, corruption and misadministration within the department that is expected to protect the marine living resources, passive corrupt acts have also taken root. This can take the form of overlooking a violation or failing to inspect vessels with due diligence, often in exchange for gratification. This 'culture of non-compliance' has had negative consequences on several fronts.

"Our country is losing billions of rand in revenue and our national marine resources are being decimated. Far more stringent laws, combined with specialised policing and intelligence gathering for fisheries organised crime and harsh sentences, need to be prioritised at a national and international level."

Prof van As and Cameron Cordell, a FishFORCE research assistant, co-authored the first chapter of "African perspectives on selected marine, maritime and international trade law topics," edited by Professors Patrick Vrancken, Nelson Mandela University, and Charl Hugo, University of Johannesburg (Sun Press, 2020).

Their chapter entitled "Slipping through the net: Reforming South African fisheries law enforcement" elaborates on the corruption and inefficiency of fisheries law enforcement in South Africa and the region. They write: "Abalone poaching in South Africa remains one of the most serious and entrenched forms of fisheries-crime violations...The fact that court-imposed sanctions do not act as a deterrent to the continued poaching ... is an inefficiency mirrored throughout the fisheries law enforcement chain.

"Fisheries crime is not just about fish – it is linked to cigarette smuggling, illegal harvesting of plants, etc. These criminal activities erode respect for the rule of law and lead to socio-economic degradation and the proliferation of gangsterism, allowing a culture of dependency to become entrenched in communities. The lack of human resources results in the failure to investigate the links between poaching and organised crime, resulting in prosecution for lesser offences and commensurate lesser penalties. There are beacons of hope where stiff penalties have been imposed such as by the court in Humansdorp thanks to a dedicated prosecutor.

"Law enforcement agencies are not using the full power of the law to address the poaching of marine living resources as a priority crime and do not allocate their resources commensurate with the value of the commodity. As a country that is beleaguered by fisheries crime, overfishing and exploitation, South Africa must take a tough stance and should pursue criminal organisations with all the power that the state can muster. This gives rise to the question whether FCOs are best suited as a unit of DAFF or whether they should become a specialised unit of the SAPS dedicated to addressing fisheries crime. These officials are primarily fulfilling a policing function and placing them within the SAPS might also assist in bringing the unit under the oversight of bodies such as the Independent Police Investigative Directorate (IPID)."

New legal developments in combating fisheries crime

FishFORCE's research resulted in the development of charge sheets and statements for charges to be brought for attempted poaching and conspiracy to commit a crime if culprits are caught with the implements used to remove abalone as there is a 'no take' policy in place for this species.

Law of the sea NESP scholar

Yonela Ndila is a master's student focusing on ocean governance and the law of the sea in the Faculty of Law. She is on the Nurturing Emerging Scholars Programme (NESP).

"I always wanted to go to university, I knew that was the path I had to take after matriculating," says Ndila, who grew up in Khayelitsha. "So many young people in the township drop out of school and are unemployed, but I wanted something better and fortunately my parents, both nurses, encouraged and sacrificed for my siblings and me to pursue our education."

After her BCom Law and LLB at the University of the Western Cape, Ndila set her sights on doing her master's but says "had it not been for NESP I would not be doing my LLM (well not at this stage) as doing my undergraduate degrees placed a considerable financial burden on me."



Yonela Ndila

"My career goal is to contribute to academia through research and practical experience," says Ndila, who is currently completing her practical vocational training, which she started at Knowles Husain Lindsay Attorneys Inc and is continuing with Cliffe Dekker Hofmeyr Inc. Ndila will be admitted as an attorney of the High Court of South Africa and notary in November.

"For my master's I wanted to pursue an area of law which, in my opinion, needs developing, as most people within the fraternity are not familiar with it. I needed something that would set me apart, and the Law of the Sea is this area. I started in 2021, supervised by Professor Patrick Vrancken and Dr Denning Metuge." Dr Metuge is a postdoctoral fellow in the SARChI Chair of the Law of the Sea and Development in Africa, which is held by Professor Vrancken.

"I recently completed my first paper as an assignment for my coursework and it has been a very difficult undertaking as I have never been exposed to the Law of the Sea before. The task was to analyse the tribunal's decisions in the following case: Chagos Marine Protected Area Arbitration (Mauritius v United Kingdom, PCA case 2011-3, award of 18 March 2015.)"

Ndila explains: "The dispute in the case concerned the United Kingdom establishing a 200 nautical mile Marine Protected Area (MPA) in and around the waters surrounding the Chagos Archipelago in April 2010 (the archipelago is governed by the United Kingdom as the British Indian Ocean Territory (BIOT). This meant that commercial fishing was prohibited, and strict limits were placed on fishing for personal consumption; other activities in the MPA were also prohibited.

"This dispute raised issues of sovereignty over the Chagos Archipelago. Mauritius claimed the United Kingdom was not entitled to declare the MPA because it was

not a coastal state in terms of the United Nations Convention on the Law of the Sea (UNCLOS), an international treaty adopted and signed in 1982,” says Ndila.

According to the Tribunal in this decision, in establishing the MPA, the United Kingdom was under an obligation to “endeavour to harmonize” its policies with Mauritius. The Tribunal added that there are instances whereby environmental considerations could potentially justify, for the purposes of Article 194(4), the infringement of Mauritian fishing rights in the territorial sea. They however accepted that such justification would require significant engagement with Mauritius to explain the need for the measure and to explore less restrictive alternatives. Something which Mauritius believes was not done. The Tribunal therefore concluded that the declaration of the MPA was not compatible with Article 194(4) and Mauritian fishing activities in the territorial sea.

As part of her master’s studies, Ndila is currently busy researching a suitable topic towards her research paper. She is particularly interested in marine spatial planning, relating to sustainable governance of the ocean.

Apart from her master’s, Ndila participates in various initiatives and programmes of interest, having identified the need for innovation in the legal practice. These include the Legal Geek Mentorship Programme; various webinars and roundtable talks organised by Netlaw Media, TechNation, LawTech UK, Radiant Law and the Innovation in Law Studies Alliance; volunteering in the 2020 Africa Innovation Week; and assisting with the organisation of a panel webinar on POPIA, the Cybercrimes Bill and the future of Information Security in South Africa, hosted by the Innovation Law Club. Ndila is passionate about legal empowerment and development and hopes her master’s will afford her the opportunity of making a lifelong contribution to the legal fraternity.

“For my master’s I wanted to pursue an area of law which, in my opinion, needs developing, as most people within the fraternity are not familiar with it.”



To WhatsApp or not to WhatsApp

Nelson Mandela University adjunct professor of cyberlaw, Sizwe Snail ka Mtuze, and Stephen Newman, Faculty of Law, have been researching key aspects of cyberlaw, notably the Protection of Personal Information Act and the Cybercrimes Act.

There are a number of cartoons in circulation that feature Facebook's Mark Zuckerberg secretly reading or listening to our WhatsApp messages and chats. At the heart of it is a worldwide concern about WhatsApp (which Facebook owns) accessing and using personal information. This was compounded by WhatsApp's recently updated privacy policy, which gives them greater access to data.

Prof ka Mtuze explains: "WhatsApp states that they do not have access to private information such as individual conversations; that these are end to end encrypted. They claim their new policy only gives them access to 'data' as opposed to 'personal information'. What is concerning, however, is their use of the term data, because the line between data and personal information is diffused, and both are very valuable commodities that can be shared and sold.

"WhatsApp's response is that they only use data about data (metadata) which, inter alia, assists marketers (who pay them for online advertising) to more accurately and directly serve and market to the consumer," says Newman. "However, WhatsApp has access to all of its subscribers' personal information, including phone numbers, email addresses, avatars, account registration details and service information, which is very revealing personal information. There is conflict between their policy and the protection of personal information as well as consumer protection regulations."

Adding to the concern, they explain, is that WhatsApp is not a stand-alone company. Facebook has a huge amount of power globally: it owns the four most downloaded apps of the decade – Facebook, Facebook Messenger, Instagram and WhatsApp.

"The potential for the cross-pollination of data and information is virtually unlimited," says Prof ka Mtuze. "Having said this, it needs to be emphasised that WhatsApp is just one of a multitude of apps gathering data from you; they all do and they all routinely ask permission to access your location, photos and other personal information."

South Africa's response to these growing concerns has been to implement the Protection of Personal Information Act (POPIA), which prevents our personal information being used in an unlawful manner.

"In terms of POPIA, without obtaining prior authorisation from South Africa's Information Regulator (IR), WhatsApp cannot process the contact information of its users other than for the purpose for which it was originally collected," Prof ka Mtuze explains. "It may not link that information to information processed by other Facebook companies or share it with any others.

"Companies operating in South Africa were obliged to comply with the POPIA by 1 July this year. They now have to deal far more diligently with the personal information they collect and the buying



Prof Sizwe Snail ka Mtuze

we all need to make sure that our businesses and organisations have sufficient plans and policies in place, including in contracts, to ensure that data that is held by us on any platform, is dealt with as prescribed by the POPIA.”



and selling of personal information on the open market is no longer allowed. Failure to comply with the POPIA rules may result in the IR imposing an administrative penalty of up to R10-million or imprisonment of up to 10 years, or both.”

During a webinar hosted by Nelson Mandela University in January 2021 titled *WhatsApp Privacy Policy: Testing South African Data Protection Laws*, attorney Lucien Pierce from PPM Attorneys, who has been in the cyberlaw space for the last 20 years, explained that an increasing number of business clients have been asking what the implications are for their businesses.

He said: “Once the documents are on your device, it is not WhatsApp’s fault if you are storing them in an insecure manner. It is up to you to ensure that the documentation that you are storing on the device is secure. Much like if I bring documents home and I put them on my desk, I should ensure that my windows and doors are locked so that somebody who is up to mischief cannot access them.”

He continued, “By the beginning of July 2021 every business and organisation was required to have a POPIA-registered information officer and a data protection policy; we all have to make sure our employees are informed about the POPIA, and the information officer needs to ensure our business processes protect all information and data according to the law.

“Employees need to understand what they are and are not allowed to do when using company data, be it on WhatsApp or email or any service or platform. Highly confidential documents or information can be protected using technology.



Stephen Newman

“In synopsis, we all need to make sure that our businesses and organisations have sufficient plans and policies in place, including in contracts, to ensure that data that is held by us on any platform, is dealt with as prescribed by the POPIA. And, whether you are an individual or an organisation, the watchwords should always be ‘caution first’.”

Intersections between the Protection of Personal Information Act and the Cybercrimes Act

By Professor Sizwe Snail ka Mtuze

The Protection of Personal Information Act (POPIA) and the Cybercrimes Act will have to work alongside each other to try to combat cybercrimes while also protecting personal information.

We have become completely reliant on the use of electronic devices, technology and digitalisation, including internet activity, social networks, eGovernance, commercial services and the Internet of Things. Accompanying this reliance is an increase in crimes such as internet fraud and email hacking, while having our privacy compromised is the new order of the day.

The spike in cybercrimes compelled government to adapt its existing cyber laws and the Cybercrimes Act, Act 19 of 2020, was signed into law on 1 June 2021.

The preamble to the Act states that its purpose, among other things, is to create offences which have a bearing on cybercrime and to prescribe penalties for such crimes. The examples below give an idea of the Act's far-reaching criminalisation.

Section 2 of the Cybercrimes Act stipulates that any person who unlawfully and intentionally secures access to data, a computer program, a computer data storage medium or a computer system is guilty of an offence.

Section 4 states that any person who unlawfully and intentionally overcomes any protection measure that is intended to prevent access to data and acquires data [thereby] is guilty of an offence.

Section 5 states that any person who unlawfully and intentionally interferes with (a) data or (b) a computer program, is guilty of an offence.

All forms of cyber fraud, cyber forgery and cyber extortion have likewise been criminalised by Section 7, 8, 9 and Section 10 of the Act.

Section 11 has now introduced 'aggravated offences', whereby any person who illegally obtains the passwords, access codes or similar data and devices relating to a restricted computer system, is guilty of an aggravated offence.

Any person who commits an offence referred to in section 5(1), 6(1) or 10, and who knows or ought reasonably to have known or suspected that the offence in question will (a) endanger the life or cause serious

"The spike in cybercrimes compelled government to adapt its existing cyber laws and the Cybercrimes Act, Act 19 of 2020, was signed into law on 1 June 2021. "





bodily injury to, or the death of, any person, or any number or group of persons; (b) cause serious risk to the health or safety of the public or any segment of the public; or (c) create a serious public emergency situation, is guilty of an aggravated offence.

It is also unlawful to send a data message which threatens persons with damage to property or violence. Section 15 outlaws the use of an electronic communications service to unlawfully and intentionally disclose a data message which threatens a person with damage to property belonging to that person or a related person, or violence against that person or a related person.

With revenge pornography becoming commonplace, Section 16(1) of the Act provides that any person who unlawfully and intentionally discloses a data message of an intimate image of a person without such a person's consent is guilty of an offence.

Meanwhile, the POPIA has brought into law new responsibilities on processors of personal information to safeguard that information and to ensure that processing complies with the eight conditions for lawful processing of personal information.

These conditions are: (a) accountability (b) processing limitation (c) purpose specification (d) further processing limitation (e) information quality (f) openness (g) security safeguards and (h) data subject participation.

In terms of POPIA the Information Regulator may now apply serious fines of up to R10-million in the case of breach of the Conditions for Lawful Processing or for a Cyber Security Breach in terms of Section 22, which will also be reportable to the affected data subject and the Information Regulator. POPIA also contains a criminal provision in the event of a person passing on account information without the requisite authority.

The POPIA regulates personal information and ensures a duty of safeguarding it by technical and organisational means, as well as imposing a duty to identify internal or external security threats and vulnerabilities. At the same time, the new Cybercrimes Act has robust substantive and procedural laws to pursue any cybercrime offence that infringes on anyone's personal information or theft of incorporeal things.

In conclusion, POPIA and the Cyber Crimes Act in collaboration will broaden the South African legislative framework relating to data protection and privacy, bringing South Africa into line with international standards, while also promoting the right to privacy that is found in Section 14 of the Constitution.

Prof Sizwe Shail ka Mtuze is adjunct professor in cyberlaw in the Faculty of Law at Nelson Mandela University, author and co-editor of upcoming textbook on cyberlaw; part-time member of the Information Regulator and member of the Ministerial Advisory Group that assisted the Department of Justice and Constitutional Development in drafting and amending the Cyber Crimes Act during its different stages of drafting.

Researchers of the year

Faculty Researcher of the year: Business and Economic Studies

Prof Andrew Phiri

"As is the case with mankind, it is really doubtful that any economy can truly prosper without being highly sacrificial."



Faculty Researcher of the year: Engineering, the Built Environment and Technology

Prof Khaled Abou-El-Hossein

"We always learn by doing."



Faculty Researcher of the year: Education

Prof Mathabo Khau

"I am strong because I know my weaknesses!"



Faculty Researcher of the year: Health Sciences

Prof Ilse Truter

"Dream big, work hard and be curious ... the (research) journey is as important as the destination. Live the journey!"



Faculty Researcher of the year: Humanities

Prof Adrian Konik

"What remains troubling is ... the still amorphous concerns ... which have yet to shed their nebulous state and assume the form of ... questions."



Faculty Researcher of the year: Law

Prof Joanna Botha

"Research matters, but unless you really care, you won't change a thing ... so research in a way that inspires others to join you."



Faculty Researcher of the year: Science

Prof Graham Kerley

"A better future for our society inspires me to push for a better understanding of biodiversity and its benefits for humanity."



Research excellence awards

Research Excellence award

Prof Darelle van Greunen

"Don't wait for a moment, create the moment."



Research Excellence award

Prof Mandy Lombard

"The ocean is the most fantastic place to work – about 90% of it is unexplored and 90% of its species not yet described."



Nelson Mandela University Researcher of the Year

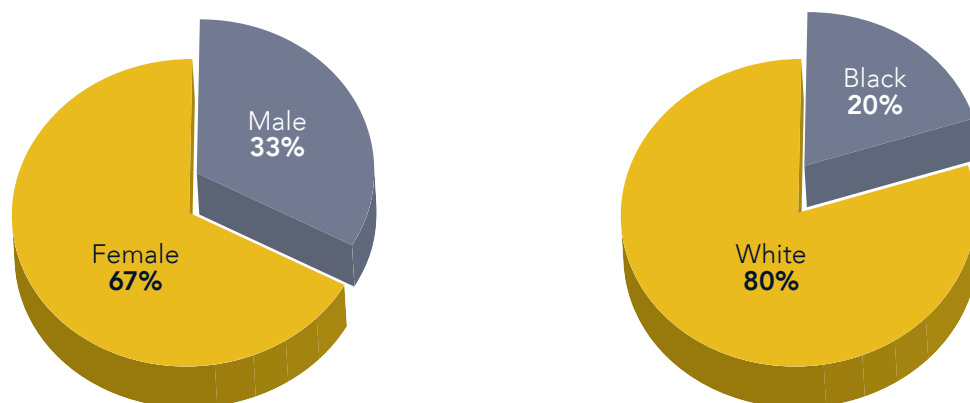
Prof Tim Gibbon

"The biggest Research demands the biggest grant, lab and team. The best Research needs only good Students, a Postdoc and a dream."



Research facts and figures 2020

RATED RESEARCHERS



FACULTY	SURNAME, INITIALS, TITLE	RATING CATEGORY	RATING PERIOD	GENDER	RACE
HUMANITIES	Boswell, R, Prof	C1	2018-2023	F	B
	Crous, ML	C3	2018-2023	M	W
	Hurst, A Dr	C3	2018-2023	F	W
	Janse van Vuuren, HE, Prof	C2	2019-2024	F	W
	Farrington, SM, Dr	C2	2019-2024	F	W
	Fourie, H, Prof	C3	2017-2022	M	W
	Makuwira, J, Prof	C2	2016-2021	M	B
	Venter, E, Prof	C1	2018-2023	F	W
EDUCATION	Blignaut, SE, Prof	C3	2016-2021	M	B
	de Lange, N, Prof	C1	2019-2024	F	W
	Singh, P, Prof	C2	2017-2022	M	B
	Webb, P, Prof	C1	2019-2024	M	W
ENGINEERING, BUILT ENVIRONMENT AND TECHNOLOGY	Abou-El-Hossein, Dr	C2	2016-2021	M	B
	Emuze, FA, Prof	C3	2019-2024	M	B
	Hattingh, DG, Prof	B3	2018-2023	M	W
	Shakantu, W, Prof	C3	2017-2022	M	B
	Smallwood, JJ, Prof	C2	2020-2025	M	W
	Van Greunen, D, Prof	C2	2018-2023	F	W
	Van Wyk, BJ, Prof	C3	2017-2022	M	W
	Von Solms, R, Prof	B2	2021-2026	M	W
HEALTH SCIENCES	Truter, I, Prof	C2	2017-2022	F	W
	Ten Ham-Baloyi, W, Dr	Y2	2019-2024	F	W
LAW	Vrancken, PHG, Prof	C1	2019-2024	M	W
	Spies, A, Dr	Y	2020-2025	F	W

FACULTY	SURNAME, INITIALS, TITLE	RATING CATEGORY	RATING PERIOD	GENDER	RACE
SCIENCE	Adams, JB, Prof	C1	2016-2021	F	W
	Anandjiwala, R, Dr	C3	2019-2024	M	B
	Agyingi, C, Dr	Y2	2018-2023	M	B
	Appadu, R, Prof	C2	2021-2026	M	B
	Barton, B, Prof	C2	2020-2025	F	W
	Booth, GL, Prof	C1	2018-2023	M	W
	Calitz, A Prof	C1	2020-2025	M	W
	Christopher, AJ, Prof	B3	2018-2023	M	W
	Cowling, RM, Prof	A1	2021-2026	M	W
	Connan, M, Dr	C3	2017-2022	F	W
	Dabrowski, JM, Dr	C2	2020-2025	M	W
	Dallas, HF, Dr	C2	2016-2021	F	W
	Downing, TG, Dr	C1	2018-2023	M	W
	Du Plessis, M, Dr	C2	2020-2025	M	W
	Engelbrecht, JAA, Prof	C2	2018-2023	M	W
	Ferg, EE, Dr	C2	2021-2026	M	W
	Fritz, H	C1	2018-2023	M	W
	Frost, CL, Prof	C2	2021-2026	F	B
	Gerber, TIA, Prof	C1	2018-2023	M	W
	Gibbon, T, Assoc Prof	C2	2020-2025	M	W
	Govender, S, Dr	Y2	2016-2021	F	B
	Grant, CC, Dr	C3	2012-2023	F	W
	Groenewald, NJ, Prof	C1	2018-2023	M	W
	Hayward, MW, Dr	B3	2019-2024	M	W
	Janse van Vuuren, A, Dr	Y2	2020-2025	M	W
	Kakembo, V, Prof	C1	2019-2024	M	B
	Kerley, GIH, Prof	B3	2018-2023	M	W
	Kirkman, SP, Dr	C	2016-2021	M	W
	Kraaij, T, Dr	C2	2020-2025	F	W
	Landman, M, Dr	C3	2021-2026	F	W
	Leitch, AWR, Prof	C3	2018-2023	M	W
	Little, KM, Dr	C2	2021-2026	M	W
	Linol, BL, Dr	Y2	2018-2023	M	W
	Lombard, A, Prof	B2	2021-2026	F	W
	Marean, C, Prof	A2	2018-2023	M	W
	Miranda, NAF, Dr	C3	2020-2025	M	W
	Motloun, S, Prof	Y2		M	B
	Nagiah, S, Dr	Y2	2021-2026	F	B
	Neethling, JH, Prof	B1	2019-2024	M	W
	Nel, JL	B3	2019-2024	F	W
	Nel, P, Dr	C2	2016-2021	F	W
	O'Connell, JH, Dr	Y1	2016-2021	M	W
	Olivier, EJ, Dr	Y2	2016-2021	M	W
	Pichegru, L, Dr	C2	2017-2022	F	W
	Pistorius, PA, Dr	C1	2017-2022	M	W
	Perissinotto, R, Prof	B2	2016-2021	M	W
	Potts, A, Dr	P	2019-2024	M	W

FACULTY	SURNAME, INITIALS, TITLE	RATING CATEGORY	RATING PERIOD	GENDER	RACE
SCIENCE	Pretorius, CJ, Dr	Y2	2021-2026	M	W
	Prins, AL, Dr	C2	2021-2026	M	B
	Quick, L	Y	2019-2024	F	W
	Rautenbach, C, Dr	Y2		M	W
	Roux, D, Prof	B3	2017-2022	M	W
	Scholtz, BM, Dr	C3	2017-2022	F	W
	Strydom, NA, Dr	C2	2017-2022	F	W
	Tshentu, Z, Prof	C2	2021-2026	M	B
	Venter, A, Prof	C2	2021-2026	M	W
	Venter, JA, Dr	C3	2020-2025	M	W
	Van de Venter, M, Prof	C2	2017-2022	F	W
	Van Dyk, EE, Prof	C2	2018-2023	M	W
	Veldsman, S, Prof	B2	2016-2021	M	W
	Watts, P, Prof	B1	2021-2026	M	W
	Weigt, M, Dr	C2	2021-2026	M	W
	Wesson, JL, Prof	C2	2018-2023	F	W

RESEARCH OUTPUTS

There has been a steady increase in research outputs in the past four years, with Nelson Mandela University showing a consistent, upward, improvement trend. *2020 numbers are still preliminary and await final approval by the Department of Higher Education and Training.

	2015	2016	2017	2018	2019
Books and chapters	10.05	30.84	22.52	35.48	21
Conference proceedings	63.64	84.09	54.23	41.93	49.6
Journal articles	324.81	319.4	312.33	349.93	389

POSTDOCTORAL FELLOWS OVER THE PAST FIVE YEARS

Year	Number of postdoctoral fellows
2016	54
2017	52
2018	61
2019	70
2020	70

RESEARCH FELLOWS IN 2020

Title	Surname	Initials	Full Names	Gender	Race	Department	Faculty
Dr	Botha	M	Marisa	F	w	CriSHET	Humanities
Dr	Gurbois	C	Chloé	F	w	Sustainable Research Unit	Science
Dr	Connan	M	Maele	F	w	Botany	Science
Dr	Pichegru	L	Lorien	F	w	Botany	Science
Dr	Linol	B	Bastien	M	w	Geosciences	Science
Dr	Rishworth	G	Gavin	M	w	Botany	Science

RESEARCH ENTITIES

Entities	Number
Research units	6
Research centres	13
Research institutes	3
Total Research Entities	22

DETAILS OF RESEARCH ENTITIES

INSTITUTES IN FACULTIES (1)						
No	Name	Acronym	Leader	Faculty	Contact number	Email address
1	InnoVenton: Institute for Chemical Technology and Downstream Chemical Technology Station and its sub-entities	InnoVenton/DCTS	Dr G Dugmore (interim)	Science	041 504 3482	Gary.Dugmore@mandela.ac.za
CENTRES IN FACULTIES (12)						
1	Built Environment Research Centre	BERC	Mr Chris Allen	EBET	041 504 2394	chris.allen@mandela.ac.za
2	Centre for Community Technologies	CCT	Prof D van Greunen	EBET	041 504 2090	Darelle.vanGreunen@mandela.ac.za
3	Centre for Research in Information and Cyber Security	CRICS	Prof R Botha	EBET	041 504 3179	ReinhardtA.Botha@mandela.ac.za
4	Centre for African Conservation Ecology	ACE	Prof Graham Kerley	Science	041 504 2308	Graham.Kerley@mandela.ac.za
5	Centre for High Resolution Transmission Electronic Microscopy	HRTEM	Prof J Neethling	Science	041 504 2143	Jan.Neethling@mandela.ac.za
6	Centre of Expertise in Forecasting	CEF	Prof I Litvine	Science	041 504 2764	Igor.Litvine@mandela.ac.za
7	Centre for Rubber Science and Technology	CRST	Prof P Hlangothi	Science	041 504 2437	Percy.Hlangothi@mandela.ac.za
8	Telkom Centre of Excellence	CoE	Prof Janet Wesson	Science	041 504 2323	Janet.Wesson@mandela.ac.za
9	African Centre for Coastal Palaeoscience	ACCP	Dr Jan de Vynck	Science	041 504 2397	jan.devynck@mandela.ac.za
10	Centre for Broadband Communication	CBC	Prof T Gibbon	Science	041 504 2141	Tim.Gibbon@mandela.ac.za
11	Centre for Philosophy in Africa	CPA	Dr Sam Nzioki	Humanities		sam.nzioki@mandela.ac.za
12	Raymond Mhlaba Centre for Leadership	RMCL	Prof Luvuyo Ntombana	Humanities		luvuyo.ntombana@mandela.ac.za
13	Centre for Women and Gender Studies	CWGS	Dr Babalwa Magoqwana	Humanities		babalwa.magoqwana@mandela.ac.za
UNITS IN FACULTIES (6)						
1	Family Business Unit	FBU	Dr Shelly Beck	Business & Economic Sciences	041 504 1392	Shelly.Beck@mandela.ac.za
2	Unit for Positive Organisations	UPO	Prof M Mey	Business & Economic Sciences	041 504 2360	Michelle.Mey@mandela.ac.za

INSTITUTES IN FACULTIES (1)

No	Name	Acronym	Leader	Faculty	Contact number	Email address
3	Unit for Economic Development and Tourism	UFEDT	Prof R Ncwadi	Business & Economic Sciences	041 504 3834	Ronney.Ncwadi@mandela.ac.za
4	Unit for Visual Methodologies for Social Change	UVMSC	Prof N de Lange	Education	041 504 4519	Naydene.deLange@mandela.ac.za
5	Drug Utilisation Research Unit	DURU	Prof Ilse Truter	Health Sciences	041 504 2131	Ilse.Truter@mandela.ac.za
6	Sustainability Research Unit	SRU	Prof Herve Fritz	Science	044 801 5121	herve.fritz@mandela.ac.za

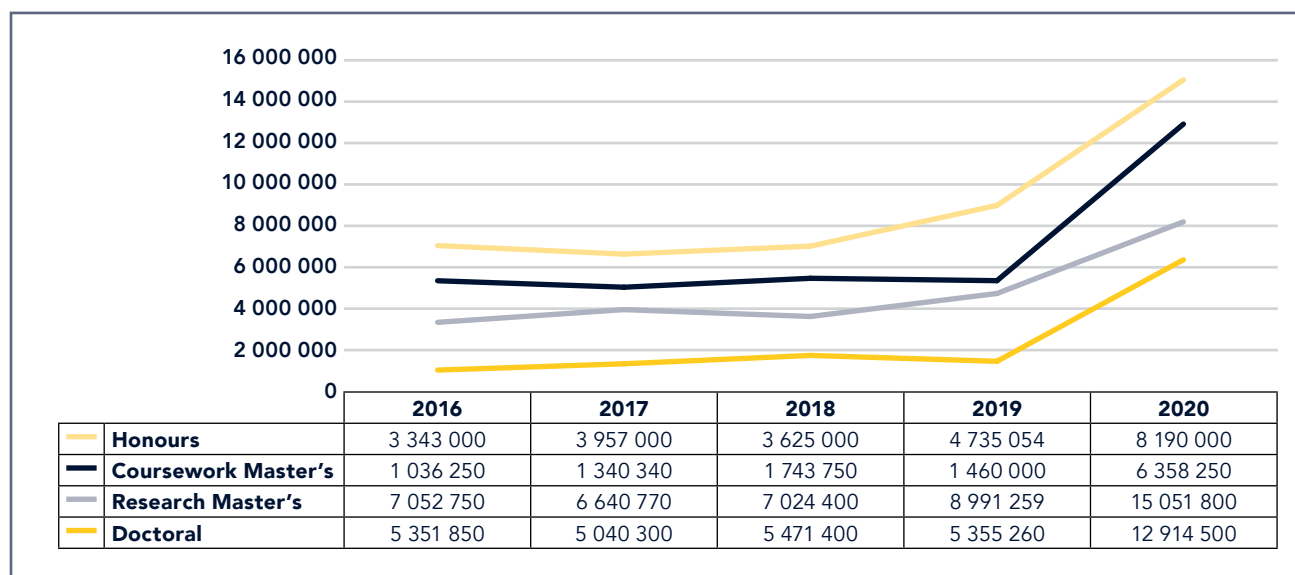
ENTITIES REPORTING TO THE DVC: RESEARCH INNOVATION AND INTERNATIONALISATION – University based (2)

No	Name	Acronym	Leader	Contact number	Email address
1	AEON - Earth Stewardship Research Institute	ESSRI	Dr Moctar Doucoure	041 504 4611	Moctar.Doucoure@mandela.ac.za
2	Institute for Coastal and Marine Research	ICMR	Prof. Lorien Pichegru	041 504 2649	lorien.pichegru@mandela.c.za

RESEARCH CHAIRS

	Title of Chair holder	Init	Name of Chair holder	Name of Research Chair	Affiliation on RPMS (Department, Faculty)
1	Professor	AM	Hurst	SARChi Chair in Identities and Social Cohesion in Africa	Philosophy, Humanities
2	Professor	AT	Lombard	SARChi Chair in Marine Spatial Planning	ICMR, DvC RII
3	Professor	J	Adams	SARChi Chair Shallow Water Ecosystems	Botany, Science, ICMR
4	Professor	P	Watts	SARChi Chair Microfluidic Bio/Chemical processing	Chemistry, Science
5	Professor	P	Vrancken	SARChi Chair in Law of the Sea	Law
6	Professor	MJ	Roberts	SA-UK Bilateral Chair in Food Security	ICMR, DvC RII
7	Professor	A	Keet	Chair for Critical Studies in Higher Education Transformation	CriSHET
8	Professor	SJ	Mbanga	<u>Chair in Human Settlements</u>	Building and Human Settlements, EBET
9	Professor	I	Gorlach	Isuzu Chair in Mechatronics	Mechatronics, EBET
10	Mr	K	du Preez	merSETA: Engineering Development	Engineering, EBET
11	Professor	S	Vally	DHET/DST SARChi Chair in Community Adult and Worker Education (hosted with UJ)	Hosted by UJ
12	Prof.	C	Walter	UNESCO Chair in Physical activity and Health in Educational Settings. Co-hosted with University of Basel, Switzerland	Human Movement Science, Health Science
13	Dr	L	Powell	Research Chair: Youth Unemployment, Employability & Empowerment	CriSHET, DvC ET
14	Prof	R	Boswell	Ocean Cultures and Heritage	Sociology and Anthropology, Humanities, ICMR
15	Prof	P	Gqola	African Feminist Imaginations	Sociology, Humanities, CWGS
16	Prof	H	Thimm	DAAD Chair in ICT for Sustainable Development	Not yet started

POSTGRADUATE RESEARCH FUNDING AWARDED



RESEARCH INCOME FROM RESEARCH OUTPUTS

	2014	2015	2016	2017	2018	2019
M and G graduations	R57 806 901	R54 256 618	R63 800 377	R70 680 385	R78 011 797	R71 195 822
Research publications	R39 783 772	R42 728 078	R47 467 383	R47 924 606	R55 851 564	R61 683 448

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