

NELSON MANDELA
UNIVERSITY



Research & Innovation Report
2016/17

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Cover Image

A Basket star (*Astrocladus euryale*) on a Palmate sea fan (*Leptogorgia palma*).
By Larize Nel



Professor Derrick Swartz

VC's Report

Universities in South Africa today need to establish a global research niche in order to remain sustainable and to play their part in addressing the world's acute current and future challenges. At Nelson Mandela University, we are proud to have secured two significant niche areas for our University in 2016.

Message from the Vice-Chancellor: Global niche areas and networks

These include the approval by the Department of Higher Education Training (DHET) for our University to go ahead with the creation of South Africa's tenth Medical School, and the securing of funding from DHET for the acquisition of the former CSIR campus next to our North Campus, which will now become Nelson Mandela University's seventh campus - the Ocean Sciences Campus.

Our Ocean Sciences Campus, launched in September 2017, is the first in South Africa, and it will position us as the leading marine and maritime sciences university on the continent. Its conception is the product of the remarkable work of a multi-stakeholder and transdisciplinary Ocean Sciences Task Team, which has been key to developing a five-year strategy (2016-2020), informed by contributions from our seven faculties.

Both of these new developments will have far-reaching consequences for our University and will expand our current mix of over 470 academic programmes on our seven campuses. They will open important new growth opportunities for ocean sciences as a distinct domain of research, teaching, innovation and engagement, and place Nelson Mandela University in the frontline of pioneering scholarship. They will also offer diversified and new career paths for students in the city of Port Elizabeth, the province, country and wider continent.

Our Medical School will add the training of medical doctors and other health care professionals to the ten qualifications already offered by our Faculty of Health Sciences. We will also be offering other qualifications, such as the training of

engineers and technicians who install and maintain the technology in hospitals and clinics, instead of having to fly in people from overseas. And we will be training mid-level healthcare workers who have four-year degrees and who work alongside doctors in hospital and clinic settings. This will significantly contribute to the services offered in rural clinics and communities, and contribute a unique and distinctive set of academic programmes.

For our Ocean Sciences Campus we are making use of the University's strategic location on the Indian Ocean coastline in a city with two major ports and over four decades of coastal and marine science, engineering, architectural and social sciences experience. We are one of the few higher education institutions in South Africa that combines high-level academic training and applied skills development. Our strategy with the Ocean Sciences Campus is to further advance our existing strengths as well as to offer a new range of maritime and marine sciences programmes.

Through Operation Phakisa: Ocean Economy, South Africa is proactively promoting sustainable development of the blue economy, and we need to make sure that in the process we do not harm the environment or jeopardise the livelihoods of small-scale fishers and coastal communities who depend on the ocean for their food and survival.

The research we do is an important tool to help governments, industries and communities to make decisions in an informed, socially and environmentally sustainable manner.

The working people of the sea, who are key to the production of prosperity, must share in the benefits of this new quest to expand new economic opportunities in our oceans. Their voices and interests should be heard in policy and planning issues, and our research agenda should be focusing on strategies to promote inclusion, equality, social justice and the democratic development of the Ocean Economy. As part of this, our University has made significant progress with the Chairs, Institutes and Academies that will be based at the Ocean Sciences Campus and these are continually growing, in partnership with:

- Other universities (in South Africa, Africa and globally);
- The South African government and other governments globally;
- Industry and Businesses (local and international);
- Citizens and communities (particularly marginalised voices).

This quadruple helix collaboration is able to drive change far beyond the scope that any single organisation could achieve.

Collaboration personifies our Centre for Coastal Palaeoscience, which is exploring how the distinctive coastal environment in the southern and eastern cape regions some 200 000 years ago may have shaped the development of modern human cognition and social collaboration, which appears to be key to our subsequent success as a species.

Researchers are probing a time when humans shifted their diet to the dense marine and other food resources found along this coast. Was this the turnkey to the development of advanced cognition and cooperation with unrelated humans that led to the formation of cooperative societies that could work together to achieve extraordinary human advances? These are some of the big questions our transdisciplinary researchers are exploring.

Having served as Vice-Chancellor for ten years, many of you are familiar with one of my cornerstone philosophies that no society has ever been successfully built without present generations investing in the education of future generations.

As a university named after Nelson Mandela, we are committed to this collective responsibility and we have entered a highly creative period of institutional growth and student 'access for success' for our 27 000 students. The challenge now is to increase our staff numbers, which have not sufficiently grown due to our inadequate subsidies. We have been calling on government to resolve both the fees and subsidies issue, as we need to stabilise our university campuses across South Africa.

Despite the instability of the past eighteen months, our research and innovation productivity has grown enormously over the same period and is advancing its impact in the world. In all our disciplines I see staff dedicated to creating something profoundly new and different; something that fulfills our requirement to rise to 21st century needs and to our philosophy of a humanising pedagogy for a humanising society. Our curricula are reflective of excellence and of our amazing African heritage and distinctive place in a changing world.

We are the first University to have launched a specific Centre to address the 'who, what, when, where, why and how' of transformation, equality and freedom. Our Centre for the Advancement of Non-Racialism and Democracy (CANRAD) was

"The research we do is an important tool to help governments, industries and communities to make decisions in an informed, socially and environmentally sustainable manner."

– Professor Derrick Swartz

established in 2010 and has grown into a crucial research and engagement vehicle for South Africa.

In diverse ways, our University's many programmes look back in time and forward in time in order to better understand ourselves and our shared country, continent and planet, with the aim of achieving a healthier, more sustainable, better future for all. We need to reduce inequality and break the grip of intergenerational poverty, and these challenges can only be solved through a transdisciplinary lens where we join up the insights and initiatives of all the different disciplines, the arts and the sciences. We need to advance the requirements of a just society, including renewable energy, food security, decent jobs and quality education for two-thirds of the population that have been increasingly neglected in the pursuit of exclusionary 'progress'.

At Nelson Mandela University we converge transdisciplinary blue sky and applied research with community engagement in all our partnerships with universities, organisations and social movements from the Global South and Global North. Our Centre for Broadband Communication is an excellent example of the calibre of our partnerships and engagements. Researchers in the Centre are developing novel optical fibre technology for the world's largest radio telescope, the Square Kilometre Array (SKA).

This technology will enable scientists to deal with the vast amounts of data dating back over 13 billion years that will be gathered by this telescope. SKA is by far the biggest scientific project Africa has ever undertaken. At the same time, one of the key aims in the establishment of the Centre was to develop the resources necessary to ensure that all South Africans – from the deepest rural areas to the cities – are connected by 2020.

While it goes without saying that universities compete for students, staff and resources, we need to compete and collaborate at the same time because on our own, none of us can achieve what we can achieve together.

Our philosophy is that if we can join our resources with other networks we can create a much wider network of achievement and innovation for a more evolved, more just world. We invite universities, industries, organisations and governments throughout South Africa and the world to join us in this bold new journey which is certainly one of the most exciting eras in the history of Nelson Mandela University.

Professor Derrick Swartz
Vice-Chancellor



Two worlds, one ocean. Image: Dr Stephanie Plön



Professor Andrew Leitch

DVC's Report

Now that we are called Nelson Mandela University, we will be seeking to enhance our collaborations and partnerships with all those who wish to work with us, in honour of our iconic leader and statesman, Nelson Mandela.

Message from the Deputy Vice-Chancellor: Research & Engagement

Our aim is to stand out as a university of which Mandela would be proud, one that equally values excellence, innovation, justice and equality; a university where our students experience their voiced desire that the name should not only be in memory of Mandela, but should also reflect the living legacy of an exceptional man from the rural Eastern Cape who stood up for justice and freedom.

There are high expectations of us, as expressed by Cyril Ramaphosa and George Bizos at our launch in July 2017. This expectation includes research and engagement that can impact and improve the lives of all our communities - from Nelson Mandela Bay to the rest of Africa and the World.

It gives me immense pleasure to say that our name change, combined with our research achievements and new focus areas, including our new Ocean Sciences Campus and Medical School, have opened many new South African and international doors for us. Leading institutions in a wide range of countries are partnering with or are keen to partner with us in transdisciplinary research.

In 2016 we launched two SARCHI Research Chairs: Professor Mike Roberts' Chair in Ocean Science and Marine Food Security, and Professor Mandy Lombard's Chair in Marine Spatial Planning.

Prof Roberts' Chair is jointly hosted by ourselves and the University of Southampton, with support from the National

Oceanography Centre based in Southampton – the United Kingdom's two leading marine science research and technology institutions. The Chair is attracting considerable interest and funding, as it creates an innovation bridge of research and postgraduate development between the northern hemisphere and Africa, with regional projects extending from South Africa all the way up Africa's eastern coastline.

Pan-African programmes are also a strength of our Law Faculty, including the SARCHI Chair on the Law of the Sea and Development in Africa, led by Professor Patrick Vrancken, the leading legal specialist on the law of the sea in South Africa. The Chair's research includes the east coast of Africa and the Indian Ocean, the west coast of Africa and the Atlantic Ocean, and the southern ocean and Antarctica. Prof Vrancken's legal input has also been invaluable in recommending critical legal improvements to South Africa's new Marine Spatial Planning Bill.

Our researchers continue to shine on local and international platforms in all our faculties, with the Faculty of Engineering, the Built Environment and IT's Professor Darelle van Greunen receiving multiple awards and European Union grants. Her team continues to research and implement novel ICT connectivity solutions, as well as education and health-focused advancements for poorly resourced communities in South Africa and the continent.

We are committed to researching and engaging on the many issues facing poorly resourced communities, and in 2016 our Faculty of Education was awarded a R1 million grant from the Mott Foundation for the Centre for the Community School, led by Dr Bruce Damons. The Centre's goal is to reimagine what well-functioning schools in poorly resourced communities should look like, and how to go about achieving this in partnership with the schools, learners, and their communities.

In 2016, our Executive Dean of Arts, Professor Rose Boswell led a multidisciplinary group of postgraduate students to research police docketts at the Gelvandale Police Station in the Northern Areas of the Nelson Mandela Bay Metro, known for the high incidence of gang-related crimes. The South African Police Service (SAPS) approached the Faculty of Arts to work with them on this project in order to gain a better understanding of the social background of these crimes.

In our Science Faculty, we have had fascinating research published in *Nature* in February and March 2017. One paper focused on the evolution of feathers for flight, while the other paper reported on stromatolites – cyanobacteria organisms dating back billions of years and contributing oxygen to the earth's atmosphere.

Approximately 70% of Earth's oxygen comes from the ocean, produced by marine plants. Key research on the ocean and coast is being undertaken by the Institute for Coastal and Marine Research (CMR), launched in 2016 and headed by one of our preeminent researchers, Professor Janine Adams. Over 40 years of coastal and marine research at our University underpins the Institute - the largest on the Ocean Sciences Campus.

In 2016, we established the Marine Apex Predator Research Unit (MAPRU) to conduct research on marine top predators, including seabirds, seals, sharks and cetaceans, particularly in relation to global change, conservation and sustainable resource management. The MAPRU will train significant numbers of postgraduate students in various aspects involving marine top predators and be regularly involved in various forms of engagement, using charismatic predator species to stimulate industry, public and government interest in marine biodiversity and conservation.

In July 2016, the Minister of Higher Education and Training, Dr Blade Nzimande, gave us the go ahead to proceed with the creation of our new Medical School, which is set to offer a full undergraduate medical degree (MBChB) by 2020 and further evolve to include medical specialist training by 2025.

Our University is ambitiously growing niche, scarce skills qualifications, research outputs, postgraduate numbers, partnerships and engagement opportunities. This is being admirably achieved in our transdisciplinary Centre for Coastal

Palaeoscience, which is constructing the palaeo-landscape and seascape or 'palaeoscape' of South Africa's southern and southeastern coasts. The University is uniquely situated at the possible ground-zero of human cognitive origins and is engaging in a range of unbelievably exciting national and international collaborations to investigate fundamental evolutionary questions.

We are in discussion with the Department of Science and Technology (DST) regarding the creation of a new palaeoscience laboratory, including the study of fossilised pollen, which reveals the plants that were around 100 000 and more years ago. Nelson Mandela University has signed an MOU with a not-for-profit organisation in Mossel Bay to establish an interpretative site that showcases what the palaeoscience research is revealing about the early modern humans who lived on the Mossel Bay and southern Cape coast. This has been proposed as a World Heritage Site.

All these research areas emphasise our common human ancestry and doctoral candidate Maxine Smit was one of the speakers at the Pre-colonial Catalytic Conference in March 2017 organised by our Centre for the Advancement of Non-Racialism and Democracy (CANRAD).

"We are committed to researching and engaging on the many issues facing poorly resourced communities ... "
 – Professor Andrew Leitch

Our Faculty of Business and Economic Sciences is doing key research on transgenerational, successful, indigenous African family businesses and what can be done to increase the number of these, as they are a vital part of the economy and make substantial contributions to economic growth and social stability. The Faculty is pioneering new avenues of inquiry, including Islamic finance, feminist economics, food and environmental security, the future of work and the fourth industrial revolution.

In 2016, we participated in a range of food security research areas and programmes, including the launch of our aquaponics farm on our Missionvale Campus, where one of our Agriculture Management master's students is working on a circular water system that supports hydroponically-grown vegetables and tilapia. The produce goes to 65 under-resourced schools in the metro. The School of Natural Resource Management's Professor Raymond

Auerbach, our Engagement Excellence Award Winner for 2016, is part of the DST-NRF Centre of Excellence in Food Security, jointly hosted by the University of the Western Cape and the University of Pretoria, with several South African universities contributing innovative thinking to this vital space.

What really struck me about the 2016/17 period is the willingness to create partnerships and networks between academic institutions in South Africa, Africa and globally. Combining specialist research skills and advancing staff and student mobility exchanges for the greater good is all part of the productive tide of the times. We are part of this tide and we look forward to this inspiring new era in our academy's life as Nelson Mandela University.

Professor Andrew Leitch
Deputy Vice-Chancellor: Research & Engagement



Professor Rose Boswell

African Engagement

Growing International Education & Research Partnerships



Executive Dean's Report

For the Faculty of Arts, 2016 was a highly productive year in which the research, engagement and innovation focus was on Africanisation, decolonisation and socially embedded research. Research has been boosted by strategic, senior academic appointments, including Dr Subeshni Moodley, Dr Babalwa Maqoqwana and Prof Nomalanga Mhkize.

Faculty of Arts: highlights

The Faculty welcomed several equity academics (Barrington Marais, Lynette Bester, Dr Fouzia Mounir, Giovanni Poggi, Thandowelthu Nomarayi, Michelle de Wet, and Njabulo Mtimkhulu, with the aim of thoroughly diversifying teaching, learning and research in the Faculty. Adding to this, the Faculty appointed a senior Adjunct Professor, Dr Denver Webb - a specialist on the history of the Eastern Cape.

In 2016, the Faculty enrolled 416 MA students and 75 PhD candidates, and graduated a total of 98 master's students and nine PhDs. In addition, many senior research students completed their degrees, leading to the graduation of 93 master's degree students; five MTech students and nine PhDs in April 2017.

Staff members, Corne du Plessis, Jakub Siwak, David Bogopa and Janelle Vermaak submitted their PhD theses for examination and an additional five students were successful in their application for National Institute for Humanities and Social Sciences (NIHSS) PhD grants. The students are mentored by the seasoned NIHSS mentor, Prof Kishore Raga.

In 2016, we completed a faculty-wide research project that provided research experience for ten postgraduate (MA and PhD) students, whose task it was to analyse the causes of gang-related crime in Nelson Mandela Bay. The Faculty also worked on another postgraduate-led project to document cultural heritage in the Eastern Cape. It received R2 million in funding from the South African National Lottery - Lotto -

and in 2017 it will produce three Lonely Planet-style field guides for the educational and tourism sectors in the province, including: *The Frontier Country and Amatole Mountain Escape*, *Karoo Heartland*, *Tsitsikamma and Baviaans* and *The Friendly N2 and Wild Coast*.

The Faculty implemented its *Decolonisation Seminar Series*, inviting four internationally acclaimed persons to present their research on issues such as gender equality and music in Africa. In the School of Language, Media and Culture, the Director of School, Prof Andrea Hurst, commenced a weekly four-hour work group session for research writing. The aim is to foster a research culture among academics in the School.

The Department of Journalism, Media and Philosophy's Francois du Plessis collaborated with the University's Research Diving Unit (RDU) in abalone seeding. The RDU seed small abalone underwater on the Wild Coast in an effort to replenish the abalone population, decimated by poaching. Du Plessis assists with the seeding and photographs and videos the process.

In the School of Architecture, colleagues initiated and hosted a three-week international training workshop to advance students' research and engagement in Nelson Mandela Bay. The highly successful workshop, coordinated by four internationally respected architects, led to the collaborative design of visions of the Nelson Mandela Bay Waterfront and Baakens River Valley.

Continuing with the focus on Africanisation, decolonisation and emergent pedagogies, Distinguished Professor Helize van Vuuren deepened our understanding of the significance of South Africa's First Peoples to social change. She received the ATKV Prize and the Esther Greeff Prize of the Akademie vir Wetenskap and Kuns for her article on the novel *Memorandum: A Story with Paintings*, and she presented a paper at the International Comparative Literature Association Congress, Vienna University, entitled *Worlds of difference, worlds of concord: between the Anthropocene and an indigenous African myth of origin*. Prof van Vuuren also conducted five 90-minute workshops on *The experiences and rights of indigenous people: the Ju/'hoan of Nyae Nyae, Northern Namibia* at Hiroshima University, Hiroshima, Japan for the UNESCO Global Peace and Citizenship international student seminar.

Dr Jacqui Lück and Sharon Rudman produced a paper on *Identity, ideology and discourse: Classroom spaces for deconstructions and reconstructions* for *The Independent Journal of Teaching and Learning*, and I published on the politics of the body in the postcolonial space in *African Identities*. I also had two further papers on voice-work and the politics of listening in the postcolonial space accepted for publication in *The Journal of the Indian Ocean Region* and *The Senses and Society*. I ended the year by completing an

edited book with Francis Nyamnjoh entitled, *Postcolonial African Anthropologies* (HSRC Press). Prof Kwame Asmah-Andoh and Dr Alethea de Villiers published papers in accredited journals, while Prof Enaleen Draai had one paper and two co-authored chapters published in a book on public management and service.

In terms of engagement initiatives, the School of Government and Social Sciences hosted the National eNCA debates. Prof Joleen Steyn Kotze, Ongama Mtimka (PhD candidate), Sindisile Maclean and Prof Enaleen Draai were key to the successful hosting and management of this national debate regarding the local government elections.

The School of Music Art and Design convened numerous national and international concerts including the invitation of the highly acclaimed diversity in music specialist, Prof Ed Sarath. The school (and specifically the Music Department) worked closely to advance music education in a less advantaged school, Greenwood Primary, and, via the stellar performance of the Nelson Mandela University Choir (led by faculty staff member, Juanita van Dijk) advanced the university reputation in South Africa and China.

The Absa Atelier Award went to Mongezi Ncaphayi for his riveting exhibition entitled *Spirits' Response*. Added to all this incredible work, a student of the School, Kristen Ristow, won the South African heat of the Society of Dyers and Colourists International Design Competition and attended the grand final in Shanghai. Dr Pieter Binsbergen chaired the Sasol New Signatures Competition's

Regional Exhibition. A total of 47 Artworks were selected (out of 100 nationally) and there were two Nelson Mandela University Prize Winners: Aneesa Loonat (B Tech painting) and Zayne Lange (alumnus). In the SA Ceramics EC Exhibition we had four student prizewinners. Finally, Mary Duker, Bianca Whitehead and Andrea Wentzel were named the Creative Output award winners for the University for 2016.

In closing, I would like to touch on transdisciplinarity, as our researchers and lecturers are increasingly partnering with other faculties.. One example is our partnership with the Centre for Coastal Palaeoscience that is addressing the question of the evolution of complex cognition in early modern humans on our coastline some 200 000 years ago. This requires a broad intellectual framework that includes Botany, Anthropology, Palaeontology, History, Science, Art and a range of other disciplines in the pursuit of this novel research.

Professor Rose Boswell
Executive Dean
Faculty of Arts

" ... our researchers and lecturers are increasingly partnering with other faculties ... "

– Professor Rose Boswell



The pollution of our ecosystems through general human activity, and most particularly the industrial processes entertained in our coastal cities, is one of the core concerns being researched and reimagined by the School of Architecture.

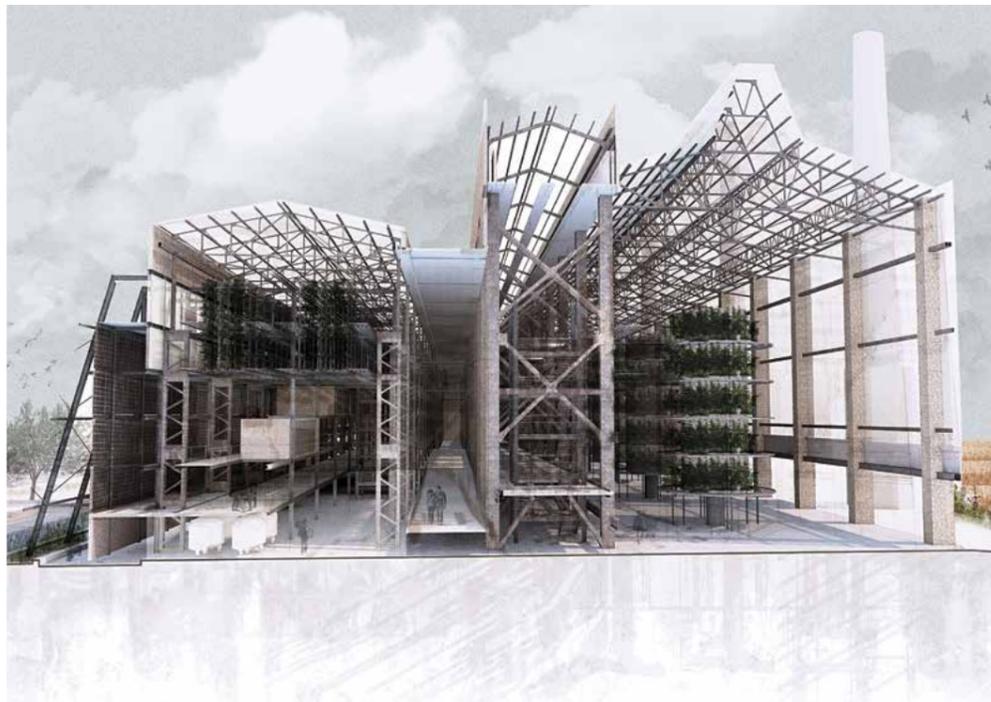
Regenerative architecture and ecosystem rehabilitation

"Our design approach centres on the holistic integration of industrial activity, human habitation and environmental systems. Ensuring clean water systems across scales is a core end goal of reconciling these imperatives in a way that might be termed 'industry beautiful'," says Head of Department and senior lecturer in the School of Architecture, Andrew Palframan.

This could not be more relevant for Port Elizabeth, which has major industrial zones that are crucial for economic progress, many of which have remnants of previous industrial activities, such as the prominent historical landmark of the Swartkops power station.

"Our focus is therefore on both Port Elizabeth's current industrial activities as well as its abandoned industrial plants and polluted landscapes that have resulted from the way in which activities were conducted in the past," Palframan explains. "Through regenerative architecture and ecosystemic rehabilitation these landscapes can be transformed into productive, human-friendly spaces and living environments that combine functionality, commercial imperatives and aesthetics."

This approach brings together several disciplines, including architecture, engineering and the environmental sciences.



“Certainly in the academic environment our intentions are mutually inclusive with distinct overlaps between several disciplines in a context where populations have expanded to the degree that the historical industrial landscapes, once on the outskirts of the city, are increasingly part of the general city fabric,” Palframan explains.

Power stations and sewerage works, for example, were once far removed from human beings and were not associated as being ‘architectural’. However, in a re-conceptualised model for cities, as ‘industry beautiful’, these and other essential systems require a high level of architectural and urban design, as well as environmental and engineering input. They can now be situated far closer to where they need to be, with the spaces around them being used to create community spaces, where citizens can interact in various ways and children can safely play.

The ecological and industrial wasteland turned environmentally friendly, habitable human landscape was the broad theme of the second International Architecture Workshop that the School of Architecture hosted over three weeks in January and February 2016.

It focused on Port Elizabeth’s geologically and archaeologically rich Lower Baakens River Valley and its integration to Algoa Bay through a repurposed waterfront. The Baakens is a 23km urban river, originating in wetlands on the outskirts of Port Elizabeth and flowing through residential suburbs to the city centre and out into the metro’s harbour. It is an iconic, underutilised, and, in many parts, polluted ecosystem.

“We had three international architects and one South African architect working with our students from first to fourth year to produce remarkable designs that envisioned rehabilitated,

integrated environments with recreational activities, housing for groups across the social spectrum, and commercial development.”

This work was tasked as part of several long-range projects that evolved with the Mandela Bay Development Agency (MBDA). The 2017 fourth-year group continue this partnership with a spatial plan for social housing in the South End area.

“It is all about demonstrating how the city can be made, more vibrant, functional, environmentally sustainable and beautiful,” Palframan adds.

The ‘productive landscapes’ category of engagement was interrogated in numerous fifth-year Master of Architecture students’ treatise work. Master’s student Scott Lenton designed a seaweed processing plant for his treatise in 2016 that combines a commercial-scale activity with the rehabilitation of the Seekoeiriver wetland biome.

Master’s student Alana Changfoot’s 2016 treatise dealt with the regeneration of the buildings and land surrounding the Swartkops power station. Changfoot was fascinated by the industrial archetype and how it has shaped the modern cities we live in.

Leon van der Westhuizen, the master’s student who produced the top treatise submitted to the 2016 Corobrik Architectural Student of the Year competition, dealt with the rehabilitation of the Shark River water system from the Forest Hill cemetery through Happy Valley.

The following three excerpts from three master’s students’ treatise abstracts offer insight into the regenerative architecture and coastal ecosystem rehabilitation approach:

Regenerating the Boet Erasmus stadium through the design of a biological water treatment facility

An excerpt from Leon van der Westhuizen’s abstract reads: ‘This treatise was born out of an ecological concern for the abandoned Boet Erasmus stadium in Happy Valley, Port Elizabeth. The derelict state of the stadium along with polluted urban wastewater and contaminated water from the Shark River has caused severe destruction to the unique ecosystems only found in this part of the metropole. The current environmental status of the stadium provides the foundations for investigations into an architectural intervention of a remedial nature to rehabilitate the valley and implement water remediation strategies to filter the polluted and contaminated water.

Rhizofiltration has been employed as a water remediation strategy for the site, through using various aquatic plants such as water lilies to filter the contaminants and heavy metals in the water. The associated agricultural practices and water cleaning systems are managed by the architectural intervention. The treatment process will provide natural public swimming areas to promote public awareness and participation and return the site to an environmentally sound state, which will contribute to the rehabilitation of Happy Valley.

Regenerative Industry: Redesigning the Swartkops Power Station for urban agriculture

An excerpt from Alana Changfoot’s abstract reads: ‘This treatise was born out of a fascination with the industrial archetype and how it has shaped the modern day city we live in today. These now abandoned structures, derelict in nature, are reminiscent of the once powerful revolution that catapulted humans into the technological era. As the resources were depleted, or the use for these industrial beasts became redundant, de-industrialisation began to occur, leaving behind scarred post-industrial landscapes.

The Swartkops power station was initially intended for the growth of Port Elizabeth in both an economic and industrial sense. It was to provide power for the city and its surrounds, and was one of the first heavyweight industrial buildings to be erected in the region.



During the years of its commission the landscapes around the site, as well as the water it used from the Swartkops River, were extensively polluted and contaminated with certain heavy metals.

We are now tasked with reclaiming these landscapes and the industrial heritage that lie within them..

Urban agriculture is a solution with many advantages: technology and techniques are somewhat low-tech in their nature as well as easily educated to the community within the local area. Food can be continuously grown inside tall buildings in the built environment.

Urban agricultural production and de-industrialisation open up a way for progressive thinking in architecture and the urban environment as a whole, initiating a need for regenerative and productive architectural solutions to a global problem. Here, the role of architecture as a productive catalyst works hand in hand with the issue of food production.

Estuary Allotment and Seaweed Revitalisation Farm

An excerpt from Scott Lenton’s abstract reads: This treatise addresses the architectural challenge of designing a seaweed processing plant that operates on a commercial scale and diversifies the existing agriculture sector in South Africa. The project simultaneously addresses the upgrading of outdated infrastructure while looking to create a new take on an existing typology; combining the process-driven architecture of ‘factory’ with a usable public interface (the water’s edge). By challenging the generic notion of ‘factory’, new construction techniques for an old typology will be investigated and be expressed in unique detailing, and will include:

- Controlling water movement, to a certain degree, as this is vitally important for the harvesting of seaweed;
- An understanding of how water and architecture may form symbiotic connections to better create quality space, as well as restoring the relationship between human and nature.



Image: Corinna Kern

A postgraduate-led project on gang-related crime in the Nelson Mandela Bay Metro worked closely with the South African Police Services to locate the causes, motivations, processes and convictions.

The sociology of crime

From December 2015 to June 2016, a multidisciplinary group of postgraduate students, supervised by Professor Rose Boswell through the Faculty of Arts, worked with the police at the Gelvandale Police Station to research the police dockets on gang-related crimes in Helenvale in the Northern Areas of the Nelson Mandela Bay Metro.

The South African Police Service (SAPS) approached the Faculty of Arts to work with them in researching and understanding the social background of these crimes, and paid a first installment for the research team's logistics, such as travel costs.

"We got ethical and police clearance for all the postgraduates, and we started looking at the patterns of violence in the small Northern Areas community of Helenvale, which has an extremely high rate of unemployment, drug use, gangsterism, violence and related crimes, including murder and rape," says Jessica Thornton, a PhD candidate and lecturer in the Department of Sociology and Anthropology, who led the postgraduate research group.

"People who are unemployed in this area are often part of a gang, which increases the possibility of violence and the use of drugs and firearms. Gang members tend to spend their

money on drugs and firearms, instead of food and education for their households, and because of this they become more violent.

Men and women in the community are both prone to committing murder, with a 60:40 male to female ratio for murder cases, and most of the victims are between the ages of 16 and 25. Intoxication is invariably written into the murder dockets, many are drug-related murders and crimes, with women tending to buy the drugs and men selling them.

While the act of committing murder is not gender specific, the profile of gangsterism and violence in Helenvale is a 20 to 30-year-old Coloured male, using a firearm, knife or some object in his hand, including a broken bottle or rock. Running street battles or revenge killings are rife.

Thornton says there are about 20 gangs in Helenvale; some of the more notable names are the Blink Boemelaars, Boomshakas, Njieje Bende, Von Boeties, and the most feared Upstand Dogs. Gang members work with other gangs in Cape Town on the Cape Flats, with a lot of back and forth travelling between the cities, notably to buy and sell firearms and drugs, including mandrax, tik and dagga. "Gang members further secure an income from members of the community who are pressurised to pay them a 'protection fee' and aggressively guard their territory, notably the street/s where they live. The gang members do have some kind of agreement with certain grandmothers, mothers or children who are not involved in drugs, crime or gangsterism, and most of whom belong to a church. How this works would need to be researched," says Thornton.

She says a common sight is of gang members sitting on top of their cars or roofs to mark their territory, and if a member of a rival gang enters their territory, they are shot in the arm or leg as a warning. Their menacing presence and the frequent incidents of violence in Helenvale tends to frighten off service providers, such as refuse collectors, from entering the area. This exacerbates the unhygienic conditions, lack of sanitation and general degradation of Helenvale, which has a population of over 12 785 people and 2 474 households. The accommodation is a combination of government houses and shacks.

"It is not a healthy environment for the children who play in the streets because the recreation area is in the middle of a gang area and too dangerous," says Thornton. "Children are indoctrinated into this world of easy violence from a very young age. On one occasion a four-year-old boy ran up to a police car, pretending to shoot. Many of the children's mothers, fathers or siblings are in gangs, and schools are the recruitment areas for gangs, with the result that some of the parents take their children out of school."

Certain members of the community, including schools, teachers and churches are trying to improve the community by applying for proper water and sanitation services, doing street cleanups, trying to get children back into school and introducing educational programmes on drugs and violence, and rehabilitation programmes for drug addicts. These members believe the starting point would be to remove all firearms from the community.

Social and cultural aspects of murder

Jessica Thornton started her PhD in 2016 on the underlying social and cultural aspects of murder. She is drawing on the discipline of social anthropology to better understand the causes and motivations of deviant human behaviour and to conduct more successful interviews with the accused, with the intention of making the trial process more efficient.

"At the moment a murder case from body to conviction or dissolution can take three years or more, and I want to reduce this time by setting up sound legal anthropology profiles of suspects, and including information on the type of murder, such as execution-style," says Thornton. "As a social anthropologist, you read the signs and nuances, including the facial expressions of suspects: the way the eyes look, slight movements of the mouth, subtle observations in which the police can be trained to help determine when people are telling the truth or not."

The police regularly patrol the area, and have done lockdowns and curfews where no one is allowed on the streets after dark, but this was not successful as the gangs simply moved their activities to other areas, which led to more violence as they were intruding on the resident gangs' territories. Thornton says several members of the police live in Helenvale or Gelvandale and are sometimes involved in the crime, but most are trying against the odds to improve the safety of the area.

She adds: "The project was supposed to go directly into Phase II when we would run workshops with schools, churches, the municipality and citizens to try to improve the community but the SAPS was not immediately forthcoming with the second installment. Fortunately, we recently heard that Phase II will, in all likelihood, start in 2018."



“We have an extraordinary culture of music in the Eastern Cape and we are proactive about nurturing and advancing it from the youngest age,” says Professor Erik Albertyn, Head of the Department of Music, which is highly active in school and community engagement programmes.

Music is the touchstone of human life

Jazz, classical music, choirs, pop, alternative music, the philharmonic orchestra ... music is alive in the Eastern Cape and there is strong interest in studying music at Nelson Mandela University.

However, the ability to read music is a requirement for any student wanting to study music at the university level. Recognising that this would exclude the majority of learners in under-resourced schools in the Eastern Cape, the Department of Music has several pre-tertiary musicality engagement programmes for school learners.

“Music is the touchstone for so many qualities required

of human life, including feeling, emotional expression, discipline, teamwork and achievement,” says Prof Albertyn.

“Many people in the Eastern Cape have exceptional musical talent, from singing ability to playing an instrument, which is a good starting point because it is easier to teach someone to read music than it is to sing or play an instrument.”

The Department of Music offers learners training in the formal disciplines required to study music, including the ability to read music. Music lecturers and postgraduate students teach at under resourced primary and high schools in the Nelson Mandela Bay Metro, including Uitenhage, and also in Jeffreys Bay.

An example is Greenwood Primary in the central precinct of Port Elizabeth’s central business district, which partners with Nelson Mandela University. Here, music lecturer Gareth Williams tutors financially constrained but musically talented learners to formally develop their ability from a young age. By the time they matriculate, many have the requisite music qualifications and skills to apply to study at the Department of Music. All students accepted into the programme are offered additional tutorials and assistance throughout their studies to help them to pass and succeed.

“Learners need a Grade 6 practical and Grade 5 theory for the BMus degree, and while they can get into the music diploma without a formal qualification, they need to do auditions to apply to be accepted,” says Prof Albertyn.

There is an inspiring Music Centre for primary and secondary learners at the University’s Bird Street Campus in Central where over 50 primary and secondary learners from schools throughout the metro receive formal musical training. The Music Centre offers a range of music skills, instruments and styles, including jazz, violin, piano, voice and whatever other skills the learners need to improve their music ability.

The University has its own symphony orchestra that Prof Albertyn facilitates, as well as a jazz big band, smaller jazz ensembles, and wind, flute and voice ensembles.

“We have an outstanding community choir and a strong relationship with the Eastern Cape Philharmonic Orchestra (ECPO),” explains Prof Albertyn, who is the Artistic Director for the ECPO and the Chair of the ECPO board.

“The ECPO hosts the annual *Concert in the Park* in Port Elizabeth where the orchestra plays more contemporary pop and jazz music with orchestral arrangements. And we have a music-teaching project, which relies on funding from the national lottery. In 2016, we had 10 full-time and 10 part-time teachers operating from schools in Motherwell and Bloemendal, with 700 learners in the choir and playing instruments.”

Regrettably, the national lottery funding is not always distributed in good time, which adversely affects the project. At present, the project can only run the ECPO String Project of 40 learners who practise at Bloemendal and the Bird Street Campus. Two young people from Motherwell have been taught how to repair instruments for the schools by an expert from Johannesburg, where they travelled to learn this skill.

National Youth Orchestra

There is a strong contingent of Nelson Mandela University students in the National Youth Orchestra, with members aged from 16 to 25 years. Out of a total of 50 in the national wind band and symphony orchestra respectively, 15 are from the University.

Prof Albertyn regularly trains the brass contingent and coordinates the Eastern Cape entrants tested at the University. “Those who are good enough are accepted into the National Youth Orchestra. It’s like being chosen for a national sporting team; it’s an enormous honour and they receive their South African colours.”

Prof Albertyn, whose favourite composers are Tchaikovsky, Mahler and Wagner, played in the National Youth Orchestra from the age of 15 to 25, and thereafter in the National Orchestra. He continues to play in the Eastern Cape Philharmonic Orchestra and in the University’s horn ensemble, which is unique in South Africa.

Nowhere else is there a grouping of such fine horn players as these 12, ranging from musicians to engineers to current and former music students.

‘It’s like being chosen for a national sporting team; it’s an enormous honour and they receive their South African colours.’

– Professor Erik Albertyn

The Jazz Unit and Jam Session

In 2016, approximately 50 learners from schools in the metro participated in the Department of Music’s Jazz Unit, learning a range of instruments, from the drums to the saxophone, piano and guitar, as well as music theory.

“In 2016, we further introduced a jam session four times a year where we invite players from the township onto campus to jam with

our resident band of staff and students and some non-university people,” says Prof Albertyn. “On these days, everyone is welcome to join in the jamming and singing, which takes place in our department’s auditorium. There are some brilliant musicians in the township. Because of circumstances many never move beyond the township and don’t achieve the recognition they deserve.

“One of our part-time lecturers, Lestie Hughes, did a master’s study on local township musician Dudley Tito and others since the 1950s. There are examples of township musicians who move beyond the township such as Feya Faku from New Brighton, who went on to study at the University of KwaZulu-Natal. It all comes back to formal training: a modern jazz musician cannot only improvise. They also need to be able to read music when they go into a studio to record or to play in tune with other people. Technical training is highly important, it opens so many more avenues and opportunities for growth and self-expression.”



“Don’t be afraid to play around with the medium and to explore class, culture and who people really are through film and video,” says Dr Subeshini Moodley, who joined the Department of Journalism, Media and Philosophy in 2016.

Exploring class, culture and who people really are

“The process of making films or videos, including YouTube-type videos has the power to change prejudices and preconceptions,” says Dr Moodley, a senior lecturer in video production and film studies, and Acting Head of Department, previously from the University of KwaZulu-Natal.

“I see film and video as therapy, as a feminist standpoint and as claiming a space of representation. I have witnessed the empowerment of women through my research on film.”

Postcolonial theory, gender and self-reflexive filmmaking, video and social media documentaries, and visual ethnography are some of the innovative approaches to

knowledge and practice that she brings to the Department.

Dr Moodley’s PhD dissertation titled: *‘Narrative Possibilities in a Postcolonial Context: Exploring Self-Reflexive Film as a Critical Articulation of the Stories of South African Hindu Women’*, was sparked by her fascination with film and video, her interest in feminist theory, and her commitment to contributing to the upliftment of women.

“I have a personal interest in feminist issues and how women are represented through mainstream media. I feel that if women have the means to represent themselves, they would offer a challenge to dominant representations of themselves.”

As a South African Indian woman from the Hindu culture, she explains that ever since she was an undergraduate, when she watched films and videos about the Indian community, she felt detached from the representation of Indian women:

“There would be the same, stereotypical, Bollywood-style representations of the devout, devoted, subservient Hindu wife and mother. But all around us it was obvious that life isn’t like this. One example is that there were single mothers in our Indian community and so I increasingly found mainstream representations to be extremely limiting.

“I wanted to find out how women in the diaspora would represent themselves or if there are other Indian Hindu women who feel limited by the mainstream, Bollywood interpretation of women, which is mostly based on Hindu mythology. Through my research I met women film-makers who offered challenges to this kind of representation, and in my master’s I tried to create a framework for this, and called it ‘postcolonial feminist filmmaking’.”

For her PhD (2016), Dr Moodley realised the research and outcome of her project would be far more interesting if, instead of making a film about Hindu women, she gave the women a camera and asked them to tell their own story.

She contacted Hindu organisation across South Africa to find Hindu women who wanted to participate in the project. Three women responded and she did filmmaking workshops with them over a couple of months to teach them script-writing, film-making and equipment literacy skills. They then went off to shoot their films. Dr Moodley helped with the editing, in addition to also making her own film about herself.

She took the auto-ethnographic/self-reflexive approach where she made films with the participants but at the same time she made a film of her life, and became a participant in the research and the participants became researchers too.

“I chose to do the story on the women in my life who have had an incredibly positive impact on who I have become – my

In one of the documentaries, the sari was portrayed as a symbol of liberation and oppression as it is imbued with the stereotype of what an Indian woman should be.

grandmother, my aunt, my mother and my daughter. It bordered on the boundary of documentary and poetry where I filmed each of them in their daily spaces and overlaid a poem I had written about them,” says Dr Moodley, adding that she was fortunate to grow up in a very liberal Hindu family.

The three women who filmed their lives included two attorneys and a woman who worked for the Department of Education and who is

also a classical Indian dance teacher. Two of the women are from Durban and one from Johannesburg. One woman is in her thirties, another in her forties and the third is in her sixties. “What was interesting was the kind of oppressions the women experienced in their lives, despite being as successful and high profile as they are. They used the films they made as a way of working through these issues,” Dr Moodley explains. “What surprised me was how prepared they were to share their stories on film, and the validation they felt when they saw themselves represented.

“One of the attorneys showed that even if you are highly educated and have a successful career, and therefore you are not theoretically trapped by your socio-economic status, this was not her lived reality. She would return home from her high-powered job and serve her father and brother.

“An older woman, who agreed to be interviewed by one of the study’s research participants, had significantly broken the mould. As a young woman she had become a driving school instructor because she wanted to be independent and to make her own money. She would head out into the working world in her sari. She also liked to go dancing, but her independence was severely judged by her community and it was difficult for her and her two late husbands to deal with.”

In one of the documentaries, the sari was portrayed as a symbol of both liberation and oppression. The women felt beautiful wearing the sari but it is also imbued with the stereotype of what an Indian woman should be.

The second attorney participating in the filming was in a highly abusive relationship. She had worked her way up from very humble

beginnings to a highly successful legal career, and had married her childhood sweetheart, only to find out on her wedding night that he was having an affair. Her mother had told her that if she married this person it could end badly, and all she could think about was the heartbreak in their eyes when she married him. She found it very difficult to end the marriage as divorce is not easily accepted in the Indian community.

“In her documentary, this woman explained that there is still so much pressure on- and criticism of women in the Indian community if they don’t comply with the stereotype, and that a lot of women still feel they cannot make it on their own; that they need a husband, irrespective of how he treats her,” Dr Moodley explains.

“If you decide to end an abusive marriage, the blame for the broken marriage will still be put on the woman, and you have to live with this. This woman got divorced, she chose to live with it, but she explains that she could not let go of it until she filmed herself. She told me that it was only when she saw what she had filmed about herself, where she spoke about what had happened to her,

over and over, that she suddenly felt that she had been heard. She said: ‘I don’t think I need to talk about this anymore’.”

Dr Moodley brings a multi-purpose approach to her research – a social development purpose where the filmmakers learn about themselves: this is an important contribution to cultural studies in South Africa and an educative purpose where her practical film-making skills and her skills as someone who teaches film, became useful to other people.

“Social development and community engagement are only effective if the scholar as an activist can simultaneously teach to- and learn from the communities where they work,” she explains.

“My intention is to build film and video studies, drawing on new and interesting techniques and approaches that advance the culture of enquiry at the University and in broader South Africa society where our graduates and postgraduates will head out and make an impact.”



Auto-ethnographic documentary participants



Dr Subeshini Moodley



Dr Ismail Lagardien

Executive Dean’s Report

“The die has been cast,” a staff member told me before our official renaming, “lead us now, to become the best faculty of Business and Economics Sciences”. And so it is. This is the path we’re on. There can be no turning back.

Faculty of Business and Economic Sciences: highlights

I recall, as I write this, the words of our former president, Thabo Mbeki, in his epoch-defining speech, ‘I am an African’, when our new Constitution was adopted in 1996, when he said: “Whatever the setbacks of the moment, nothing can stop us now!”

In other words, every boulder, every barrier and every barrister they use to stop one of us is of no use, for it cannot stop change nor halt the passage of time, nor reverse the social and historical forces that drive transformation and excellence. The Faculty of Business and Economics Sciences at this University has set off on a course of meaningful transformation that should change, for the better, the lives

and futures of every child in our country. This change will be radical and organic. We will dig deep into our ideas as an African society shaped, as we have been, by autochthonous social and historical forces, and by those that have shaped the world of the 21st century. The die has been cast.

We are cautious, of course, never to confuse ambition with achievement, and that a lot of work needs to be done, but we are bringing together our students and staff, our stakeholders in civil society and government, to work with us. We are opening up our faculty to new ideas, to an array of concepts and methods. We are asking deeper questions about the role of business and economics sciences in society, and we

are seeking answers to the questions posed to us as students, teachers, administrators and janitors.

Already within our Faculty, in Economics and Development Studies, we are opening up to new avenues of inquiry: from Islamic Finance to Feminist Economics; from Food Security to Financial Stability; from the Future of Work and the Fourth Industrial Revolution, to protection of common pool resources, especially the natural environment, including our waterways and our oceans. We are opening up tourism studies as an active commercial activity, while exposing the tourist gaze to the local gaze, and opening up to the world our historical, environmental, scientific and cultural heritage. Our new areas of inquiry come together in the political economy of South Africa's national developmental objectives. Our strength lies in seeing how all these factors come together to build a more prosperous and equal society with high levels of trust among everyone.

In Business we are looking closely at companies as social entities in a social world, and less as exclusively profit-maximising entities that are disembedded from communities and society. We are looking at how we can work with business leaders and government on how to reduce the cost of doing business, and create access for new entrepreneurs, industrialists and innovators. We do these in collaboration with our schools of Management Studies and Industrial Psychology & Human Resources, we are giving life to the entrepreneurial spirit of our students and communities.

Our School of Accounting stands apart from its peers in the country as one of the best in South Africa, and we continue to expand our scholarship to include public accounting, strengthening general accounting, and we will continue to present to the country, the best chartered accountants.

Last year, our new Director of the School of Accounting, Professor Houdini Fourie was awarded a Category C (established researchers) by the National Research Foundation (NRF). The NRF-rating system for academic researchers is a key driver in the country's objective to build a globally competitive system of scientific research in South Africa. Ratings by the NRF are allocated on the basis of a researcher's recent research outputs, and their impact as perceived by international peer reviewers. More significantly for us, as a Faculty, the rating of researchers is based on the quality and impact of research outputs over an extended period. This award is consistent, therefore, with the Faculty objective to focus more on the quality of our research output, and less on the volume.

And so, as a Faculty, we are letting loose the innovation and social imagination of students and scholars – and we do this reflexively. We believe that if we know our students better and they know us, we will find that organic element to transformation. We believe, as a Faculty, that if we proceed organically with our students and staff, fully aware of our national and global responsibilities, there is no turning back. Transformation is a progressive and dynamic process that moves ahead, constantly, adapting to new realities, new challenges and, as our Constitution requires of us, to undo the injustices of the past. In doing so, we also bear the responsibility of the institutions we create for the future.

The Faculty is mentoring a group of young scholars who stand ready to take up leadership. Each one of them has dedicated themselves to excellence and achievement. They have expected no favours, and take no hand-outs, they are some of the finest young minds in the academy who claim no easy victories. With them, our future is in good hands. With them our Faculty is in good hands. We will continue to mentor and develop academics of the future from their first day at university, through the PhD process and into the professoriate. We cannot claim transformation when only our student numbers meet equity objectives; meaningful transformation includes a deep overhaul of our curricula and of our professoriate. This is the very least we can do for successive generations of South Africans.

The sands of time are shifting, constantly. As the Dean of Business and Economics Sciences at Nelson Mandela University, I am proud to say that we may take detours along the way to becoming the best faculty in the country – but in the long view, giving up on this goal is not an option. This, too, we know, for certain: the purpose of education is as much to change the learner, as it is to change the teacher and what is being taught. We have to avoid fooling ourselves into thinking we have reached the end of everything that can be known, and that only a small group of people own curatorship of bodies of knowledge.

The world is in the midst of one of the biggest crises in global political economics – almost all the dimensions of which are reflected in South African society. It is out of this crisis that we will produce ideas that will make the world a better place for coming generations.

Dr Ismail Lagardien
Executive Dean
Faculty of Business and Economic Sciences

“In Business we are looking closely at companies as social entities in a social world, and less as exclusively profit-maximising entities ... ”

– Dr Ismail Lagardien



The entrepreneurial orientation and transgenerational potential of indigenous African family businesses and factors influencing black consumers' perceptions of financial planning are two fields of novel research being pursued by PhD candidate Tony Matchaba-Hove, a lecturer and researcher in the Department of Business Management, and 2016 Faculty Emerging Researcher of the Year.

African family businesses

“Globally, family businesses perform a crucial role in the creation of economic and social wealth. In Africa, family businesses are a vital part of the economy and make substantial contributions to economic growth and social stability. However, family businesses face significant challenges to survive and prosper across generations,” explains Matchaba-Hove whose grandfather started and owned a general dealer, which is still being run by his uncle in Masvingo, Zimbabwe.

“For my doctoral research I am attempting to develop a framework for enhancing the transgenerational potential of indigenous African family businesses, as very little research has been conducted in this area. I am specifically focusing

on African family businesses in South Africa, Botswana and Zimbabwe in the transport, logistics and property sectors, as there are several successful examples in these sectors. My objective is to provide deeper insights and an increased understanding of the practices implemented among indigenous African family businesses that have survived across the generations, as well as the African context in which these businesses operate.”

In October 2016, Matchaba-Hove attended the inaugural STEP (Successful Transgenerational Entrepreneurship Practices) Global Academic Conference. The STEP Project is a collaboration of scholars worldwide studying the successful entrepreneurial practices of family businesses over time.

Nelson Mandela University, through the Family Business Unit, is the only institution representing Africa on the STEP Project. Matchaba-Hove presented a paper entitled, *The entrepreneurial orientation of indigenous African family businesses*. In total, over 50 STEP scholars from 35 academic institutions representing 29 countries participated in the conference. It provided a platform for STEP scholars to present their research within the field of family business as well as strengthening the ties between STEP team members across the globe.

“The STEP project provides a unique opportunity to compare and contrast successful transgenerational family business practices in Africa with the research that has been conducted by fellow STEP scholars in Europe and North America, Latin America, and Asia Pacific,” says Matchaba-Hove.

“The family businesses are chosen according to STEP criteria as they need to meet certain requirements of the project in order to make accurate comparisons. They need to be successful and sustainable, defined as them having made it to at least the second generation, and where two generations are actively involved in the running of the business. Size-wise, they must be medium to larger size businesses with about 50 employees or more, with a healthy turnover.

“The STEP project provides a unique opportunity to compare and contrast successful transgenerational family business practices ... ”

– Tony Matchaba-Hove

In 2016, Matchaba-Hove further co-authored a paper with his colleague from the Department of Business Management, Xolile Antoni, entitled: *Factors influencing black consumers’ financial planning intentions: an exploratory study*. They presented this paper at the International Business Conference (IBC) 10th Annual Conference in Langebaan in September 2016.

Matchaba-Hove explains that financial planning has, to date, been seen as more of an elite activity for people in the higher income brackets. On top of this, in South Africa, national and global economic pressures, rising health care costs and other societal factors have caused the vast majority of the population to remain underprepared financially.

“There is a general lack of understanding of financial planning, as well as an under-utilisation of financial planning services, and a distinct lack of literature dealing with financial planning in the South African and greater African context,” he says.

For this exploratory research, they looked at the factors that would influence employed black consumers seeking financial planning assistance. They found that financial self-efficacy levels were low among many black consumers whose lack of belief in their numeracy skills negatively

impacted on their pursuit of any kind of financial planning.

Matchaba-Hove says: “Financial self-efficacy was found to have a significant influence on black consumers’ intentions to seek financial assistance. The main recommendations from this finding are that black consumers must start to learn at an early age about financial planning and setting their financial goals and objectives. This can start from early childhood through parents and teachers who can help ensure their financial literacy levels are good.

“Furthermore, it is recommended that financial planners, as well as the Financial Planning Institute of South Africa (FPI) offer more workshops to the public, targeted at black consumers, to make them aware of the basics and the benefits of financial planning. In addition, financial planning businesses need to come up with more appropriate financial planning solutions for middle and low-income earners. Our recommendation to the government is to make financial literacy programmes mandatory at institutions of higher learning, as well as in the final year of secondary education.”

“I am focusing on how and why these businesses are successful, and what lessons can be learnt from successful African family-owned businesses in general. This is extremely important for community development and skills development in the drive to develop entrepreneurialism and employment.

“When you run a successful, enduring business, you create long-term income and employment, and you also grow your influence in your area, region, country and world.”

Matchaba-Hove believes that one of the fatal flaws in entrepreneurialism today “is that people think they have to have the perfect concept, and the right amount of funding, or they think they don’t have the skills to run a business. In other words, they are always waiting for things to fall into place and life never happens like this.”

He adds that all the African family businesses he is researching started small and grew from there, and have been well run from one generation to the next, with customers enjoying the fact that they can put a face and a family to the business. It is personal, and customers want personal service.



The Journal for Development and Leadership (JDL) was conceived in 2010 by Economics Professor Hendrik Lloyd to serve as an academic vehicle for the dissemination of niche research in the Social Sciences.

Six years of the Journal for Development and Leadership

“In 2010 we looked at our strategic vision for the Faculty and realised that we needed a vehicle to publish research in the specific niche areas of socioeconomic development and African leadership,” explains Prof Lloyd. “I suggested the development of a journal and was asked by the Faculty to investigate this and get the process going.”

The first edition of the JDL appeared in June 2011. Six years later, in 2016, ten editions have been published, with a combined total of 80 articles. Prof Lloyd is the JDL’s Editor-in-Chief and Chairperson.

To start a journal is a long and difficult process and not many undertake it. Before you are even allowed to apply for

accreditation with the Department of Higher Education and Training (DHET) you need to have an established track record of the journal, and publication record of the journal for three consecutive years. It must also have a specific theme and a broad spectrum of contributors and readers.

First applications for accreditation are frequently turned down by the DHET, as happened to the JDL, which submitted a second time and is awaiting the response. “We’re hopeful and it will mean a great deal to become an accredited journal, both for the prestige and because articles published in the journal then attract government subsidy for the home university of the author and for the researcher to build up a research fund,” says Prof Lloyd.

The JDL has an average of two editions per year, with eight articles per issue, including four from international contributors outside of South Africa, two from national institutions and two from Nelson Mandela University, with an emphasis on foregrounding the research of younger scholars.

Volume 5, Number 2, December 2016 opens with an article titled *Placing ethics in economy under scrutiny* by the new Executive Dean of Business and Economic Sciences, Dr Ismail Lagardien, who took up his post in 2016.

Discussing the tradition of 'real world' economics he writes: *"In this tradition we commence the argument that moral inquiry ought to be part of the economist's toolkit. This argument emanates from the basic understanding that the subject matter of economics has to do, in very fundamental ways, with decisions made by people within a social environment. This environment is shaped by history as much as it is by agency.*

"Economic choices are therefore often framed by social relations and governed by ethical norms that change over time. Consider, for instance, the 'legitimacy' of trading human bodies (slavery) over centuries, and how moral outcry and considerations of right and wrong, the very basis of ethics, have overturned that practice. Conceptions of what is wrong or right change then over time. In this sense economic activities, or markets, operate within moral ecosystems.

In one of his final paragraphs he concludes: If we are to situate power relations, social justice, equality and ethics more centrally in development and leadership, we may have to start with opening up orthodoxy economics, and exposing it to the real world and the life world of the millions of people whose lives are affected by the economics logic that drives global public policy making."

All 80 articles published in the JDL to date were subjected to the respective review and other processes, including:

- The academic merit determination process by a senior academic in the Faculty for acceptability to be entered in the review process;
- A double-blind peer review process that includes an evaluation of each article by two independent peer reviewers – prominent national and international academics in the relevant field;

The JDL serves national and international academic and practitioner communities from an inter-, multi- and trans-disciplinary perspective ...

- A language-editing process; and
- Vetting for technical correctness, including punctuation and referencing.

For each issue, 500 copies are printed and mailed to individual and institutional recipients. The online version is then uploaded to the JDL website.

The JDL serves national and international academic and practitioner communities from an inter-, multi- and trans-disciplinary perspective, particularly with respect to the fields of Economics, Development, Marketing, Human Resources, Industrial and Organisational Psychology, Accounting, Financial Management, Tourism, Management and Business Management, Logistics and Marketing, among others.

Submissions for publication in

the JDL are invited from:

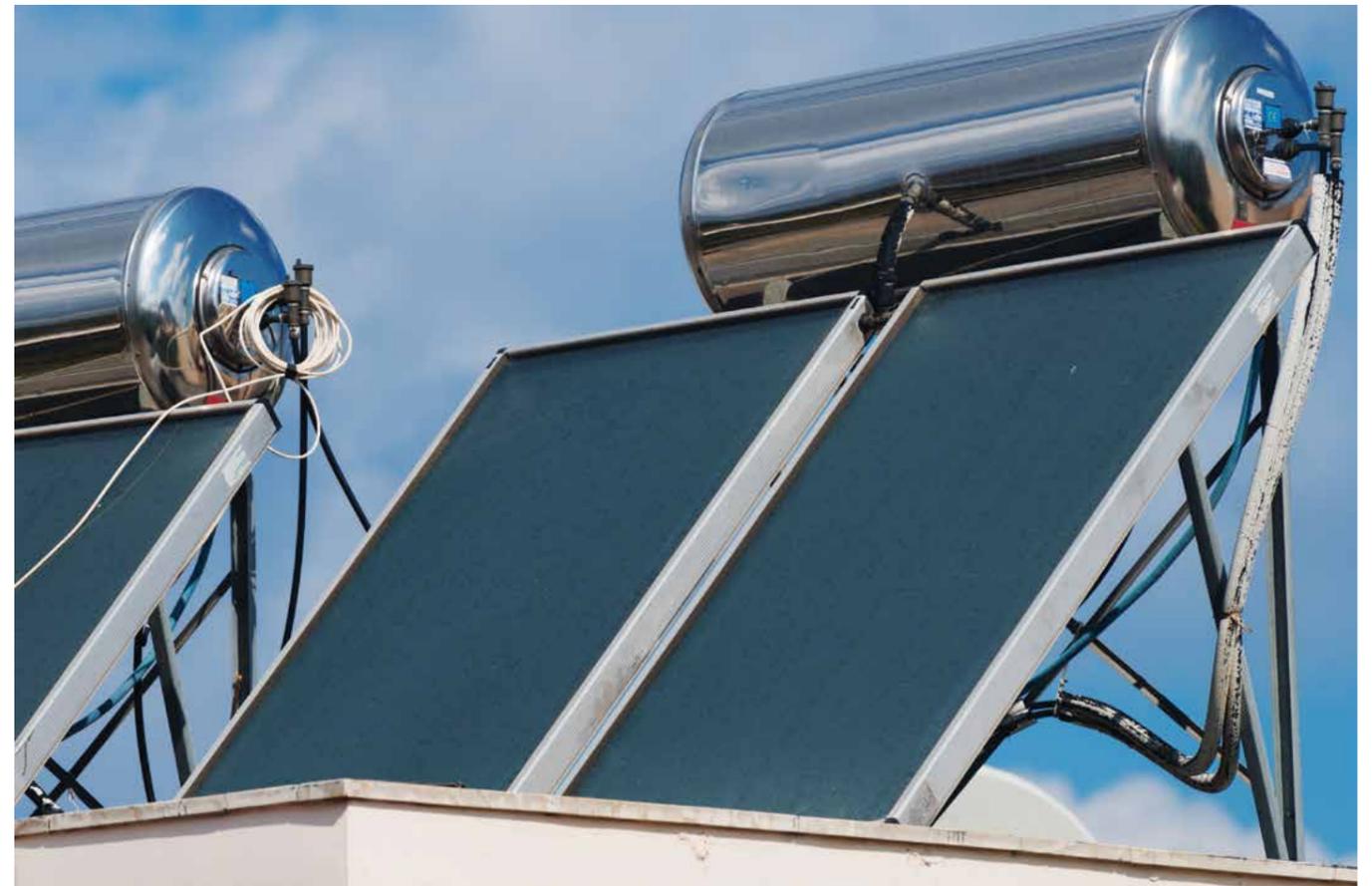
- Academics (international, national and from NMMU)
- Business managers
- Corporate leaders
- Entrepreneurs
- Public service managers and leaders
- Researchers
- Planners
- Consultants
- Other interested parties

In 2016 the JDL published two editions and a pan-African, Special Student Edition, through the international Southern African Development Studies Association (SADSA). This issue included papers from a SADSA conference that explored local and regional economic issues. The idea for this special issue was to foreground the best or promising research done by younger scholars in Africa.

"We have found that the partnership factor works particularly in Africa as part of our goal is to have a far more prominent footprint on the continent and to focus on development and leadership research throughout Africa," says Prof Lloyd, adding that it has also proved to be a strong marketing vehicle for the Faculty.

All articles from the journal can be viewed online and free of charge.

jdl.mandela.ac.za



The Township Revitalisation Project builds on research that is exploring the concept of sustainable working class townships, community self-sufficiency and local small business development.

Township revitalisation project

The project is led by Professor Ronney Ncwadi, the head of the Department of Economics who grew up in Zwile Township in Port Elizabeth where his mother was an informal trader. "I learnt about trading, managing money and running an informal business from an early age because of my Mom," he explains.

"She would sell clothing and buy boxes of apples, oranges and peaches, which she would then sell individually, as well as cut up large bars of soap into smaller pieces. In our school holidays we would help my Mom by selling door to door or on sports days we would sell to the spectators.

"With the money my Mom earned, she helped pay for our school fees, school uniforms, university fees and she helped

to supplement my Dad's salary – he was a bus driver and later a factory worker – to cover the household expenses."

Prof Ncwadi recognises the importance of locally owned township businesses, large and small, formal and informal, to grow self-sufficiency and the township economy. This inspired him to start looking at the revitalisation of locally owned township businesses in the Nelson Mandela Bay Metro, as many of these have closed down, and, in some areas, foreign business owners have taken over this role.

In 2016, together with Professor Deon Pretorius who lectures in Development Studies they compiled a concept document on the fundamentals of Township Economy Revitalisation. Based on this, Prof Ncwadi is currently working with one of

“Building the township economy is part of the national development plan for the City and it has an important role to play within the global context of climate change,”

– Professor Ronney Ncwadi

his Honours students, Noloyiso Mpati, to explore why locally-owned businesses have closed down or failed, what foreign business owners are doing right, what the local people are doing to survive in view of the high unemployment. If they are running businesses what are the bylaws constraining them, what are the missing skills in the townships so that people can be upskilled and what motivates people to own and develop a business, how many people use microloans, which, in general, are not sustainable for running a business, and what other access to finance there is for funding startups.

“What concerned us is that people in general seem to look to government to provide them with some sort of living where, for example, tenders are seen as the way to start a business. And then once they get the tender and complete the job, they often sit without any livelihood or opportunity until the next tender; hence they become tenderpreneurs rather than entrepreneurs.”

The research revealed that some of the reasons that foreign-owned township businesses, such as spaza and shops owned by Somali nationals, are successful is that they work extremely hard, they keep long hours, they are excellent at customers relations, they offer low-level loans to their customers when they need goods on credit, and they buy as a collective.

“They buy in bulk from wholesalers at cheaper prices and outcompete other small businesses who buy their stock from retail outlets or supermarkets,” Prof Ncwadi explains. Small businesses also increasingly need to compete with the large supermarket chains and malls that have penetrated the townships.

“At the same time there are a notable number of small, locally

owned informal sector businesses that are thriving and who are at their stores or at their stall at the taxi rank every single day, working at making a living,” he adds. “There are all sorts of businesses in the townships, including tyre repairs, mechanics, plumbers, hair salons, carpenters, welders, funeral parlours, dressmakers, airtime vendors and solar energy businesses.

“We need to encourage the informal sector without formalising it or creating rigid rules or demarcating where people can and cannot trade. We must not try to make suburbs out of the townships as the township economy thrives under the township ‘vibe’. It is this vibrancy that keeps the township economy alive, not rigid, formal rules. However, we do need to invest in small business development, upskill people in financial management and in managing and growing their business. If we don’t do this, year after year, the number of people looking to the state for social grants will increase and the burden on the state will grow.”

Prof Ncwadi says anyone who wants to own their business or to be an entrepreneur “has to keep the fire burning, to keep on their toes and keep their instincts sharp while constantly evolving and trying new angles because there will always be people copying what you have done, so you have to keep a step ahead. If you don’t do all this, the fire goes out.

“As I explained when I presented to small business owners in Peddie in 2016, who wanted to know what makes for a successful business: it’s about starting your business every day as if it is the first day. You don’t say ‘I’ve been in business for 30 years’ and therefore I don’t need to learn anything new; you treat each day as a new learning opportunity to build and better your business and you never stop learning about business.”



Every day, people from townships all over South Africa take their skills and their spending money into the city centres, returning to their township homes at night. But what if their skills and money could be harnessed to a far greater degree in the townships? What if the townships were alive with cooperatives, businesses and entrepreneurs running a range of businesses and using existing resources to respond to the needs of the residents?

The transition township

With this in mind, Professor of Development Studies Janet Cherry is piloting a project, in partnership with the residents of Port Elizabeth’s KwaZakhele township. Called the ‘Transition Township’, and supported by the National Institute for Humanities and Social Sciences (NIHSS), Prof Cherry is working with local community members to pilot a new model of sustainable and integrated local economic development in three areas: renewable energy and waste recycling, food production and distribution, and cultural industries.

In KwaZakhele, 50% of the working age population is unemployed. Most houses have one or two social grants coming in, and someone working part-time as a casual labourer or domestic worker or self-employed (such as child-minding or selling food).

“Instead of township residents being dependent on the state for social grants or on part-time jobs or employment at the few big companies in the Metro, which is not secure (as we have just seen with the closure of General Motors), we are looking at alternative incomes, focusing on locally owned cooperatives and local control over resources.”

Based on this model, residents can produce food and energy on a smaller or larger scale, where they become the owners, managers and shareholders of, for example, the ‘Township Energy Corporation’.

The long-term aim is to develop a thriving township economy where residents sell and install renewable energy systems for electricity, and, in the process, promote low-



Community research in KwaZakhele March 2016

carbon lifestyles. Or they grow and sell fresh produce, own and run bakeries, car repair businesses, cellphone repair and airtime vending businesses, brickworks, clothing and hardware stores. Those with creative talents could make films and documentaries, capturing the voices and vibes of their own streets.

“The pilot phase of the project, which started in 2016, has seen a community research team documenting and analysing one gap tap of 36 households in Ward 22,” Prof Cherry explains. “Here, the owners will be forming cooperatives of which they will become the shareholders and managers. The cooperatives include locally grown food, energy production and waste management businesses (such as recycling and using the organic vegetable waste for composting). The pilot phase is focusing on a corridor of development, running from Daku Street to Njoli Square, and on to the old Swartkops power station.

“Building the township economy is part of the national development plan for the City and it has an important role to play within the global context of climate change,” adds Prof Cherry. “We need to shift to a localised economy – with localised energy and food production serving local needs and markets.”

A number of partners are involved in this project, including the Co-operative and Policy Alternative Centre (Copac) and its Food Sovereignty Campaign; and a Cape Town-based NGO called the Alternative Information and Development Centre (AIDC) and its local affiliate: the Amandla! Resource and Information Centre. The project also forms part of the global One Million Climate Jobs Campaign.

“I would like to see this project move out of the realm of research and into a really dynamic community-controlled development, which involves residents owning energy and food supplies and managing them as a township enterprise or cooperative,” explains Prof Cherry.

“I would like to see KwaZakhele become a good place to live, with a good quality of life, with the income generated flowing into and through the township, not out of it, with people spending what they have within their own economy, and with residents controlling their own economy.

“This is part of a broad social justice agenda, and a belief in the agency of ordinary people. It’s not a question of looking for multinational companies or relying on government departments. People can control their own lives and their own environment.”

“Building the township economy is part of the national development plan for the City and it has an important role to play within the global context of climate change ... ”

– Professor Janet Cherry



Image: Larize Nel

Danai Tembo is doing her DPhil in Development Studies on Sustainable strategies for the improved implementation of marine living resource legislation in South Africa.

Solid policies, poor implementation

“Since the promulgation of the Marine Living Resources Act, the South African government has taken the necessary steps to ensure that this environmental legislation is abreast with global environmental legislation and trends,” Tembo explains.

“This include the signing of international agreements such as the United Nations Convention on the Law of the Sea. At first glance South Africa seems to have very solid policies. Unfortunately, solid legislation and proactivity on the part of the government is marred by poor implementation. With so many instances of poor policing, corruption and increased levels of illegal, unreported and unregulated fishing, South Africa is on the road to losing its valuable marine resources.

“The objective of my study is twofold; first, to explain the

factors influencing the failures in the implementation of marine living resource legislation in South Africa; and second, to contribute to the development of strategies that will improve implementation efforts. In pursuing this, I need to identify the factors that influence successful implementation of marine living resource legislation. Based on literature, expert opinion, observations and research, the study will endeavour to develop a set of strategies to improve current implementation practices, and which are universally applicable in all the coastal provinces in South Africa.”

In June 2016, Tembo presented a paper on *Disparities arising in the policing of consumptive (fishing, poaching) and non-consumptive marine activities (whale watching, swimming with dolphins, recreational activities)* at the interdisciplinary OCEANEXT Conference in France.



Dr Oswald Franks

Executive Dean's Report

Higher Education institutions are generators of new knowledge and innovation, advocates of social justice, and contributors to societal health and wellness. Against this background, I am privileged to share some of the Faculty's initiatives, in three areas in which the Faculty is engaged: the Ocean Economy, Smart Technology Solutions for Communities, and Design, Manufacturing and Alternative Technologies.

Faculty of Engineering, the Built Environment and IT: highlights

The Ocean Economy

South Africa's coastline, spanning approximately 3000 kilometres, is bordered by three oceans – the Atlantic, Southern and Indian Ocean. This vast expanse offers a wide range of habitats, from cool water kelp forests to subtropical coral reefs, and has the potential to significantly contribute to the national economy, job creation, poverty alleviation and knowledge enhancement.

In recognition of this, the government has commissioned Operation Phakisa to support the expansion of the ocean economy. This is contingent on the:

- Preservation of ocean health and mitigating the negative impact of climate change;
- Development of necessary human capabilities and skills to capitalise on the economic opportunities afforded by the ocean economy.

In response, the Faculty has undertaken a number of initiatives, including:

- Developing a three-year Bachelor of Engineering Technology in Marine Engineering degree which

will be accredited by the South African Maritime Safety Authority (SAMSA) and the Engineering Council of South Africa (ECSA).

- Forging links with ship-building companies, including the Finnish Ship Design and Construction Company, Wärtsilä; Norwegian ship builders, VARD, and South African ship yards.
- Facilitating partnerships with international universities with significant expertise in the area of Marine Engineering and Navigation including: Aalto University in Helsinki, Finland, and Southampton University in the United Kingdom.
- Planning the development, in partnership with the merSETA and Wärtsilä, of state of the art Marine Engineering laboratories including video conferencing facilities for use in delivering training programmes to participants in remote locations.
- Harnessing and adapting our automobile engineering and technological expertise for applications in the marine and maritime sectors.
- Building staff capabilities, with funding from the merSETA, through recruiting staff for the new Maritime Engineering degree programme and supporting staff to acquire postgraduate degrees in Marine Engineering.

Smart Technology Solutions for Communities

In 2014, the Centre for Community Technologies (CCT) was launched with the purpose of innovating technologies to develop the human potential of disadvantaged communities. The adoption of smartphones and the internet is having a huge impact on the lives of people throughout the world, with Africa experiencing the fastest uptake of mobile devices globally. Here, mobile subscribers are set to hit half a billion in the next five years. By implementing mobile Apps and developing smart solutions that can be accessed via mobile devices, the CCT is creating an ecosystem co-created with the beneficiaries and end-users to change everyday challenges into research and engagement opportunities that allow for sustainable interventions in a variety of communities.

The CCT provides smart solutions for agriculture, education, health, financial inclusion, traditional leadership, small and medium enterprises, and youth development. Their work is focused on multiple African countries in partnership with multi-national institutions.

The CCT's innovations are complemented by the Centre for Research Information and Cyber Security (CRICS) that conducts research and educational programmes aimed at maintaining secure

Information Technology systems and practices with an emphasis on cybersecurity.

Design, Manufacturing and Alternative Technologies

The manufacturing sector plays a leading role in contributing to the national gross domestic product and level of employment. Consequently, the Faculty focuses on the development of skilled graduates and technologies to advance productivity and capability.

The Faculty has created a number of entities that support local, national and international companies with challenges in the areas of technology development and skill shortages. One such entity is eNtsa, which, with the support of the Department of Science and Technology (DST) via various funding agencies such as the Technology Innovation Agency (TIA), has laboratories equipped with the latest technologies to support both industry and academic programmes.

eNtsa researchers, in collaboration with colleagues from the Science Faculty, led an eMobility initiative known as uYilo, and established a smart grid pilot project for the energy efficient charging of electric vehicles (EVs) through battery storage and energy

management across a network of charging stations. eNtsa also established an accredited testing and development laboratory facility for lead-acid batteries. eNtsa's medium-term goal is to expand the facility to include accreditation for the testing of lithium-ion batteries which would make this laboratory unique on the African continent.

Furthermore, Faculty staff developed the expertise to use 3D printing with applications in the renewable energy (wind) sector, as well as to design and build a 3D printer which is capable of printing wind turbine blades of five metres in length.

The potential and applications for 3D printing is vast and spans a wide range of disciplines. Consequently, EBEIT plans to create a central 3D printing facility that can be used by all seven faculties.

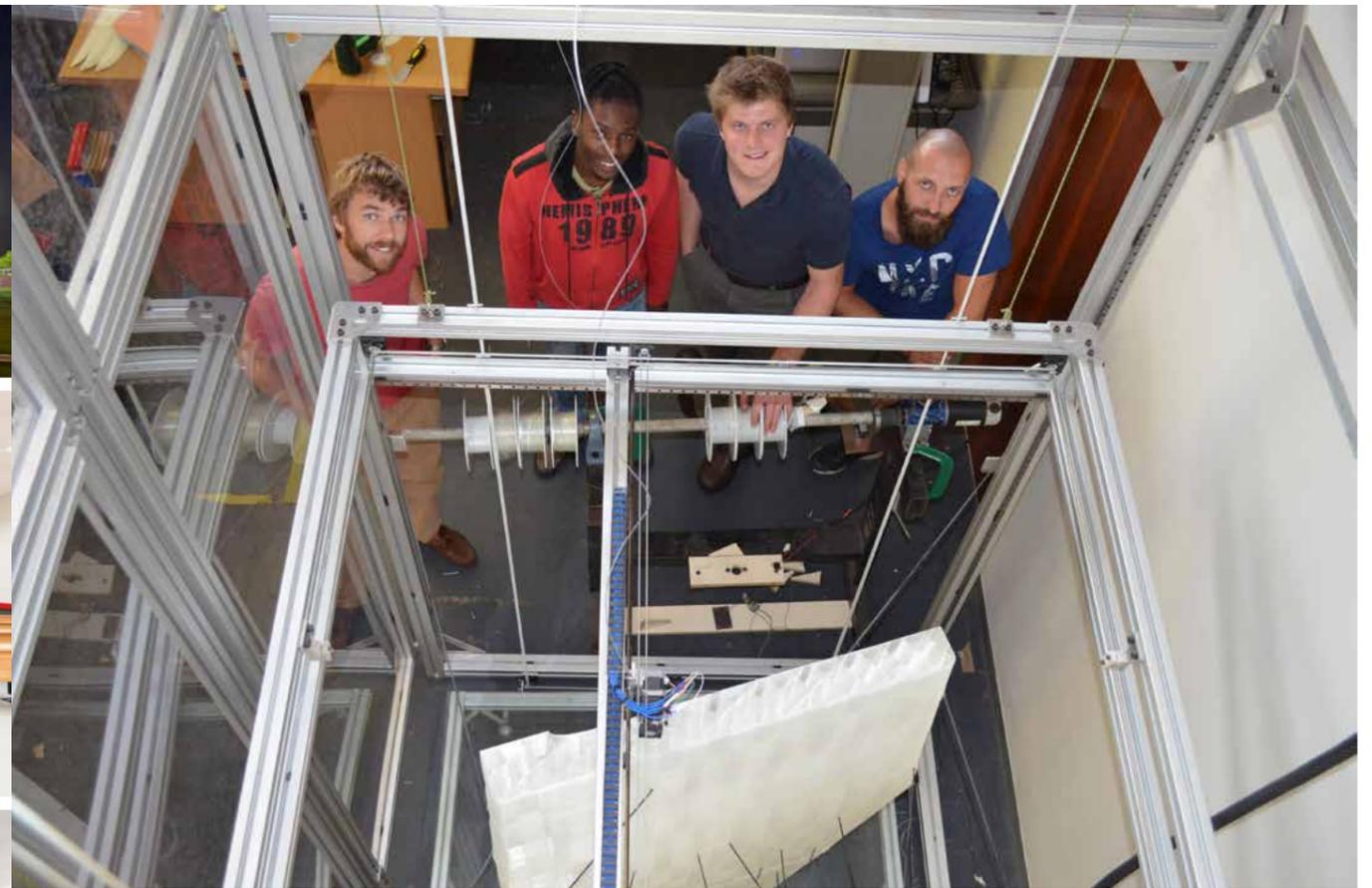
I wish to express my gratitude to all my dedicated colleagues who achieve beyond the call of duty, and to Vice-Chancellor Professor Derrick Swartz and his team of executives for creating a climate in which we can thrive.

Dr Oswald Franks
Executive Dean

Faculty of Engineering, the Built Environment and Information Technology

“The Faculty has created a number of entities that support companies with technology development ... ”

– Dr Oswald Franks



New Engineering Building Phase I. Phase II will be completed in 2017.

Composites engineering is in its infancy worldwide, with new materials from the international aerospace programmes now being used in a wide range of industries for lighter, stronger, more energy efficient construction.

From space to earth: we've joined the composites revolution

Composites are currently experiencing a rapid revolution, akin to the revolution of battery technology over the past 10 years. The challenge is how to comprehensively utilise aerospace and light-weighting composites.

In 2016, funding for a Collaborative Fibre Composites Project (CFCP) was received by eNtsa from the Department of Science and Technology (DST). Composites comprise any matrix of materials, natural or synthetic, where the combination of materials provides a specific set of properties.

"The CFCP is a skills development programme because there is a huge growth and employment opportunity in

the development of new composites for a wide range of construction needs, including marine, automotive, aviation, and renewable energy; many wind turbine components are made from composites and we need to be able to do all this in South Africa," says eNtsa's Engineering Director, Andrew Young.

eNtsa is an engagement entity led by Professor Danie Hattings within the Faculty. An internationally recognised research and innovation hub, it has 45 staff members and an annual turnover of approximately R43m, with several focus areas, including: solid-state welding, eMobility and composites. eNtsa also hosts a number of masters and

doctoral students registered within the Faculty, bringing together theory and practice at the highest level.

Young explains that the commercialisation of developed technologies, engineering services and high technology human resource capability is a key strategic objective for the eNtsa management team. Focus is placed on activities that will advance the local engineering community, create new nodes for economic and employment opportunities and secure eNtsa and the University's future growth and sustainability through direct and indirect partnerships with the commercial entities it partners and incubates.

The CFCP epitomises this focus, as Young describes:

"In the composites development and construction process for wind turbines or light aircraft structures, for example, we need skilled people to make use of the advanced materials that have come out of the aerospace programmes, and we require skills for their maintenance and repair. Both skills are scarce in South Africa. Wind turbine blades, for example, need to withstand harsh conditions, including high-speed winds and hail, and we need people to repair them on site, 100m in the air."

In 2016 several eNtsa staff members received training in the use of finite elements analysis in composites.

Through the CFCP, four final-year Mechanical Engineering Diploma students from the University received a one-year internship in composites. They graduated in 2016, and three of them are now in Korea on an exchange programme, while the fourth, Jan de Jongh, is pursuing his composites research in EBEIT's Renewable Energy Research Group (REREG).

"As part of our skills development programme we built a four-metre lightweight recreational boat. It's essentially a ski boat, which a company in Port Elizabeth can now build from the design. The boat is an exercise in reverse engineering in the marine environment, where we performed a light-weighting exercise," Young explains.

"We laser-scanned it, used a CAD system to create a virtual prototype, then we revised the shape of the hull, added our own

deck features and used vacuum infusion as the build technology to create a boat that is stronger and less than half the weight (± 70 kg) of the similar existing model (± 200 kg). One of the lightweight boat prototypes will be used to train Marine Engineering students, who can gain sea experience on it and get a skipper's licence. The other will go to the Mandela Bay Composites Cluster at Propella as a demonstrator of lightweighting."

The DST wants to see strong skills development and research outputs from its investments and eNtsa delivers this.

In 2016 another of the CFCP projects was the building of a spare wheel for the automotive industry out of prepreg carbon fibre, a composite material imported from France that must be transported and stored at minus 18 degrees centigrade and only come out of this when it is going to be used. The spare wheel is being built as a trial with a local manufacturer in the Nelson Mandela Bay Metro on the basis that its lightweight characteristics could save fuel.

"We need to show viability and cost-effectiveness compared to the standard wheel," Young explains. "The experiment is based on measurement of the performance of composites under bearing loads. The first prototypes are coming out mid-July 2017 and we will test them

at MA Automotive, which makes all the steel wheels for all the motor companies in South Africa, and is based in the Metro."

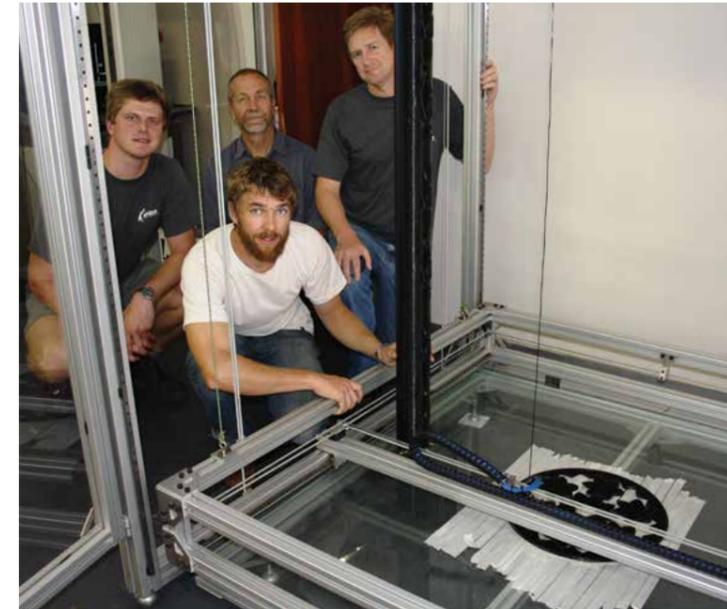
Also through the CFCP, master's student Timothy Momsen developed the largest 3D printer in South Africa for his project. Standing five metres tall, the 3D printer is for the manufacturing and rapid prototyping of moulds required for the composites industry, such as moulds for wind turbine blades. It can also produce other three-dimensional, structurally sound solid objects from digital files. Engineering PhD, Dr Sean Poole, developed the concept printer and software and will be the 3D printing expert on campus, which all the faculties will use.

Vice-Chancellor Professor Derrick Swartz is firmly behind the establishment of an Additive Manufacturing Centre (AMC) on campus, where a variety of 3D printers will be housed.

"We have the capacity to build custom printers. In conjunction with

"We are extremely fortunate to be able to collaborate with leading applied researchers in a number of fields at the University, including energy, energy storage, physics and photovoltaics."

– Andrew Young



Back, from left: Mechanical Engineering intern Jan Hendrik de Jongh, Mechanical Engineering's Prof Russell Phillips, eNtsa's Andrew Young, and (front) Dr Sean Poole.

Andrew Young

our colleagues in the Built Environment, we are planning to build a printer that will print in a concrete medium with a view to printing houses. This has been done elsewhere in the world. However, it should be a first for Africa," says Dr Poole.

"The 3D printer is ideal for research and invention. Not only can researchers print the components, we can now accelerate prototype research to an unprecedented degree by adapting or adjusting designs on the computer in an instant and then simply pressing 'print' again," says Professor Russell Phillips, senior Mechanical Engineering lecturer and the head of the Renewable Energy Research Group (REREG) within EBEIT.

"This is invaluable for the advancement of the renewable energy industry, which is a major growth area for South Africa that is booming in the Eastern Cape," says Prof Phillips. "At Nelson Mandela University our goal is to be a global leader in applied renewable energy and we are attracting increasing numbers of engineering postgraduates who are interested in this field.

"We are extremely fortunate to be able to collaborate with leading applied researchers in a number of fields at the University, including energy, energy storage, physics and photovoltaics. Collectively, we are able to put all the pieces of the puzzle together and it's great for interdisciplinary research. We have patents on most of the

renewable energy team's designs, secured in partnership with our Innovation Office."

eNtsa's research, which is intended for commercialisation, is wonderfully stimulating for students. Many of them work after hours and on weekends. Their commitment speaks for itself.

"To advance our students' skills we are setting up a composites skills development and research lab that will be used by undergraduates and graduates alike," says Young. "The DST is the funder and we are collaborating with the CSIR, with whom we have also worked closely on the CFCP."

One of the CSIR's research areas is on the replacement of costly synthetic fibres with natural fibres, including a shrub called kenaf, on which trials are being conducted in the Winterton area, KwaZulu-Natal. They are also looking at other natural fibres such as flax, hemp, cotton and banana – any plant with long enough fibres.

"The opportunities for using these fibres are huge; over and above aircraft, motor vehicles and yachts, they can be used in the insulation of buildings and in the door panels of motor cars, which Mercedes is already doing," says Young. "The revolution is upon us and we cannot wait to see what we develop and what gets taken to market over the next couple of years."



The Faculty of Engineering, the Built Environment and Information Technology (EBEIT) is on an inspiring growth curve in the marine and maritime space, with new appointments, programmes, partnerships and facilities navigating its path.

Ship building & the marine engineering programme

EBEIT's exponential marine and maritime expansion in 2016/17 coincides with the completion of the superb additional space they will occupy in Phase II of the New Engineering Building. Included in the space are two training studios for shipbuilding and high definition video conferencing facilities. The combination of contact and live video lectures combined with practical instruction offers EBEIT students access to world best education.

The Faculty has received much support for its marine and maritime focus, including funding from the manufacturing, engineering and related services SETA (merSETA) of R10 million a year for three years, starting in 2016. Credit is due to the merSETA's CEO Dr Raymond Patel's foresight as to what

the growth of EBEIT's academic and applied skills offerings can contribute to the blue economy.

"Drawing on our significant base knowledge in Mechanical and Electrical Engineering, we have registered the new Bachelor of Engineering Technology Marine Engineering, which will be offered at Nelson Mandela University from 2018," says EBEIT's Marine Engineering and Nautical Science Project Manager, Howard Theunissen. He is a senior lecturer in Mechanical Engineering and the programme leader for this unique qualification in South Africa that is endorsed and approved by the Engineering Council of South Africa (ECSA) and the South African Maritime Safety Authority (SAMSA).



Greg Davids

From 2020, another new degree will be offered by EBEIT, the Bachelor of Nautical Science, to train ship captains and ship navigators. It is being designed in collaboration with Captain Richard Dunham from the Australian Maritime College (AMC) in Tasmania.

Part of the funding from merSETA is being used to hire experts in Marine Engineering to teach, support and grow students for the marine and maritime industry and to increase research for naval architecture and ship engineering.

"The new degrees and the association with merSETA will significantly contribute to the maritime future of the Eastern Cape and South Africa. Our approach is also aligned with the Nelson Mandela Bay Metro's request that Operation Phakisa invest in a shipbuilding sector in Port Elizabeth," says Karl du Preez, merSETA Chair in Engineering Development at the University.

Lecturers and specialists recently contracted by EBEIT include:

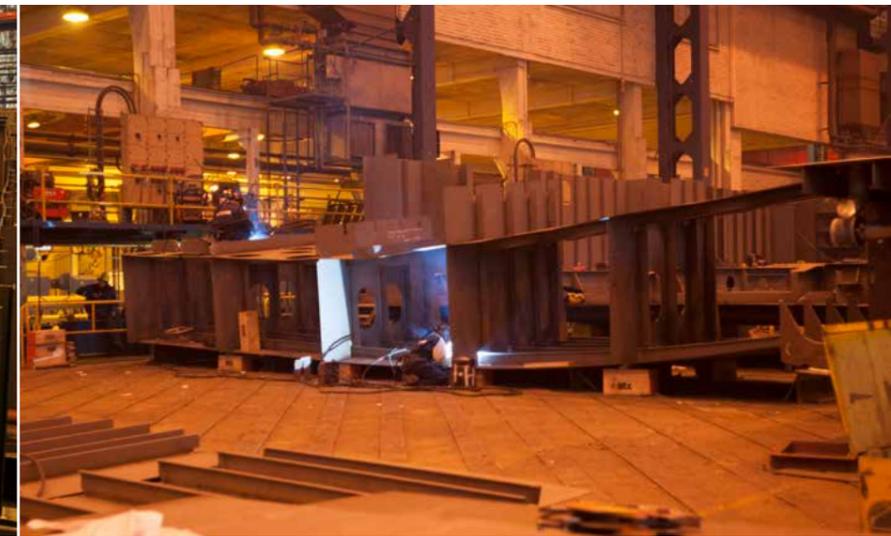
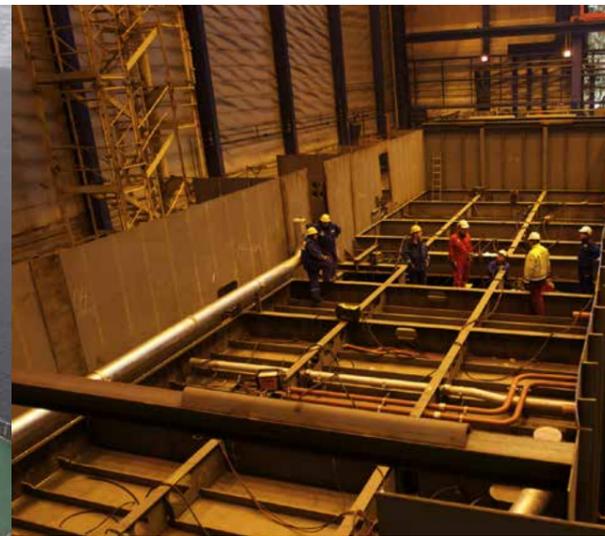
- Boswell Douse has been appointed as a lecturer in Marine Naval Architecture. He is a Mechanical Engineering graduate of Nelson Mandela University, and is currently completing his master's in Naval Architecture at the University of Southampton, the leading marine and maritime university in the United Kingdom, with whom Nelson Mandela University has a strong partnership. Douse is funded through the Next Generation Academic Programme (nGAP) and will go on to do his PhD in Naval Architecture. Douse's supervisor at the University of Southampton, Prof Philip Wilson will do guest lecturing for EBEIT in Port Elizabeth;



John Fernandes

- Port Elizabeth-based Chief Engineer Sergio Giannotti, who has 15 years of practical ocean going experience, has been appointed as a lecturer in Marine Engineering Knowledge to train seafarers and develop short courses;
- John Fernandes, who has a master's degree in Mechatronics from Nelson Mandela University, has been appointed as a lecturer in Marine Engineering, specialising in electrical engineering and automation. He is currently doing his PhD in Mechatronics with a maritime focus on intelligent navigation of mobile systems for unmanned vehicle applications, such as the loading of cargo vessels or the use of submarines to inspect undersea pipelines or unmanned sea vehicles to inspect the surface of the sea;
- Finnish naval architect Hakan Enlund, who has extensive ship building experience, including the construction of a number of South African navy vessels, such as Agulhas I and II, has been appointed as a Professor of Practice. He hopes to join the EBEIT academic team in Port Elizabeth shortly and contribute his knowledge and experience to the Marine Engineering Programme, specifically in the development of technology in the marine vessel-manufacturing industry. Enlund is renowned for a ship manufacturing technique called 'block-building', where the ship is divided into six segments along its length and each segment is built simultaneously in a different part of the shipyard or in several shipyards to significantly reduce the manufacturing time.

"EBEIT intends to play a significant role in the development of Port Elizabeth as a manufacturing hub for marine vessels of all sizes, with handsome incentives offered to manufacturers," says EBEIT's Executive Dean, Dr Oswald Franks.



A significant part of his work in developing the marine and maritime space for the University, the city and South Africa, is to identify and establish the highest level academic, industry, professional and government relationships.

One of EBEIT's key industry partners is the Finnish corporation Wärtsilä, which manufactures and services engines for about 40% of all ships worldwide, in addition to a range of equipment in the marine and energy industry. The company routinely trains engineers and technicians from all over the world, with English as the medium of instruction.

Wärtsilä is represented in South Africa by USG Advisory Services, a division of the Urban Soul Group whose CEO, Greg Davids,

is a prominent figure in the marine manufacturing sector. He has extensive experience and longstanding partnerships in the international and South African shipbuilding and repair industries, and among vessel owners and fleet managers, as well as the fishing sector. In 2016, EBEIT appointed Davids as an Adjunct Professor, bringing his industry knowledge to the University and his foresight in developing EBEIT's marine and maritime strategies.

Wärtsilä recently won the tender to supply the engines and power train for the South African Navy's new hydrographic vessel – a scientific research and investigation vessel that uses sound and visual detection to determine what is happening under the sea. It is being built by the Southern African Shipyards in Durban and the contract requires of Wärtsilä to engage in development activities,

which they are bringing to the University where they will establish a Wärtsilä/Nelson Mandela University Land and Sea Academy.

As part of this, Wärtsilä is donating Wärtsilä engines, the W8L20 and W8L26 engines, a 2-speed gearbox, thruster and propeller, as well as a range of cutting edge simulation and software packages for the training of technicians and marine engineers who work on ship power systems. Marine Engineering students at Nelson Mandela University will attend live video link training classes from Wärtsilä's headquarters in Finland.

Adding to EBEIT's applied Marine Engineering skills is the Advanced Mechatronics Technology Centre (AMTC) at the University, which is a Siemens-accredited Programmable Logic Controllers (PLC) training provider in South Africa. "From 2016 we will increasingly be turning these capabilities to the marine sector because the underlying process technology is used in Marine Engineering," says Theunissen.

The AMTC has received support from the MerSETA to develop their capabilities in process control in the marine industry – such as controlling ship rudders, heating and cooling systems, and the integration and visualisation of systems, many of which are remotely controlled. "To set up the base process knowledge we have built an industry standard simulator. We are also starting to develop online

tools where students can, for example, work with depth control of a submarine online, which is part of master's student Ngonidzashé Zata's research in the Department of Mechatronic and Marine Engineering," Theunissen explains.

In a South African Society of Engineering Education (SASEE) peer-reviewed article entitled: *A Web Based Learning Platform for Remote Engineering Laboratories*, co-authored by Zata, Fernandes and van Niekerk, all from EBEIT, they write:

The simulation based process control system, which was implemented as an actual lab, offers numerous further benefits. The model-based virtual plants can be re-configured and expanded at will without having to make additional software or hardware purchases. Results from the student feedback show that the implemented system is successful in reinforcing concepts taught in class and in bridging the gap between individual course components such as software design, control, dynamic systems modelling and real-time implementation.

In an era of financial constraints, increasing student numbers and industry demands, this multi-use approach is being used by EBEIT to offer engineering students strong theoretical knowledge integrated with real-world problem solving exposure that is essential for the development of design-oriented thinking.



“We are ready to join hands with suitable partners to exponentially expand and revolutionise the e-Mobility landscape in South Africa and internationally,” says the project leader and Deputy Director of the uYilo e-Mobility Technology Innovation Programme, Hiten Parmar.

SA’s groundbreaking solar charging system for electric vehicles

After a year of development (2015-2016), a smart grid pilot project for the energy-efficient charging of electric vehicles (EVs) through battery storage and energy management across a network of charging stations has proved successful.

The project, innovated by the uYilo e-Mobility Technology Innovation Programme, a national multi-stakeholder programme hosted by Nelson Mandela University, paves the way for a new era of green transport and smart cities, and accelerates the development and commercialisation of South African electro mobility technologies.

Hiten Parmar, who also serves as the Secretariat of the national Electric Vehicle Industry Association of South Africa, is extremely pleased with the breakthrough: “Charging EVs with optimised management of renewable energy is a groundbreaking achievement for South Africa and globally. We are not aware of anyone else who has achieved this kind of outcome, which incorporates demand management and load levelling.”

With the software the uYilo team has developed, the green future of energy-efficient charging of EVs is now a reality. Further technology advancements will also include opportunities to be able to transfer power from the EV into the grid or to power

“Through our pilot project we’ve demonstrated that energy efficiency applied to solar-powered EV stations can be developed at scale ... ”

– Hiten Parmar

people’s homes through a bi-directional charger. The 100% electric Nissan Leaf available in South Africa currently supports this feature of vehicle-to-grid functionality. What this all means is that instead of the energy utility having to increase infrastructure for EVs, this system considerably reduces the load on the national grid.

efficiency applied to solar-powered EV stations can be developed at scale because we have solved energy storage through re-using the lithium-ion battery pack from an EV for stationary storage. The energy management system prioritises each charging event, based on renewable and stored energy available, and incorporates a Time-of-Use feature

“Petrol and diesel vehicles are the biggest carbon emitters in the transport sector and the major thrust globally is to use renewable energy as far as possible to ensure that EVs are 100% green; powered by renewable energy sources and not by fossil fuel-generated, CO2 emitting sources of electricity,” says Parmar.

“Within the next five years we are likely to see strict policies coming into effect around energy efficiency and green transport in South Africa. It’s already happening globally. Japan today has more electric vehicle (EV) charging stations than fuel stations.”

According to a recent study by Japanese vehicle manufacturer Nissan, there are now more than 40 000 EV charging ports across Japan compared to fewer than 35 000 fuel stations.

“In the United Kingdom, EV charging stations will exceed gas stations by 2020, and the Netherlands is planning to ban the sale of petrol and diesel engines from 2025,” Parmar adds.

A recent study published by uYilo cited that South Africa currently has 98 EV ‘public’ charging stations across the country, including 77 AC slow chargers, which take three to eight hours to charge a battery, and 18 DC fast chargers, which take about 20 minutes. Most of the charging stations are located at the Nissan and BMW dealerships nationally, but there are also some at Melrose Arch in Johannesburg and the V&A Waterfront in Cape Town.

A locally manufactured public AC charging system costs about R30 000 per charger installed, while DC charging systems are currently imported and cost approximately R400 000 per charger installed. “Through our pilot project we’ve demonstrated that energy

to manage peak and off-peak charging. This way, EVs can be sustainably charged 24/7.”

The uYilo programme is accredited by the South African National Accreditation Society (SANAS) for lead-acid battery testing and is expanding on this to become the only facility in South Africa to provide certified lithium-ion battery testing.

Recharging an EV in South Africa currently costs approximately R30 – R40 for 130 – 150kms travelled. The two 100% electric EVs currently on the South African market are the Nissan Leaf and the BMW i3, both of which can drive for up to 200kms. The BMW i3 REX can drive for about 300km; 130 of which are on its 9-litre range extender, petrol engine.

Alan Boyd of the BMW Group in South Africa says that from the March 2015 launch of their fully electric vehicles to the second half of 2016, they sold 142 in South Africa and 60 000 worldwide.

Boyd says they expect to sell more if the economy improves and when the number of EV charging stations increases, and are installed for easy access at companies, business estates, shopping centres and apartment complexes. Many developers are already including EV charging facilities in their new buildings.

“We are confident that this is an attractive business opportunity for a local or international commercial roleplayers to partner with us in taking it to mass commercialisation. We have developed the IP for this energy management system, and the added advantage is the equipment we have used to create this facility is 90% local South African technology.”



The mHealth4Afrika (Mobile Health For Africa) project, led by Professor Darelle van Greunen, is the only European Union-funded Horizon 2020 or H2020 project that was awarded to South Africa out of seven national submissions.

Three million euro EU online healthcare project for Africa

Prof van Greunen, Director of the Centre for Community Technologies (CCT), in collaboration with European partner, the International Information Management Corporation (IIMC), initiated and led the 200-page mHealth4Afrika grant application that took 14 months to complete.

Following the awarding of the grant, Prof van Greunen became the Principle Investigator for South Africa and the Technical Lead of the mHealth4Afrika project, which started in November 2015 and gained significant traction in 2016.

This three million Euro grant over three years is building a mobile, electronic management system for patient/client

data in public clinics and hospitals in South Africa, Kenya, Malawi and Ethiopia, initially focusing on the records and data for pregnant women and their full pregnancy cycle until the newborn phase.

In South Africa and other African countries, primary and public healthcare records are all still mostly paper-based. The electronic management of records will go a long way towards better and more efficient healthcare management.

The maternal health management system will work on any device (laptop, cellphone, tablet, pc) that can access the internet, and it also works without internet connectivity.

Nelson Mandela University is partnering with several universities on this project, including Strathmore University in Kenya, Chancellor College/University of Malawi, the University of Gondar in Ethiopia and the University of Oslo in Norway.

“The DHIS2 technology backend platform we are using was originally developed by the University of Oslo and is the preferred health management information system used in 47 countries across four continents. Nelson Mandela University and Chancellor College in Malawi will be leading the development of the system for Africa. The system needs to be country specific. For example, in Ethiopia the system needs to be translated into Amharic,” explains Prof van Greunen, who speaks English, Xhosa, Sotho, Afrikaans and German.

She is confident the system will significantly assist in the prevention and early detection of problems during pregnancy, childbirth and early childhood – problems during these stages are among the biggest causes of death in Africa.

The report on the Countdown to the 2015 Millennium Development Goals showed that South Africa has reduced under-five child mortality from 61 per 1 000 births in 1990 to 45, but it did not meet the MDG target of 20 by December 2015. South Africa has made slow progress in cutting maternal deaths from 150 per 100 000 in 1990 to 140, against a target of 38. HIV/Aids accounts for 17% of under-five deaths, while pneumonia accounts for 14% in South Africa.

If the mHealth4Afrika project proves successful during the three-year project, the aim is to roll out the solution to 14 additional African countries, and expand it to include all areas of public hospital healthcare.

This project is one of a fleet of ICT solutions that Prof van Greunen and her postgraduate team at the CCT are currently working on, including:

- A school health-screening application (app) they have developed and piloted over three years in the Eastern Cape. Supported by funding from the Medical Research Council’s Strategic Innovation Partnerships’ funding programme, the application was refined in 2016 with the intention of initially rolling it out to the Sarah Baartman district in the Eastern Cape and the Overberg district in the Western Cape. The ultimate aim is for all 2000 school health teams in South Africa to have a system of this nature for routine health checks in our schools – from checking the learners’ eyes and ears to screening for communicable and non-communicable diseases, as well as for health issues like malnutrition.
- The Ncediso™ App is an integrated mobile application developed to up-skill community healthcare workers including nurses and clinic practitioners in areas where basic healthcare, first aid skills and clinics are scarce.

The application allows for the early detection of various disabilities and diseases among children, including child nutrition and chronic disease management, information on infectious and non-infectious diseases, first aid and various other conditions. The application also offers inter-operability between the different users. Ncediso™ underwent strict user testing and is available to users through Google Play Store.

“Everything we develop at the University is open source and for the public good. Our work is focused on the development of human potential, particularly in disadvantaged, vulnerable and deep rural communities. Our tool towards achieving this is ICT,” says Prof van Greunen.

She has been focusing on developing community technologies since 1990 when she realised that if learning was to be part of the democratic journey, it needed to head down the ICT road. She therefore did postgraduate degrees in computer aided learning, distance learning and usability, with her doctoral degree focusing on the experience of end users who interact with technology.

Over the past 20 years, she has participated in numerous local and international transdisciplinary partnerships on education, agriculture and health projects, focusing on the user experience of ICT projects in low-income areas.

Horizon 2020 is the biggest EU Research and Innovation programme ever undertaken, promising more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.

The Centre for Community Technologies (CCT) is the only research unit at a South African university that specifically focuses on ICT solutions for Africa, by Africans, in Africa.

The CCT’s focus on ICT solutions for Africa, by Africans, in Africa includes policy interventions aimed at lowering the market costs of technologies that hold significant prospects for the social and economic empowerment of communities throughout Africa. “We spend a great deal of time speaking to people in national government in order to align what we do with national and continental priorities. What we do in South Africa must also be transportable to our neighbouring countries and throughout Africa where we collaborate with numerous partners,” says Prof van Greunen, who is recognised as one of a handful of global user experience experts focusing on the use of ICT in rural areas.



South Africa urgently needs to cultivate a cybersecurity culture. The state, companies, organisations and citizens remain very under-informed, under-protected and negligent about the risks that continually threaten their online information management.

South Africa urgently needs a cybersecurity culture

The National South African Cybersecurity Policy Framework was drafted in 2012 and accepted in 2015. Its implementation is lagging, and as a result the South African government, businesses and citizens are at risk while active in cyberspace. The same applies to many countries internationally as there is no international standard that applies globally.

The Centre for Research in Information and Cyber Security (CRICS) is focused on helping South Africa to develop a cybersecure culture and to assist all citizens to behave in a cybersecure manner, with six professors researching and supervising postgraduates in this critical, rapidly evolving field. "Cybersecurity is a very wide area with three main pillars: the

technical side, the software side, and the people side or what we call the human aspect of information and cybersecurity," explains Professor Rossouw von Solms, the Director of CRICS.

As a researcher in the field of information and cybersecurity and IT governance, he supervises a number of postgraduate students and regularly publishes peer-reviewed articles in journals and conference proceedings. He also co-authored a book on Information Security Governance some time ago.

He regularly works with local government and municipalities to develop efficient IT systems and cyber secure processes required for a clean IT audit.

In mid-2016, CRICS hosted the Municipal IT Governance Workshop at the University, attended by 24 people from 22 rural, economically strained municipalities in the Eastern Cape who, like many other municipalities in South Africa, need to improve their IT governance and risk management.

"To help municipalities to help themselves, instead of spending excess money on consultants, we developed an IT governance toolset, which we tested with the workshop participants and it appears they are now using it capably. Depending on the successes of the toolset, we envisage it to be utilised on a national basis," says Prof von Solms, who in 2016 supervised five master's students, four of whom graduated *cum laude*. They are Pieter Delpont, Joshua de Lange, Ruan Koen and Unathi Mcube (co-supervisor). Additionally, one PhD candidate graduated in 2016 under his supervision.

At the national level, some of CRICS' researchers and their PhD candidates are involved in enhancing cybersecurity culture in government, corporates, and organisations, as well as at the individual and family level.

There are a number of research areas in the human aspect of information and cybersecurity on which the CRICS team focuses. Prof von Solms is involved in governance aspects, which includes collaborating with government and senior managers and boards of companies in developing and refining the policy side of cybersecurity.

Then there is the privacy issue, which looks at where your private information is stored confidentially on your local devices, networked devices and the cloud.

And there is the educational side, as any form of security awareness involves humans in the development, use, management and control of it. The educational side ranges from ensuring that the IT people are on top of their game, safeguarding systems continuously, to individuals acting in a secure manner in their everyday cyberspace endeavours.

At every turn this requires educating people working in companies and organisations or in their individual capacity how to use the information and cyber-related systems securely, how to keep cyber or online information private and confidential and which everyday risks to watch out for. It further involves educating all people, including children, teachers and parents about information and cybersecurity, and how to be IT and cybersecurity savvy. They need to keep up with what their children are doing online and to teach their children the correct way to be cyber safe. Currently, many parents know less than their children about ICT and cyberspace.

PhD candidate Noluxolo Gcaza's project was triggered by the National Cyber Security Framework South Africa, which includes



PhD candidate, Noluxolo Gcaza

strategic objectives that South Africa wants to address in this environment, including a cybersecurity culture.

"The policy stated what the government wants to accomplish but not how to define, develop and accomplish this," says Gcaza who is doing her PhD, supervised by Prof Von Solms, while working for the Council for Scientific and Industrial Research (CSIR). "We clearly needed to map out the 'how' in detail in order to promote a cybersecurity culture and to pinpoint the strengths and weaknesses.

"Towards this, I researched the existing body of knowledge, and established the current stance of South Africa regarding national cybersecurity culture.

"The outcome was that the cybersecurity culture in South Africa remains poorly defined and there is no national standard and practise in this regard. There is a general awareness of the need for cybersecurity culture but the state is not doing enough about it, which makes us a vulnerable target," Gcaza explains.

"From here we did a general morphological analysis with a group of subject specialists in the cybersecurity domain to determine what elements would define and be required of a cybersecurity environment at a national level, in order to develop the strategy."

Two journal articles co-authored by Gcaza and Von Solms, describing the cybersecurity environment were accepted in 2016 for publication in 2017: *A general morphological analysis: Delineating a cyber-security culture* published in *Information & Computer Security* and *A Strategy for a Cybersecurity Culture: A South African Perspective* published in *The Electronic Journal of Information Systems in Developing Countries*.

With assistance from the CSIR, Gcaza developed a cybersecurity ontology, using a methodology designed by the CSIR called the

Cyber bullying at schools

In 2016, CRICS researcher Professor Johan van Niekerk and his team ran a large engagement campaign in schools in the Nelson Mandela Bay Metro, to teach 10-to-15-year-old learners the basic skills of cybersecurity, staying safe in cyber space and how to respond to cyber bullying.

“Cyber bullying is one of the major issues in schools – it ranges from embarrassing images of peers being shared online to mocking peers about how they look or what they are wearing,” Prof van Niekerk explains.

In 2016 we focused on this in addition to decoding what we are trying to communicate about cybersecurity to the learners – are they understanding and digesting what we tell them or are they simply hearing an adult saying ‘don’t do this and don’t do that’.

“To assess this, we ran a campaign where we compiled a curriculum for teachers to assess the message through child-friendly videos. We also provide all teachers with a free, multi-media package on cybersecurity and we teach them cyber savvy skills such as how to disempower cyber bullies.”

The researchers are doing a lot of collaborative work with researchers in education, psychology and marketing to improve their message delivery.

They are also looking at online or eLearning and the effective use of technology in education.

Morphological Ontology Design Engineering (MODE) model. In essence, it conceptualises and represents the body of knowledge in a holistic manner, and attempts to make it as accurate as possible, as defined by the experts in this field.

The primary purpose of modelling this environment is to be able to move towards devising a national strategy for cultivating a cybersecurity culture, and to serve as supportive instruments towards the development of relevant solutions.

To finalise the ontology, Gcaza worked with a group of eleven local and international experts in the field from government, academia, the CSIR, at a three-day workshop hosted by the CSIR in Pretoria in 2016.

Participants included specialists from Nelson Mandela University, North West University, the University of Denmark, the CSIR, the South African National Defence Force’s Directorate of Information Warfare and the Department of Telecommunications and Postal Services.

To establish South Africa’s current stance concerning national cybersecurity culture, Gcaza further compiled a comprehensive questionnaire including these and other questions:

- What are the existing government-led functions for cybersecurity culture?
- What national resources does the government avail to support cybersecurity culture?
- What methods and means are in place to support the functions for national cybersecurity culture?
- Do the methods and means in SA employ appropriate communication mediums?
- Are there monitoring and assessment measures in place for national cybersecurity culture initiatives?

“From here, together with my supervisor, Prof von Solms, we developed a national cybersecurity culture strategy, grouping a number of elements in the ontology dimension to serve as supportive instruments in the development of relevant solutions. We looked at the various stakeholders and their relation to the different cybersecurity functions required, and then we categorised related elements according to what they focus on and how they can be monitored and evaluated.

“In the process it was important to make these context appropriate to the South African environment and challenges, and to compare these with existing international systems, such as in the United Kingdom and the United States, and extract the best elements to include in ours,” says Gcaza, adding that this research has been proposed to government for use at a national scale.



Dr Muki Moeng

Executive Dean’s Report

Despite the hiatus in the academic year in mid-September 2016 with the Fees Must Fall (#FMF) protests, there were many research highlights, including publications in journals, book chapters, research projects and local, African and international partnerships and collaborations.

Faculty of Education: highlights

Nelson Mandela University embraces a humanising pedagogy and prides itself on being an African university that actively seeks to establish research collaborations with other African universities in order to grow our presence on the continent. To this end, the Faculty continued its collaboration with universities in East Africa and Oldenburg University, Germany, through the East and South African German Centre of Excellence for Educational Research Methodologies and Management (CERMESA), which is funded by the German Academic Exchange Service DAAD (Deutscher Akademischer Austauschdienst).

The project partners are Moi University in Kenya, Nelson Mandela University, the University of Oldenburg, the Uganda Management

Institute and the University of Dar es Salaam, Tanzania. The CERMESA team facilitated a high-contact supervision support programme for academics who supervise postgraduate research students in Education. More than 80 academics have participated in these since CERMESA was launched in 2014. The eight CERMESA scholarship students spent four months at Nelson Mandela University in Port Elizabeth in 2016 and six weeks in 2017 working with their supervisors and attending research seminars and workshops. The fruits of this work will become evident when this first cohort of scholarship students graduates in December 2017.

Many of the research areas that are being promoted in the Faculty reflect the times we are living in, with dominant

themes of decolonisation, social justice, citizenship education, social cohesion and critical pedagogies that contribute to social change. A focus on these crucial research areas will meaningfully inform the rearticulation processes that is underway in the Faculty. Hence, the strategic promotion of impactful scholarship that brings Research, Teaching, Learning and Engagement together to inform our pedagogy and praxis, and contribute to social change.

Following on this, in 2016 the Faculty decided to host the annual South African Educational Research Association (SAERA) conference at Nelson Mandela University in 2017, with the conference theme: *Education in an era of decolonisation and transformation*.

Approximately 450 academics from all disciplines and from universities throughout the country attend the conference. Participants from international universities also attend, and speakers range from academics to students at the forefront of #FMF.

As part of the decolonisation and transformation agenda, we have to address the entire educational system. In 2016, South Africa had terrible matric results overall, and the spotlight is once again on the educational system and what can be done to improve the low standard, and assist Grade 12 learners to do better.

We have to realise that matric results are the culmination of 13 years of formal schooling. Monitoring, support and preparedness has to start in the Foundation Phase and continue right through to matric.

Foundation Phase teachers are responsible for the educational foundation of children from Grade R to Grade 3, from age 5 to 9. They guide the development of each child's mathematical ability, language and literacy, self-concept and self-confidence, which profoundly influences the rest of these children's lives.

As the Faculty of Education we decided to concentrate on this key phase, and to ensure that we produce outstanding teachers from our four-year B.Ed Foundation Phase degree. Our flagship Foundation Phase building on our Missionvale Campus is close to a number of primary schools in the surrounding townships of Missionvale, Zwide and New Brighton. It was specifically built here to send a direct message to all communities that we are committed to all children receiving a first class educational start in life.

The Faculty's Professor Sylvan Blignaut concluded an NRF-funded, national research project, focusing on three provinces, namely the

Western Cape, KwaZulu-Natal and Eastern Cape, to address the question: *What explains learners' poor academic performance in South African schools*. He presented on this at the SAERA conference in 2016.

NRF ratings and publications in 2016 included:

Professor Prakash Singh also retained his C-3 rating with the NRF;

Dr Shervani Pillay published a book chapter with world-renowned scholars in curriculum development: Pillay, K. 2016. *Curriculum as discourse: from Africa to South Africa and back*. In Paraskeva, J. and Steinberg, S. (eds). *The Curriculum: Decanonizing the Field*. USA. Peter Lang Publishers.

As part of decanonisation, the curriculum needs to reflect Africanised knowledge systems and reading lists need to include African scholars and scholars from elsewhere in the world who do not follow the Eurocentric view. We emphasise the training of student teachers who can speak isiXhosa and we upskill all students in indigenous language skills.

To advance high school education in the Eastern Cape, over the past ten years we have also been focusing on attracting graduates with subject specific strengths and degrees such as a BSc or BCom or BA to do our one-year postgraduate certificate in education (PGCE), which qualifies them to teach high school learners.

To assist Grade 12s, the University has a range of intervention programmes run by our different faculties. After being approached by parents from the Northern Areas last year, we designed an intervention programme curriculum in partnership with schools, teachers and parents. The programme started in 2017 for Grade 10, 11, 12 learners and we plan to extend it to other schools in the Nelson Mandela Bay region.

So much can be done to address the basic education challenge in the Eastern Cape and throughout South Africa, phase by phase. However, central to this is for the National Department of Basic Education to commit to attracting exponential numbers of well-qualified, quality teachers into the profession, remunerating teachers appropriately and elevating the profession to its rightful position as a critical, prestigious vocation.

Dr Muki Moeng
Executive Dean
Faculty of Education

"As part of the decolonisation ... agenda, we have to address the entire educational system."

– Dr Muki Moeng



All people think but the majority of people do not spend time reflecting on and refining their thinking and questioning ability. Dr Canisius Manyumwa regards this as critical to intellectual and social development, and says it starts with the educators.

Critical thinking and critical pedagogy in education

"Educators teach learners content but at the same time they need to be teaching learners how to develop their thinking and questioning skills," says Dr Manyumwa, who completed his PhD through Nelson Mandela University's Faculty of Education in 2016, graduating in 2017.

He is collaborating with the Faculty from his base in Zimbabwe where he is a lecturer in the Philosophy of Education and Head of Educational Foundations in the Faculty of Education at Midlands State University in Gweru, Zimbabwe.

"My concern is that school learners in postcolonial countries like South Africa and Zimbabwe are still receiving a colonial-

style education, which does not encourage them to think critically. This is because the majority of teachers are not educated in critical thinking and critical pedagogy."

Critical thinking, he explains, "is the process of developing and refining one's thinking in order to allow it to develop in a way that produces a critical consciousness, inspired by questioning, innovative, thought-provoking and useful findings. It is a process of learning to ask insightful questions and making sure that you receive and understand the answers you are seeking. This makes you a more perceptive, clearer thinker who can debate and defend your thinking and constantly improve it."

In most cases it falls upon universities to start teaching students how to think and question, but this is often too late, he explains, as learners need to develop these skills from the earliest age.

In 2016, he co-authored a book chapter with the Faculty's Professor Sylvan Blignaut entitled *Critical Thinking and Critical Pedagogy in Education in Education Studies for Initial Teacher Development* – a textbook for teacher education colleges.

"Critical pedagogy in education is the system we propose because it encourages critical thinking but it is not widely adopted because it is seen by many as a radical approach," Dr Manyumwa explains.

"We argue that radical change is required in a postcolonial education system that continues to reflect the legacy of colonialism. One of the key features of this is *'the predominance of a transmission type of education that prides itself on an almost mechanical passing on of ready-made content. This content is provided to school learners mainly for the purpose of its reproduction in examinations, whose results are then used to sort individuals into the labour market.'*"

Not only does the transmission process not make space for critical thinking and questioning, it is presented as if it is objective and neutral. But content and content selection is never neutral, as they explain in the chapter: *'The prerogative to select what knowledge to include and what knowledge to exclude from the curriculum is a very empowering responsibility for those who do it, while it is extremely disempowering to the disadvantaged, who wait powerlessly at the receiving end of the process.'*

In contrast, they explain: *'With the help of critical pedagogy, teachers are made to appreciate that their teaching is never a politically and ideologically neutral activity, and that it often serves to buttress the dominant perception in society of the permanence and unchangeability of the social order.'*

'Issues surrounding learners of the less advantaged groups – including academic underachievement, high dropout rates, high rates of suspension and expulsion from school, high propensity to drug abuse, high propensity to teen pregnancy and early marriage, and even the higher risk of petty theft offences – cannot be taken as educational problems that can be dealt with technically by the school without addressing the fundamental social and ideological origins that are the real roots of these social conditions.'

'In critical pedagogy, these issues are not the problems; they are merely symptoms of malformations in a highly unequal social order screaming for attention and action. Critically aware teachers realise that all the conditions listed above, and more, are a direct result of the unequal power relations in society along with the grossly unfair distribution of privileges. Critically aware teachers realise that solving these conditions requires society-wide interventions, counter-hegemonic in nature, that work to eliminate the artificial dominant-subordinate relationships between social groups. The deficit lenses need to be removed.'

Dr Manyumwa explains that while there are various differences and similarities between critical thinking and critical pedagogy, the two concepts have great potential to work in synergy in teacher preparation and to make a unique social justice contribution towards decolonising education, thinking and society.

"We need to give life to these concepts by encouraging questioning and forming groups of critical thinking communities among students and educators at the grassroots level. Even if the groups are small at first, they will grow and gain traction and eventually they will make inroads to the administrators," explains Dr Manyumwa, who interviewed a range of educators from teaching colleges in the Harare and Masvingo regions of Zimbabwe for his doctorate entitled: *Teaching for Criticality; an analysis of the current status of teacher education in Zimbabwe.*

"The educators I interviewed were very forthright that even at their level they are not allowed to ask too many questions, such as

in staff meetings, and anyone who does so is suspected of being against the system and is likely to be transferred as a result," he explains. "Their superiors do not want to be asked the difficult questions; instead of engaging in honest, critical debate they believe the person is trying to undermine them or prove what they don't know."

In his position at Midlands State University, he has started working with the teacher education colleges in Zimbabwe: "I am very committed to effecting change from within the educational system in Zimbabwe. My intention has always been to contribute to my home country as you lose touch with what is happening if you leave.

"I want to see the critical thinking and pedagogical changes that myself and my colleagues are proposing, being implemented here, and in South Africa."

"... to develop in a way that produces a critical consciousness, inspired by questioning, innovative, thought-provoking and useful findings"
– Dr Canisius Manyumwa



The new Foundation Phase Building on the Missionvale Campus. Image: Rob Duker

Synopsis of NRF C3-rated Professor Sylvan Blignaut's inaugural address

The curriculum as an instrument of social change

Curriculum transformation and decolonisation is an imperative of our times and it will not go away. As someone who has dedicated 33 years of my professional life to the study of education, I believe it is our obligation to search for alternatives.

Alternatives are not given, they are imagined, and there has never been a more opportune time in our history than right now. It presents us, as teachers and intellectuals, with an opportunity to rise to the occasion.

More than ever before in South Africa we need what the Greeks call a *metanoia*, a complete about-turn or change of heart, literally a spiritual conversion, a new way of seeing and perceiving. We need new frameworks of thinking to describe the world we live in as the old ones have become moribund. To understand this, let's reflect on the first attempt at

curriculum reform in South Africa, which was introduced to our schools in 1998 in the form of Curriculum 2005 (C2005). It was the first major curriculum statement of the South African democratic dispensation, and its constructivist approach broke away from the apartheid education system, based on rote learning and memorisation. C2005 was not successful for a variety of reasons, but it was a bold attempt that preceded any such effort in higher education.

Nineteen years later, in addressing the current call and need for curriculum reform, we need to understand what went wrong with C2005. One of the reasons was a lack of alignment between the school curriculum and teacher education in universities and colleges. Another was a lack of capacity and support for teachers whose opinions and feelings about the curriculum were not taken into consideration. It left many teachers feeling hopeless or inadequate; with a reduced

sense of efficiency and ability to provide quality education for their students.

For any new curriculum to be successfully implemented, policymakers and curriculum reformers have to engage teachers at the school and university level, and take into account what they think. Teachers' views about what constitutes good teaching often contradict new curriculum policy. It would be strange if this were not the case as teaching practices have histories, and any change has to adequately take this reality into account.

Having established this, the starting point for a new curriculum is to ask what kind of society do we want to build, and what role should basic and higher education institutions be playing to transform society in increasingly complex, turbulent and diverse environments. These are core questions, yet curriculum reformers often neglect to take these factors into consideration.

Too often, they think that they only need to produce a technically sound curriculum and announce it to the world, and implementation will proceed smoothly. It reflects a view of learning, teaching, leadership, and change that is excessively cognitive, calculative, managerial and stereotypically masculine in nature. Implementing a generic curriculum of this nature into a society that has been systematically subjected to underdevelopment through racial policies for the majority of its citizens can only exacerbate inequalities, which were the hallmark of apartheid education.

It contradicts a central task of education and the curriculum, which should be the cultivation of compassionate citizens who are deeply moved by a sense of justice and the creation of a more equal and humane society. Educational institutions who see their role solely as imparting narrow skills and knowledge that prepare students only as part of the work force in a market economy, negate the other important functions of education as contributing to the functioning of critical citizens in a democracy.

Given the nature of South Africa as one of the most unequal societies in the world and the perennial problem of racism, there can be no doubt that any future curriculum should at least address these pressing issues. It should also strengthen students' resolve and commitment to strive for a different social order other than the present preoccupation with individualism, and the promotion of capitalism and profitability.

I believe that universities and schools as places of teaching and learning have a moral responsibility to address issues of racism,

inequality, power, privilege, gender and patriarchy. Discussions about race and racism need to happen at school level since by the time these students reach university they have strongly developed ideas.

I argue that the curriculum through its content as well as the choice of pedagogies should be utilised to teach against racism and advance social justice and cohesion. Critical pedagogy can point the way in creating an alternative vision of society, one that takes the notion of justice and equality seriously. I support the view that critical pedagogy is one of the central means in the struggle for justice and liberation.

As humans we can intervene in the world, and change it, as we are not merely spectators. As humans we are not objects of history but subjects who can alter the course of events. This is a starting point for theorising about social transformation. If we focus only on the present and the dominant and debilitating discourses of neo-liberal politics, it can be paralyzing and prevent a focus on the future; it can stifle our imagination of what could be and of pedagogy as a practice of freedom.

Curriculum and pedagogical change can only succeed if we embrace new ways of viewing knowledge as

well as accommodating multiple knowledge traditions. Views of knowledge as discoverable, ahistorical, independent of time and place, objective, value-free, measurable, static and unchanging need to be supplemented with alternative conceptions of knowledge. If we abandon the notion that knowledge is objective and value-free and accept it as always provisional, incomplete and partial, it paves the way for an epistemological dialogue between different ways of knowing.

In universities in particular, it is not possible to teach students of the 21st century with outdated transmission methods of knowledge transfer or acquisition. The curriculum as an instrument of social change should enable our students to become critical travellers through the world.

Less hierarchical approaches are better suited to confront some of the pressing crises of our time, such as, poverty, global inequality, pandemics, climate change and racism, as alluded to earlier. As teachers and academics, we have not done enough to prepare the young for the coming and changing world in which they will be living. If we do not take up the challenge to be social activists of change, committed to transforming the curriculum and education in meaningful ways, the dream of a non-racial and just society will remain an elusive ideal.

“we need ... a complete about-turn or change of heart, literally a spiritual conversion, a new way of seeing and perceiving”
– Professor Sylvan Blignaut



“Our goal is to reimagine what schools in poorly resourced communities should look like, and how to go about achieving this in partnership with the schools, learners, and communities,” says the Director of the Centre for the Community School, Dr Bruce Damons

Reimagining our schools, strengthening our communities

The majority of schools in the metro, Eastern Cape and South Africa, are located in areas facing high unemployment and severe socio-economic challenges, including poverty, crime, disease and gangsterism.

The media regularly focuses on these in the urban and peri-urban areas, but rural areas are facing the same challenges, compounded by a lack of infrastructure.

“The Centre for the Community School (CCS) is part of the Faculty of Education and our slogan is *Improving schools and strengthening communities*. Our goal is to strengthen and support the work of schools in Eastern Cape communities,

with an emphasis on schools faced with severe socio-economic challenges,” says Dr Damons.

“We firmly believe that to advance teaching and learning effectively, we need to give attention to the multiple socio-economic challenges. We simultaneously need to move away from the notion of getting schools ‘back to the way they were’. Instead, we need to reimagine new ways of dealing with current and future challenges.”

The CCS emphasises the phrase ‘co-create’ as it seeks, and values, the advice of all stakeholders with an interest in schooling. Key stakeholders are the parents and community

in which the schools are situated. Together, they work to assist schools in dealing with their challenges.

“I draw on the example of Sapphire Road Primary School in Booyesen Park where I was the principal for 15 years. Up to 45 volunteers at Sapphire assist in a variety of ways – from helping as teaching assistants to security and safety (identified as a priority), maintenance, cleaning classrooms, improving the school grounds and looking after orphaned and vulnerable children.”

The school is well known for the incredible contribution of volunteers whose work significantly assists in increasing the functionality of the school, and is undertaken with the full engagement of the teachers, parents and community.

“As part of my PhD research, which I recently completed, I looked at what motivated the volunteers at Sapphire Road Primary to contribute and asked how their work can be expanded and sustained.”

Key motivators that emerged from in-depth engagement with 15 of the volunteers is that they are motivated by their love for the school and the love they received from the school when they were learners. They also said that it would greatly enhance the volunteer programme if they could receive some kind of remuneration.

The CCS worked with the group of 15 who have since graduated and become trainers at other schools in the metro. The knowledge generated through Dr Damons’ PhD research led to the development of a procedure manual, with the aim of expanding the volunteer programme in interested schools.

“This is part of a reimagined approach to engagement and teaching, which is about valuing all the faces, voices and knowledges in a community and getting them involved in improving their schools. In time, we would like the expanded schools volunteer programme to be funded by government, along the lines of the Community Health Workers programme,” says Dr Damons.

“This programme and others we are engaged in, aim to develop complementary support for teaching and learning in schools. Our Faculty of Education is striving to graduate an increasing number of quality teachers and school leaders who can be responsive to the challenges faced by most schools in the metro and Eastern Cape.

“In reimagining education, we further need to redefine what quality education means. We need to focus on both academic and vocational excellence so that learners have an opportunity to achieve their full potential.”

The Centre is currently working on school improvements plans for 2017 to 2019 with a network of six high schools and their principals in the northern areas, in collaboration with the Helping Hand Trust.

Teacher initiatives

This programme includes the Principal Action Learning Set (PALS) and the Wellness Action Learning Set (WALS) for teachers.

WALS was launched on 26 January 2017 and is led by 12 teachers at the six schools, two teachers per school, working in partnership with the Centre and other disciplines at Nelson Mandela University. It is all about supporting the physical, social, spiritual, economic and psychological wellbeing of our teachers.

When asked to describe the multiple roles of the teacher, the teachers replied: ‘A teacher is a parent, detective, leader, companion, partner, fund-raiser, coach, caregiver, counsellor, organiser, friend, motivator, unqualified mental worker, strategist,

spiritual leader, shifting spanner, mentor, and doom prophet.’ The latter because teachers often feel unsupported and they do not see a future for many of their learners. This has to change.

The Centre is further working with the Manyano Network of Schools, which includes 14 schools located in New Brighton, Zwide, Kwazakhele, the northern areas and Uitenhage. The programme has also expanded to the rural Eastern Cape, starting with three schools in 12 areas in the Cala district from February 2017.

“It is a multi-stakeholder engagement in which, together with the communities we envisage what the ideal school could look like in the rural context,” says Dr Damons. “The name we adopted for the programme is *Sakhingomso*, which means *building the future* in isiXhosa.”

Across all the schools, the Centre is further encouraging teachers to undertake postgraduate studies as part of a scholarship circle they have established. “Many teachers find the prospect of postgraduate studies daunting and we are having conversations with them to develop their confidence levels and to match them with academics from the Faculty of Education who can help to mentor them. Research on current and required areas of practice in our schools is a much-needed, novel area and a critical part of the Centre’s engagement, and methodology, which is to give attention to real life problems now.

“As concerned citizens, we need to come together and start seeing our schools as legacy buildings of hope, in which all our communities are important stakeholders.”

“This ... is about valuing all the faces, voices and knowledges in a community ... ”
– Dr Bruce Damons



Decolonisation and Africanisation of the curriculum are the themes of our time, and all faculties in South Africa are currently re-assessing and re-writing their curricula. Towards achieving this, the annual conference of the South African Research Association will greatly assist in defining what a decolonised curriculum looks like and how to implement it.

Decolonisation and Africanisation of the curriculum

Approximately 450 academics from all disciplines and from universities throughout the country come together for the conference, which will be hosted by Nelson Mandela University in 2017. Participants from international universities will also attend. Speakers include academics and students at the forefront of #FMF who made the call for the decolonisation of the curriculum.

The Faculty of Education at Nelson Mandela University believes the curriculum should reflect Africanised knowledge systems and the broad range of students in the lecture halls. Reading lists should include African scholars and scholars

from elsewhere in the world who do not follow the Eurocentric view and there are many such scholars in all disciplines.

The Faculty further believes that although it is contested terrain, Western thought and philosophies should remain in the mix to create a balance between Western and African education. It is all about including great thinkers in all the traditions and making sure that great thinkers who are not widely known or have been neglected in the past are included in new knowledge systems. It is also about making sure that indigenous knowledge systems are included in the decolonised curriculum.



Kenyan master's student Janet Ronoh is researching the place and position for indigenous knowledge in the school curriculum in South Africa and Kenya. She is a full-time student at Nelson Mandela University, supervised by Distinguished Professor Paul Webb.

Indigenous knowledge and East African collaboration

In 2016 Prof Webb authored a book chapter on indigenous knowledge in science titled: *'Indigenous knowledge and science education: What knowledge, whose knowledge and how do we bridge the gap?' in Africanising the Curriculum: Indigenous Perspectives and Theories* (M.T Gumbo & V. Msila (Eds.), Stellenbosch, South Africa: SUN Press.

"There is a lot of dynamic change in indigenous knowledge – which ranges from wisdom to solving scientific problems – and even what we call indigenous knowledge today has transformed over the years. This is because indigenous knowledge is related to the culture and way of life of a group of people and it is therefore dynamic," says Ronoh

who has a scholarship from the East and South African German Centre of Excellence (CERMESA), as do seven other CERMESA scholarship holders. CERMESA is a co-operative project between the University of Oldenburg in Germany, Moi University in Kenya and Nelson Mandela University in South Africa. It is funded by the German Academic Exchange Service DAAD (Deutscher Akademischer Austauschdienst) and also includes the University of Dar es Salaam and Ugandan Management Institute in its network.

The CERMESA team facilitated a high-contact supervision support programme for academics who supervise postgraduate research students in Education. More than



80 academics have participated in these supervision support workshops over the past three years, since CERMESA was launched in late 2014. The eight CERMESA scholarship students spent approximately four months in Port Elizabeth in 2016 and six weeks in 2017 working closely with their supervisors and attending research seminars and workshops. The fruits of this work will become evident when this first cohort of scholarship students graduates in December 2017.

Ronoh's master's project is entitled: *Indigenous knowledge in the school curriculum: Teacher educator perceptions of place and position*. She interviewed ten isiXhosa-speaking and eight Nandi home-language speaking academics in teacher education at Nelson Mandela University and Moi University in Kenya respectively.

"There is a great deal of current debate on the Africanisation of the curriculum and I chose Kenya and South Africa for my research because both countries have grappled with colonisation ever since they acquired independence. The school curriculum, for one, is still similar in many ways to colonial education. It does not include indigenous knowledge and it marginalises many of the learners.

"The South African participants emphasised the inclusion of Xhosa into the curriculum as the language of instruction for first language Xhosa speakers from Grade 1 – 3, with English as one of the subjects, and from Grade 4 the language of instruction, with Xhosa as a subject.

"They said the cognitive development of the learners is developed at this age and because culture and indigenous values are all embedded in language, they said it is important to use Xhosa to teach subjects and language components such as proverbs, riddles, folk tales, songs and dances. The Kenyan participants shared this view."

Ronoh says the participants all agreed that it is essential to include indigenous knowledge in the curriculum across all grades but that a lot of research still needs to be done on what should be included per subject.

Nandi proverb

Mokikigiree koris kitonga is a Nandi proverb, the literal meaning of which is *You cannot run to catch the wind with a basket*. It means when you have not established the facts about something, don't rush to act otherwise you may act on false information and make the situation worse than before or regret your action. It is a warning to people who are prone to accusing others before investigating the cause of the matter at hand or who rush into making decisions.



Professor Lungile Pepeta

Executive Dean's Report

We have a sizeable and growing Faculty of Health Sciences with about 4000 students in ten departments. All these departments work together in a transdisciplinary manner through our Interprofessional Education (IPE) platform with the theme: Transforming health sciences education to support equity in health.

Faculty of Health Sciences: highlights

The IPE integrated, research and health service delivery platform was piloted in 2016 and is now part of our Faculty programme, serving communities in need in the Nelson Mandela Bay Metro from 2017. Both the Department of Higher Education and Training (DHET) and the National Department of Health (NDOH) have recommended this approach.

Under our IPE projects, we have the University-sponsored mobile clinic, Zanempilo ('bringing health'), and the Phelophepha Train Support initiative, supported by staff and students of the Faculty. There is also the Faculty-initiated and driven Interprofessional Health Research Network (IPHRN), which focuses on interdepartmental research and on the mentoring of emerging researchers by established faculty

researchers.

The Missionvale Campus runs the Zanokhanyo ('bring light') Clinic that focuses on developmental assessment and management of behavioural problems in children, and the occupational health and rehabilitation of communities in need in the Metro, including Zwide, Missionvale, Algoa Park and others.

Another flagship project of the Faculty is the Disease, Activity and Schoolchildren's Health (DASH) project, which addresses peri-urban health issues with particular focus on the health and wellbeing of school children and their teachers in previously disadvantaged and poorly resourced schools. This project is partnering with Basel University in Switzerland and is currently funded by the Novartis Foundation. Out of this

project, students from a number of departments, as well as from Basel University have obtained, and continue to obtain, sponsored Honours, master's and doctoral degrees through both universities.

The Faculty, together with the faculties of Education and Science, is further engaging at the school level in initiatives that are geared towards improving the high school performance of learners in mathematics and science. This increases the access of learners from less advantaged backgrounds to university qualifications. Other interfaculty (transdisciplinary) service learning, research and community engagement projects include: the tablet and mobile phone health education apps through the Centre for Community Technologies in the School of Information Technology, and the Community Aquaponics Garden on Missionvale Campus that produces fresh vegetables and fish, which are supplied to under-resourced schools in the townships.

Our *modus operandi* is to develop and expand on our research projects in line with the vision and mission of the University, the United Nations' Global Sustainable Development Goals, South Africa's National Development Plan 'Vision 2030', and the strategic goals and five-year plans of the National Department of Health and the Department of Higher Education and Training.

All these emphasise engagements with various partners in the eradication of poverty, provision of quality education, good health and wellbeing (health promotion and disease prevention), provision of food security and good sanitation, sustainable development and the promotion of collaboration among all stakeholders.

Plans are underway towards the establishment of a Medical School, which will offer a medical practitioner training programme within the next three to four years. Medical practitioners and other health practitioners will be trained in primary healthcare settings, and they will provide services while they learn. This will help to address the delivery of health training and services in an equitable and socially just manner. In essence, this approach is

"Plans are underway towards the establishment of a Medical School, which will offer a medical practitioner training programme within the next three to four years ... "

– Professor Lungile Pepeta

in line with the National Health Insurance vision and re-engineering of primary health care services.

As part of our Faculty re-circulation, we are committed to training Health Sciences professionals who are 'fit-for-purpose', and our training goals include:

- Rolling out integrated training of all Health Science students at various levels, right from admission to university, to graduation and integration into the health professions' work force;
- Ensuring community engagement and involvement in training of health practitioners. This advances restoration of dignity in our communities while ensuring disease prevention and health promotion at the same time;
- Consultants from tertiary and quaternary hospitals, such as Livingstone Hospital in the metro, delivering tutorials and lectures through eLearning platforms such as video-conferencing, podcasts, Moodle or Blackboard. The University utilises Moodle as an asynchronous learning resource and posts lectures, assignments and assessments there. Some of the provincial hospitals, such as Livingstone, have Health Resource Centres that are equipped with audiovisual facilities to provide eLearning to district hospitals and community health centres; and
- Commitment to assisting the province and Walter Sisulu University in shouldering some of the administrative and logistical needs associated with the returning Cuban-trained medical students in June 2018.

We need to embrace partnerships and be part of all these initiatives together. As Madiba said: 'The important thing is that no single person can do everything.' (Nelson Mandela, June 2001). As a Faculty, we look forward to growing our partnerships and collaborations, and a very productive 2017.

Professor Lungile Pepeta
Executive Dean
Faculty of Health Sciences



At the African Cyber Conference 2016 hosted by Nelson Mandela University in Port Elizabeth, academics from the Department of Psychology presented fascinating research on online behaviour.

Dating in the dark and other online activities

The psychology and motivation of online human behaviour and interaction is immediately absorbing, and there are few among us who would not want to find out what the leading researchers in the cyber field revealed at the conference.

Peer-reviewed papers were presented by academics from South African universities, as well as the University of Glasgow, United Kingdom, the University of Auckland, Australia, and the University of California at Davis, United States. They represented a thoroughly transdisciplinary lineup, with experts from the disciplines of Psychology, Information Technology, Law, Management, and Education. To qualify to present at the conference, a double-blind

reviewing process took place, defined by South Africa's Department of Higher Education and Training (DHET) refereeing standards. A total of 31 full papers were reviewed, with 16 accepted. The papers had to meet the following criteria: relevance to the cyber-based theme; originality and innovativeness of the research; quality of academic writing and argument; and appropriateness and quality of literature sources used.

The conference chair was Professor Johan van Niekerk from the University's School of ICT, who also chaired the review and final editing of the selected collection of papers from the conference, published by Nelson Mandela University.

Participants reported finding it easier to communicate online and were more open to revealing intimate details about themselves.

The four papers presented by academics from the Department of Psychology were:

'Parents' Perceptions of their Adolescent Children's Internet Use'
Z.A. Butler and Professor J.G. Howcroft

'The role of social media in coping with relationship dissolution'
T. Lambert, E. Cothill and Professor J. G. Howcroft

'Dating in the Dark: A Phenomenological Study of the Lived Experience of Online Relationships'
Authors: C.M. Froneman, Professor J.G. Howcroft and T. Lambert

'Personality traits and self-presentation on facebook: A systematic review'
Authors: D. Venter, Professor J.G. Howcroft and T. Lambert

Included here are excerpts from *Dating in the Dark*, which offered insight into four participants' experience. Many of the media portrayals of online dating are sensationalised or highlight aberrant, and negative experiences. These participants represent the lived experiences of online relationships..

Recently, the popularity of online dating as an acceptable way to meet partners has increased and has grown from a once marginalised and stigmatised activity, to a more conventional social way of connecting with possible partners (Antheunis, 2009; Couch, Liangputtong & Pitts, 2012).

Online romance, or cyber dating, has emerged as a distinct type of contemporary relationship (Hardie & Buzwell, 2006) and has become increasingly popular due to the availability, accessibility, and affordability of online social networking and dating sites. Individuals are progressively moving from meeting romantic partners face-to-face to meeting and engaging with individuals online.

This qualitative, exploratory study made use of snowball sampling and provided an in-depth account of four participants who engage in online relationships. Data was gathered through an online questionnaire and analysed thematically.

Lived experiences

The study specifically aimed to explore and describe the lived experiences of individuals who engage in online dating. The study aimed to explore the progression of the online relationship. The study used a qualitative, phenomenological

approach and the findings generated a greater understanding of the complexities of online dating.

The data analysis produced four main categories in the lived experience of online relationships. These included, (1) dynamics of online dating, (2) online dating and relating, (3) cyberlove, and, (4) the language of love: online self-disclosure. These findings highlighted the lived experience of online relationships.

All the participants conveyed a need to form lasting intimate relationships indicating that this is a primary motivation for joining an online dating site. The participants' descriptions conveyed seven sub-themes as motivations for using a dating site, the primary motivation being the need for affiliation which was influenced by other factors including their age, location, marital status, the time constraints experienced, as well the need to increase the dating pool.

The accessible and easy to use dating sites allowed participants in the current study to meet a wide range of individuals and allowed an avenue for romantic relationships to develop. All four participants reported that the accessibility of being able to use laptops and cell phones made it easy for them to communicate, required very little effort, had high controllability, and was quicker than communicating in a face-to-face relationship.

There is a reported feeling of the addictiveness of online dating. Online dating always has a potentiality for developing addictive features, and this combined with the accessibility of internet dating and the instant gratification of being able to speak to anyone at any time, which is congruent with a postmodern lifestyle, emphasises the feeling of the next 'fix' (Henry-Waring & Barraket, 2008).

Participants reported that online dating addictiveness was linked to their self-esteem. They enjoyed the attention and flirty comments because it made them feel good about themselves. This egotism made participants want to keep dating online and continue looking for new potential partners who would feed them praise and compliments.

There was a sense of control that dating online provided. Participants in the study reported that they could make decisions about when and how to disclose information about themselves as well as how to respond to messages in their own time. They also reported that they could decide how to disclose negative information and could construct messages and then reread them before sending them. Participants indicated that they regularly self-regulated the messages and liked the ability to save messages and to disconnect from the conversations at any time they wanted.

Participants were open to finding love online; however sharing their experiences with their family and friends produced anxiety and hesitancy. Disapproval from family and friends toward online romantic relationships may play a significant role in how online participants assess their relationship's possibility (Wildermuth & Vogl-Bauer, 2007).

Physical attractiveness and initial attraction were very interesting phenomena that thematically emerged in the participant's stories. All of the participants agreed that the profile photo was one of the most important aspects when looking for potential partners.

Participants reported finding it easier to communicate online and were more open to revealing intimate details about themselves. While the participants admitted to communicating differently online, they did not view it as deception or dishonesty. Because individuals can edit and revise text-based messages, they have more opportunities to present themselves in a strategic manner to convey a highly socially desirable image. Such strategic self-presentation might entail contextualising negative information in a positive light, selectively revealing negative information over time, actively suppressing negative information or presenting an impression that reflects one's ideal self or true self rather than one's actual self (Finkel et al., 2012).

Participants reported that the ability to stay connected with their partner allowed them more intimate self-disclosure. They could send messages and connect with their potential partner any time of the day and reported talking for hours a day, every day. This is remarkably different from face-to-face interactions. In a new relationship, face-to-face interactions would only take place at a prescribed time and place and for a short while.

All participants agreed that intimacy occurred rapidly online and they shared intimate details within two weeks. This is congruent with the 'boom and bust' phenomenon, when individuals reveal more about themselves earlier than they would in face-to-face interactions, that is, relationships develop rapidly and intensely (Whitty & Gavin, 2001).

Such an accelerated process of revelation may increase the chance that the relationship will feel exhilarating at first and become

quickly eroticised, but then not be able to be sustained because the underlying trust and true knowledge of the other is not there to support it (Kraut et al., 2002).

All participants reported high levels of passion in terms of sexual intimacy online. Participants explained that engaging in cybersex was the goal of some individuals on the online dating sites but they always disengaged with these individuals as they were looking for something more.

If the potential partner's response was positive the participant would then engage in email communication with the individual and go through a stage of introductions and disclosure. The duration of these conversations would last between two to four weeks.

Once the participant had established an online relationship and both intimacy and trust had occurred, the participant would then meet face to face. The participants' ultimate goal was to meet offline to see if the relationship could progress any further. Once they had met face to face and the outcome of this meeting proved positive, a mutual agreement to remove both parties' profiles from the site was made as a form of commitment to each other. If the outcome was negative, the individual would return to the cataloguing phase or pursue the other individuals with whom they had contact.

It is the hope of the researchers that the present study provided the participants with a small opportunity to have their voices heard in the scientific community. In a relatively new field where knowledge is rapidly developing and changing, it may be valuable to have such insights to balance the divergent and often extreme views of both the public and social scientists. While the study does have its limitations, it provides useful information to further the exploration of online relationships in the South African context.

These four research studies essentially explore the quest for intimacy in cyberspace. One of the findings emerging from these studies is that it is not feasible to view the development of online relationships as a unitary process. Rather, online relationship experiences are impacted upon by a complex intertwining of various dynamics including the individual's personality makeup, the life phase they find themselves in, their goals and objectives, and their intentional utilisation of the unique contextual qualities of the various social network sites.

Ultimately, the research attempts to answer the following: whether and how digital life-styles and technosocial relationships may enrich or erode, deepen or alter sensibilities, notions, and relations of intimacy" (Van Manen, 2010, p.1029).

This egotism made participants want to keep dating online ...



On 6 July 2016, Minister of Higher Education and Training, Dr Blade Nzimande, requested that Nelson Mandela University proceed with the creation of its new Medical School. The Department of Higher Education has also formally approved it.

More doctors for South Africa

"Our goal is to be able to offer a full undergraduate medical degree (MChB) by 2020 and further evolve to include medical specialist training by 2025," says Professor Derrick Swartz, adding that Dr Nzimande's request was "a truly historic decision".

The decision comes after years of campaigning by the University for the creation of a second Medical School in the Eastern Cape, in addition to the existing Medical School based at Walter Sisulu University (WSU) in Mthatha.

The context of the new Medical School is that the current training output of medical schools across South Africa is between 1200 and 1300 doctors per year, which is hopelessly too few. The rollout of improved national healthcare and

National Health Insurance requires that the Department of Health more than doubles this number.

"If we look at the latest figures for South Africa, we have only nine doctors per 10 000 people compared to a country like Brazil, which has twice as many at 19 per 10 000," explains one of the key drivers of the Medical School, Professor Vic Exner, former Executive Dean of the Faculty of Health Sciences from 2012 to 2016, who handed over the reins to Professor Lungile Pepeta in January 2017. Prof Exner remains with the University on a part-time contract as a specialist consultant in Health Sciences in the Vice-Chancellor's office.

Prof Exner explains that what makes matters worse is that 75 percent of all our doctors are in the private sector in South

Africa. This means that only 25 percent of doctors are in the public sector, which puts the figure at about 3.7 doctors per 10 000.

In the Eastern Cape, with a population of 6.56 million (Stats SA) there are currently only about 100 doctors and a small number of specialists, being produced annually by the province's only medical school, Walter Sisulu University in Mthatha, which is more than five hours away from Port Elizabeth.

Responding to provincial and national needs, six years ago, in 2010, the University's Council decided in favour of establishing a Medical School in Port Elizabeth, which has two large government hospitals, Livingstone (tertiary) and Dora Nginza (level 2), serving vast areas of the Eastern Cape.

Nelson Mandela University is fortunate to have a strong base from which to establish the Medical School, using a building block approach that augments the Faculty of Health Sciences' current offerings. These include a diversity of professions: Psychology, Social Work, Environmental Health, Biomedical Technology, Sports Sciences and Biokinetics, Pharmacy, Radiography, Nursing Sciences, Dietetics and Emergency Medical Care.

Student numbers in Health Sciences have been steadily growing, from approximately 2800 in 2012 to almost 4000 in 2016/17. The Medical School offering will exponentially increase this.

"The building block or 'bottom up' approach we are pursuing in establishing a new Medical School is a more affordable model, which incrementally adds medical undergraduate programmes to the existing Faculty of Health Sciences offerings, and upgrades existing infrastructure belonging to the University and its broader clinical training platform (hospitals and clinics), with the assistance of the National Departments of Higher Education and Eastern Cape Health," Prof Exner explains.

This approach contrasts with the 'top down' model of securing vast amounts up-front for new buildings, infrastructure and human resources.

"Based on our building block approach, in 2020 we will accept our first group of first year students, as well as a group of graduates into third year – these graduates will be from the new Bachelor of Public Health degree as well as from other Health Sciences programmes

who qualify for entry into the third year level of our Graduate Entry Medical Programme (GEMP)."

To inform this approach Prof Exner visited a number of mid-income, developing countries, including India, Brazil and Mexico, which, like South Africa, need to approach best practice in Health Sciences Education and Health Services differently to developed countries.

Ethiopia, for example, has rolled out more than 10 new medical schools in a few years using the building block approach, where programmes are expanded and added incrementally as capacities and resources increase. Brazil has also embarked on a massive rollout of new medical schools across their country, based on a similar model. Nelson Mandela University's approach could serve as a blueprint for the roll out of more medical schools in South Africa in the future.

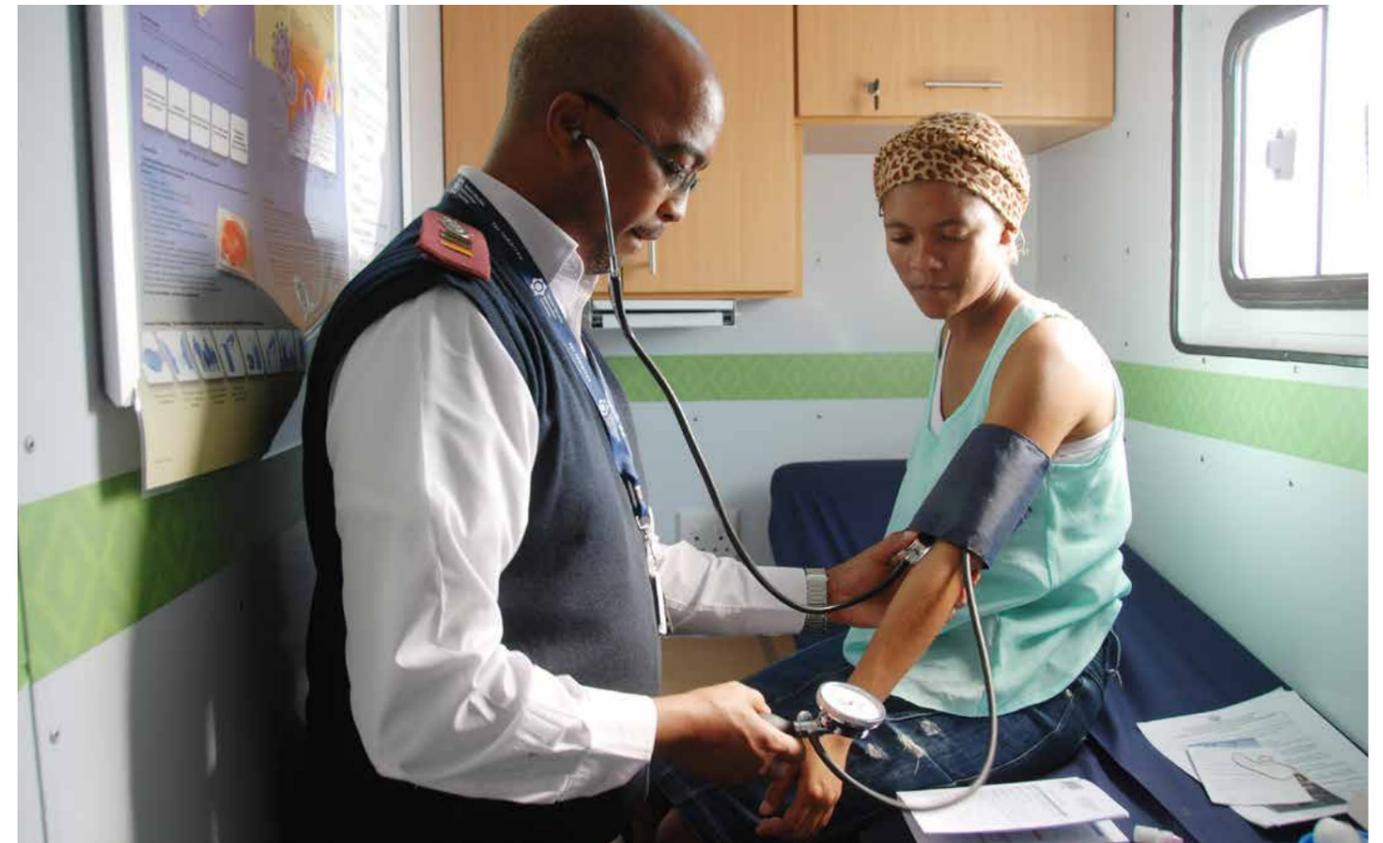
The Faculty encourages innovative thinking and a shift away from the traditional hierarchical approach of doctors seeing other health professionals as fellow team members rather than as their servers. Today, health professionals need to work as a transdisciplinary team in which all members respect their colleagues' roles and inputs.

"As part of our transdisciplinary approach, we are transforming the curriculum and by 2018 a number of foundation modules will be mandatory for all first year of students in the Faculty," explains Prof Exner. "This will include preventive healthcare, a re-engineered form of primary healthcare and conversational ability in an indigenous South African language – in the Eastern Cape this is isiXhosa.

"Another key aspect of curriculum transformation is to decentralise teaching and training onto a broader training platform, where we take it out of the classroom and into the real world. Our new Zanempilo Mobile Clinic is already doing this by taking groups of students and staff to the most needy communities in the greater Nelson Mandela Metro where they not only learn and deliver basic health services but also how to work together in multi-disciplinary teams.

"From first year, our students will develop a keen social awareness and learn how to speak the same basic healthcare 'language' when caring for people, including sharing messages such as 'no smoking, no excessive drinking, sound nutrition and prevention is better than cure'. It is all about caring for people with empathy and patience – what we call a 'good bedside manner' and ultimately delivering the best healthcare for all."

The building block or 'bottom up' approach we are pursuing in establishing a new Medical School is a more affordable model
– Professor Vic Exner



Interprofessional Education brings together students and lecturers from all ten disciplines in the Faculty of Health Sciences who work with under-resourced communities in the Nelson Mandela Bay Metro to holistically improve health care and wellbeing.

Working together for health care

"I am Amos Mtengwana. I am a leader in the Fairview community near the racecourse where a lot of us work, men and women. I am an assistant racehorse trainer and I have worked here since I was 19. I am now 51. Our partnership with the University is a great one. Their team has touched on the things we could only dream about ... psychologists, pharmacists, emergency medical care, environmental health ..."

Sitting inside 'Banzi's Place', an eatery and shebeen in Fairview, Mtengwana talks about the University's new Interprofessional Education (IPE) programme, which responds to the national focus on primary health care and community-based health care education.

Leading the programme, for which a successful pilot was completed in 2016, is Dr Suzette du Rand, a senior lecturer in the Faculty. "IPE is now being included in the Faculty

of Health Sciences programme, which has close to 4000 students," she explains.

"We have nursing and pharmacy students working alongside social work, human movement science, environmental health, dietetics and other health sciences students, to share their knowledge and competencies, to learn from community members and to gain a greater overall understanding of their health needs and issues."

Fairview is one of the communities with whom they have engaged. About 350 families live in this settlement, which was without water, electricity or sewerage. Mtengwana welcomed the collaboration from the outset, called a community meeting to introduce the University team and translated into isiXhosa how they could work together to strengthen the community's health and wellbeing.

“Off his own bat, Mtengwana had done a lot to try and promote this, including encouraging everyone to ride bicycles and organising community bicycle races,” Dr du Rand explains. “The community had also collectively decided that no one in Fairview is allowed to carry knives, and, if they do, they have to pay a fine, which goes into the community’s coffers.”

Du Rand says that through the IPE programme, colleagues and students from Health Sciences as well from Engineering and Agriculture, started partnering with the Fairview community to improve their physical and psychological health, including addressing issues such as drug abuse, as well as partnering in projects such as solar lighting and community vegetable gardens.

“Fairview and all the communities with whom we work have a lot of strengths and abilities – or what we call ‘assets’ – to manage what they have and to self-organise,” Dr du Rand explains. “Within IPE we use an assets-based approach, where the students learn from community members and gain a far greater understanding of the assets and health and environmental issues in each community. We do this to strengthen and develop these assets in order to bring about transformation and development.”

The University’s advanced primary healthcare professional nurse, Sister Shanene Olivera adds: “The assets-based approach moves away from a relationship of dependency; instead we work with the community to identify their strengths and health needs and what we can do together to address these.”

Olivera manages the University’s Mobile Health Education Unit, Zanempilo. A service learning platform, it is a converted self-

sufficient, 13-ton truck with consulting and examination rooms and a medicine cupboard. It works alongside the Department of Health’s ward-based outreach teams, and travels to different under-resourced communities in the Metro, where undergraduate Health Sciences students assist their mentors and see up to 40 people a day.

Through IPE and Zanempilo, the Health Sciences students spend quality time in a wide range of communities, meeting with people, speaking to people, including community health workers, and finding out firsthand about the range of issues people face, from early childhood development issues to teenage pregnancies, drug and alcohol issues, common illnesses and old age problems.

“This way, we develop more socially conscious students who are exposed early in their training to students from other health science disciplines. They are able to form friendships and working relationships of mutual respect,” says the Faculty’s IPE facilitator, Dr Elizabeth du Toit.

“The networking aspect is a very important part of IPE culture – they share their knowledge from different disciplines and when these students graduate they will feel comfortable to network with all health sciences professions.”

Du Toit explains that traditionally, the system has tended to promote doctors to feel they are the leader of the pack. Accordingly, they may not have paid sufficient attention to the critical opinions of, for example, social workers, pharmacists, biokineticists, radiologists or dietitians. This programme breaks down outdated professional silos and gets teams of health sciences students working together to become streamline, efficient and respectful.



Amos Mtengwana



Dr Suzette du Rand (far left) with the IPE team at the Maranatha Child and Youth Care Centre.

During the pilot her groups worked in two informal settlements: Seaview and Zwelindinga. These communities have communal taps and chemical toilets and some solar-powered lights. They are approximately 20 kilometres from the nearest government clinic and rely heavily on the Zanempilo mobile clinic, which visits once a week.

“What struck me during the pilot is how easily the group of students inherently understood and embraced the IPE approach once they got to know and understand the community,” says Dr du Toit.

“They worked with these communities for eight weeks, where, for example, they visited crèches and engaged with the managers about what can be done with limited resources to stimulate the children. They met with soccer and netball coaches to engage on health and sport and the issue of drug and alcohol abuse in the community.”

“Coming from different Health Sciences disciplines, we all look at health and human development issues differently,” says Lusani Mbadaliga, a 2016 fourth-year Environmental Health student who participated in the IPE pilot programme.

“When we went to the crèche, after engaging with the manager, I recommended how to improve their waste management as they had no system, which is a health hazard for the children. I also recommended how to ensure the water they get from the communal taps is healthy for the children – it needs to be boiled and stored in containers that are regularly cleaned.

“My Pharmacy colleagues said it was the first time that they understood what environmental health is about. It is not solely about nature, it is about all the different aspects in people’s living environments that need to be managed to prevent disease and protect human health. In turn, I learnt from the pharmacy students how they approach illness, and I learnt from people in the communities how they manage their lives and how they survive in very hard conditions.”

Ben Kashala, a 2016 third-year Pharmacy student in the same

group says: “The IPE experience was very valuable for me. I learnt how to not judge. I had preconceived ideas about the needs of under-resourced communities, but when we got there and I got to know about the challenges they face, I gained critical new insight. As a pharmacist, for example, we often say a certain medicine must be taken with food but many of these people don’t have food.

“I also learnt to treat people as equals and that I can learn from everyone. And I learnt from other Health Sciences professions; the way they ask questions and how my peers from environmental health and human movements respond to a patient compared to how we as pharmacists respond.”

The team also worked with the Maranatha Child and Youth Care Centre in Southdene, where they also have an outreach for destitute adults. The latter help to manage the tunnel-system vegetable and fish farms. The vegetables are used in the kitchen and sold into the market to help sustain the Centre.

“At Maranatha, I asked the people who manage it whether they have anyone helping them to develop the children’s motor skills, which is all about how the neuromuscular system functions to coordinate the fundamental skills humans need, such as walking, running, throwing, writing or swimming,” says 2016 second-year Human Movement Science student, Keagan Bouwer.

“They said they didn’t have anyone and they really need this, and so from here we could start to work on a plan together with the skills of my peers. Our skills go together, such as, for example a Social Work giving me her assessment and vice versa. It makes for a much better programme for a child, which helps the managers of the Centre.

“Overall, I think IPE is a major step forward and that not only universities but all health practices should work this way. It’s the future for health sciences, a great way of learning to work together with communities, to trust each other and to learn from, with and about each other.”



The groundbreaking Disease, Activity and Schoolchildren’s Health (DASH I) study focuses on children’s health in poorly resourced schools and the effect of common infections on their growth and learning ability.

Healthy schools for healthy communities

“Our research shows that children infected with worms and parasites and children who do not receive treatment or proper nutrition experience growth and learning problems, including stunting and lower attention levels. This is one of the issues we are addressing through DASH I,” says Professor Cheryl Walter, a senior lecturer in the Department of Human Movement Science.

“On the positive side, our research also shows that children who are active for 60 minutes or more per day, irrespective of their background, are happier, healthier children.”

Prof Walter is leading the DASH I pilot study (2014 – 2017) for South Africa, with over 1000 Grade 4 learners in eight, no-fee-

paying schools and communities in the Nelson Mandela Bay Metro. DASH focuses on assessing and addressing children’s health and the dual burden of disease related to lifestyle and nutritional issues, combined with infectious diseases.

Four of the schools are in the townships and four are in the northern areas. All of the communities are overcrowded. One of the participating communities was originally built for 6000 people and there are over 40 000 people living there. The water and sanitation systems cannot cope, and sewers frequently overflow.

The study is a partnership between Nelson Mandela University and Basel University in Switzerland to promote good health

among school learners, including environmental health, school cleanliness, addressing communicable internal parasite infections, non-communicable chronic conditions, exercise and nutrition. It also addresses teacher health as the study found that most of the teachers suffer from hypertension.

“Professor Uwe Pühse from the University of Basel’s Department of Sport, Exercise and Health is the main driver of the project through the Swiss South Africa Joint Research Programme (SSAJRP). We are one of about 50 projects funded in this programme between universities in Switzerland and South Africa,” says Prof Walter.

“We employed a retired nurse to do the medical examinations, and we have four Biokinetics Master’s students from our University and six from the University of Basel participating in DASH I.

“The master’s students’ research in 2016 will inform the next phase, which will be to bring in programmes for all poorly resourced schools in South Africa, partnering with the Department of Education and the Department of Health.”

The participating children in DASH I responded enthusiastically to the study, and baseline assessments were conducted in the following areas:

- Medical entrance examination done by a nurse (height, weight, medical history, testing for hypertension, anaemia and Type II diabetes);
- Stool and urine sample assessed for prevalence of parasitic diseases;
- Cognitive performance and psychosocial health assessments conducted, including an attention test;
- Physical fitness assessment conducted; and
- Evaluation of the school nutrition programme.

“Parasite and worm infection rates were very high in two of the schools, with very little nutrition going into the children’s growth, which directly affects their physical and mental development,” says Prof Walter. The children in all four schools were given deworming tablets and were taught how parasite infections occur, and the importance of drinking clean water and washing their hands after going to the toilet. Each classroom was provided with a washbasin and anti-

septic soap and the toilets, basins and bathrooms at the schools were cleaned and painted.

“We recommended that de-worming at the schools happens twice a year. As it happens, the National Department of Education started a deworming project in all South African schools in 2016, which we highly support. We are also working on programmes to reduce the high levels of *H. pylori* parasite infection and re-infection in all the children,” adds Prof Walter.

“It comes down to having hygienic living spaces, which children in impoverished environments do not have, and are therefore prone to infectious diseases, spread from hand to hand in play. This testing was done at the Medical Laboratory Sciences at the University where fourth year students were trained to assist with the testing under the guidance of Swiss PhD student, Evan Muller.”

Nutrition-wise, the children receive one meal a day at their schools, and training in healthy food preparation on a budget was conducted with the local community members who cook the meals for the schools. The team also shared the importance of low budget, healthy lunchboxes as the children mostly ate cheap junk foods, full of sugar and tartrazine, which

they bought at school.

The master’s students helped the teachers to introduce two physical education lessons a week, a dance and exercise class, as many of the schools don’t offer physical education.

The study confirmed the importance of sustainable longitudinal monitoring of these health indicators in socio-economically disadvantaged children, and has proved so successful that new funding has been awarded for the second phase from Novartis Foundation through the University of Basel.

The project will be scaled up over the next three years with interventions in the Metro across all grades and it will also look at teachers’ health and various health risks. The Novartis Foundation is also interested in the project being scaled up by the team for the rest of South Africa and other countries in Africa.

“It comes down to having hygienic living spaces, which children in impoverished environments do not have, and are therefore prone to infectious diseases, spread from hand to hand in play. ”

– Professor Cheryl Walter,



“To become a pharmacy technician is a strong career option, considering that medicine supply management is a major focus area in all pharmacies, hospitals and clinics throughout South Africa,” says Teri-Lynne Fogarty, a lecturer in the Department of Pharmacy.

TVET students can now qualify as pharmacy technicians

There is considerable demand for pharmacy technicians, also known as pharmacy technical assistants. They are qualified to manage primary care dispensaries and are invaluable to pharmacists as they are trained to perform the more technical tasks in a pharmacy or dispensary. This includes data capture, packing and labelling of medication, ordering and receiving stock, compounding medication, and performing on-site clinical tests such as blood pressure, diabetes and cholesterol tests.

The pharmacist either supervises them directly in a pharmacy or indirectly in a Primary Health Care facility, which frees up the pharmacist to supervise several dispensaries at a time. Nelson Mandela University is the only university in the country currently accredited to offer the two-year pharmacy technician certificate programme through its Department of Pharmacy.

To date the University has had three cohorts of pharmacy technicians graduating. In 2014 they graduated 50, in 2015 75, and in 2016 they graduated 105, largely from the Eastern Cape, some younger, some older. The University will ultimately register up to 120 students per year for this qualification. Qualified pharmacy assistants earn between R14 000 to R20 000 a month, depending on their level of experience.

“To enroll as a pharmacy technician student you do not need a physical science, but must at least have studied life science. Maths literacy is accepted, provided the applicant achieves at 50 – 59%. This ultimately broadens access to the pharmacy profession and complements the Health Science Faculty’s restructuring of certain qualifications to match the primary healthcare needs of South Africans. It is also in line with

the re-engineering of primary healthcare for the National Health Insurance. (NHI),” Fogarty explains.

As part of this, a sub-group within the Faculty has been working on articulating certain qualifications from TVET colleges to university qualifications at Nelson Mandela University. This approach to further learning and career streaming is critical for many TVET students who find themselves with a certificate but without the required level of training for posts such as the pharmacy technician.

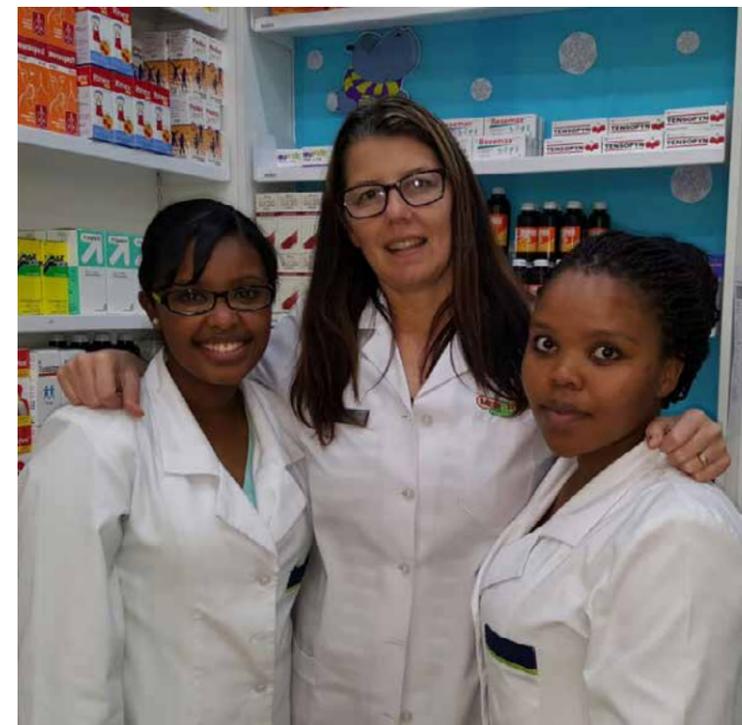
In 2016, several students from the East Cape Midlands College were part of a pilot group wanting to pursue further studies at Nelson Mandela University once they had completed their NC(V) Primary Health. They are specifically interested in the Higher Certificate in Pharmacy Support, which gives access to the Pharmacy Technician Programme.

Applications from students with an NC(V) Primary Health qualification are considered for admission to the University, on condition that they meet the admission criteria, including NCV academic performance and the University’s Access Assessment Test performance. Five students qualified for entry, of whom three registered in 2017 to pursue the Higher Certificate in Pharmacy Support. These students, however, battled to find funding as they were not funded for this second qualification, as per the National Student Financial Aid Scheme (NSFAS) policy.

Qualified pharmacy technicians are currently registered as ‘post-basic assistants’. This will change the moment the Department of Health publishes and gazettes the scope of practice for the pharmacy technician. Once this happens, the qualification registration will change to pharmacy technician and posts for pharmacy technicians in primary healthcare clinics will be created.

The Faculty is further working with the East Cape Midlands College to support the development of its students and assist in strengthening its own programme content and teaching and learning practices. The aim is to better align the programme, not only to access certain University programmes, but also to access available employment opportunities in the sector and to other training programmes where articulation pathways could provide further specialisation for NC(V) Primary Health students.

“There is so much opportunity for change and growth in this field in South Africa. Too many of our pharmacists are caught up in the technical skills required in a pharmacy or dispensary, when pharmacy technicians should be managing these. In the United Kingdom, for example, pharmacy technicians run the hospital dispensaries while the pharmacists are in the wards working alongside the doctors, and focusing on patient care. Pharmacy technicians can also



advance their training to become a ward technician who shadows the ward pharmacist,” says Fogarty, who visited St Mary’s hospital and the Chelsea and Westminster teaching hospital in London.

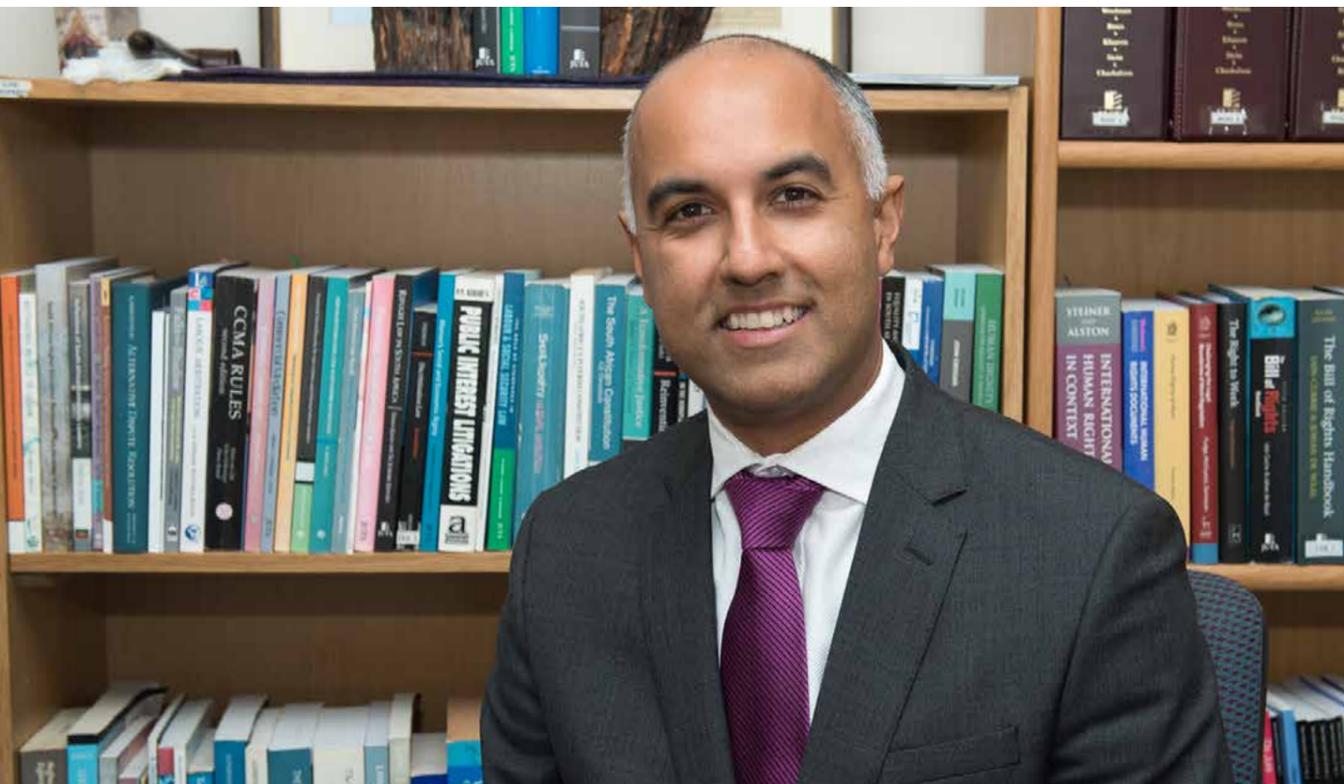
Fogarty has made a considerable contribution to the field, including being the primary author of the 432-page *Southern African Pharmacy Technician Training Manual*, published in July 2016.

It is co-authored by the Head of the Department of Pharmacy, Professor Shirley-Anne Boschmans, Professor Kenneth W Schafermeyer - the Director of the Office of International Programmes, St Louis College of Pharmacy, St Louis, Missouri, USA; and Dan Kibuule, MSc, a Senior Lecturer and Head of Department of Practice and Policy, School of Pharmacy, University of Namibia.

“We have a highly supportive partnership between our Department of Pharmacy and the St Louis College of Pharmacy, managed by the American International Health Alliance’s HIV/AIDS Twinning Centre, which is funded by the US Department of Health and Human Services, Health Resources and Services Administration (HRSA),” Fogarty explains.

The training manual was made possible through the generous funding from the US President’s Emergency Plan for AIDS Relief (PEPFAR) and CDC/South Africa. It was originally an American textbook that the Nelson Mandela University and Namibian authors adapted and re-wrote for a southern African context.

The American publishers gave them royalty-free copyright so that they can sell it to students at cost. They sell it through the Department of Pharmacy for R350, several hundred rands below what its retail price would be.



Professor Avinash Govindjee

Executive Dean's Report

The Faculty of Law continued to produce relevant, high-impact research during 2016/17. Faculty members have also been particularly focused on disseminating their research findings by publishing in accredited journals and by presenting papers at important national and international conferences.

Faculty of Law: 2016 research highlights

A number of Faculty academics are engaged in the final stages of research for postgraduate qualifications, and these colleagues will be well placed to make important contributions to the Faculty's overall research output.

Highlights for the year include the following:

- Professor Deon Erasmus, Associate Professor in the Department of Criminal and Procedural Law, was named Faculty Researcher of the Year, having been involved in three articles (in the area of criminal procedure) published in various accredited journals;
- Advocate Lindi Coetzee, Senior Lecturer in the Department of Mercantile Law, was recognised as

the Emerging Researcher of the Year, courtesy of her various publications and presentations in the area of company law;

- Prof André Mukheibir, Professor in the Department of Private Law, delivered an exhilarating inaugural lecture, entitled *Transformative constitutionalism and reconciliation – balancing the interests of victims and beneficiaries*;
- Dr Joanna Botha, Head of the Department of Public Law, graduated with the Doctor of Laws (LLD) qualification. Her thesis, entitled *Hate speech as a limitation to freedom of expression*, received outstanding reviews from eminent external examiners. Work inspired by portions of the thesis

has subsequently been published in various journals, including the *South African Law Journal* and *South African Journal of Human Rights*;

- The Faculty's strong focus in labour and social security law (through the work of academics associated with the Labour and Social Security Law Unit of the Faculty (LSSLU), headed by Prof Adriaan van der Walt), is reflected in various ways: a large number of students graduated with Master of Laws (LLM) (Labour Law); various book and journal publications were produced with a focus on labour law; collaborative policy work in the area of social security law was finalised; and academics received invitations to contribute to various international conferences and publications in this field;
- An increasing number of Adjunct Professors and Research Associates linked to the Faculty's four Departments have succeeded in having their work published. Special mention must be made of the publication by LexisNexis of *Review in the Labour Court*, co-authored by Advocate Anton Myburgh (an Adjunct Professor in Mercantile Law) and Advocate Craig Bosch (Research Associate in Mercantile Law);
- A number of revised editions of South African student textbooks involving academics from the Faculty were produced. This includes contributions to *Principles of Evidence* (Schwikkard and van der Merwe (eds), 4th Ed, Juta), *Introduction to Human Rights Law* (Govindjee (ed), 2nd Ed, LexisNexis) and *Labour Law in Context* (Van der Walt and Govindjee (eds), 2nd Ed, Pearson);
- The Annual Private Law and Social Justice Conference continued to attract a good number of academics from various Faculties of Law from across the country.

The Faculty is also making significant inroads in respect of academic contributions and the development of networks relating to marine and maritime law. The Centre for Law in Action, headed by Professor

Hennie van As, Professor in the Department of Public Law, has sourced funding from the Norwegian Department of Foreign Affairs and established the FishFORCE Fisheries Crime Law Enforcement Academy. FishFORCE aims to build enforcement expertise and strengthen cooperation between agencies, domestically and cross-border, in order to address fisheries crime. This will be achieved via a combination of -

- hands-on expert training of fisheries control law enforcement officers from multiple relevant agencies;
- the provision of post-training support; and
- focused research.

Prof van As has himself established a reputation for being an expert in the area of fisheries crime and has been involved in developing inter-agency collaboration to address this. Prof van As' receipt of an invitation to serve on a panel together with representatives from INTERPOL, the UNODC and the US National Oceanic and Atmospheric Agency, was a particular highlight. The Government of Indonesia, the Norwegian Ministry of Trade, Industry and Fisheries, the United Nations Office on Drugs and Crime and the PescaDOLUS network at Nelson Mandela University also successfully hosted the 2nd International Symposium on Fisheries Crime, bringing together more than 250 political leaders, policy makers, representatives of law enforcement agencies and civil society from more than 45 countries.

"Many contributions focus on laws directed towards improve the living and working conditions of vulnerable members of society ... "

–Professor Avinash Govindjee

The high-impact work of the incumbent of the Chair of the Law of the Sea and Development in Africa, Prof Patrick Vrancken, also deserves special mention. Prof Vrancken has given extensive input on the draft Marine Spatial Planning Bill. He oversaw the publication of the first issue of the *Journal of Ocean Law and Governance in Africa* and attended to the updating of the *South African Ports Law Handbook*. Importantly, significant progress has been made on a major, multi-authored publication on the *African Union and the Law of the Sea* (expected to be published in November 2017). Prof Vrancken has also progressed in developing a monograph on

state ocean jurisdiction (to be published in 2018) and has been instrumental in organising and chairing the law-of-the-sea session of the International Law Association biennial conference in Sandton. Finally, the work of the Chair is instrumental in linking the Faculty's research agenda with the various ocean-related initiatives emerging at Nelson Mandela University.

The research work of law academics and Faculty-linked associates is spread across a range of themes. Many contributions focus on laws directed towards improving the living and working conditions of vulnerable members of society, safeguarding their interests from human rights violations, or identifying legislative anomalies

or lacunae. These focus areas are being carried forward by the growing body of postgraduate work produced by students registered with the Faculty. Many members of staff are immersing themselves in research areas that are new for the Faculty, and in work that dovetails with broader institutional research themes. It is expected that the Faculty's research output and impact will significantly increase in years to come.

Professor Avinash Govindjee
Executive Dean
 Faculty of Law

FACULTY OF LAW



Refugee Rights Centre

The Centre offers legal services to asylum seekers, refugees and urban migrants, and provides training for legal professionals and government officials.

SARChI Chair in the Law of the Sea and Development In Africa

The Chair's research activities focus on the law of the sea (including the legal regime governing the South African continental shelf and the exploitation of its resources), development in Africa and the law of the sea (including relevant indigenous law) and the legal aspects of marine tourism.

The Faculty of Law houses several important entities that play an important role in research, teaching and community engagement.

The Legal Aid Clinic

The Law Clinic's aim is not only to provide free legal services to needy people, but it also offers exiting opportunities for the training of law students.

Labour & Social Security Law Unit

The Unit's mission is to carry out research, train students, undertake contractual investigations and research, disseminate information and provide a forum to communicate its research.

Centre for Law In Action

The Centre offers short learning programmes to government officials to equip them with effective implementation of existing legislation and increase access to justice. It has also partnered with the Norwegian and South African governments department to form FishFORCE – a fisheries Law Enforcement Academy



The scope of the right to freedom of expression, including the regulation of hate speech and an appropriate threshold test for a legislated hate speech offence, are contentious issues in which Dr Joanna Botha specialises.

Hate speech and the law

South Africa and countries worldwide are experiencing an unprecedented level of racial hate speech where victims have felt deeply offended by racially derogatory insults, verbal threats, epithets and slurs.

In March 2016, the United Nations Human Rights Committee (UNHRC) recommended that South Africa 'redouble its efforts to prevent and eradicate all manifestations of racism and xenophobia' by enacting legislation to prohibit hate speech and hate crimes. It noted that it was alarmed about the 'numerous manifestations of racism and xenophobia' in South Africa and concluded that the authorities were unable to hold perpetrators accountable in the absence of appropriate laws.

"A central issue at stake here is that free speech promotes democracy, hence you have to be extremely careful about

where you draw the line specifying where free speech has been overstepped. Is it therefore too dangerous for our law to draw that line? I don't think so," says Dr Joanna Botha, an attorney and the head of Public Law, who graduated with an LLD in 2016.

Her doctorate was on the regulation of hate speech and her expertise includes freedom of expression and the interrelation between this and the right to human dignity and equality, specifically as far as the regulation of hate speech is concerned.

"My perspective is that the law does have a role to play in criminalising hate speech and hate crimes. Countries in Europe and the United States, have had these laws in place since the 1970s and South Africa's constitutional definition of hate speech can be effectively used as an initial benchmark," she explains.

"Hate speech is defined as the advocacy of hatred against an identifiable group of persons and which also constitutes incitement to cause harm (in the form of harm to the group or the broader societal well-being)."

An article addressing the dilemma between 'hate speech' and 'free speech', which she wrote in 2016 entitled *Towards a South African 'Free Speech' Model*, will be published in 2017 by the South African Law Journal.

"For me, the legitimacy of hate speech legislation in South Africa from a jurisprudential perspective requires a clear and meaningful standard to guide the discussion around the reform of South Africa's hate speech laws and to create a conceptual framework for the development of an appropriate threshold test for a criminal hate speech regulator."

South Africa's *Promotion of Equality and Prevention of Unfair Discrimination Act of 2000* addresses hate speech as a human rights violation, and while it does not deal with the criminalisation of such speech, the 2016 Penny Sparrow case was nonetheless dealt with under this Act, as it was unacceptable and racially loaded of her to make comments on Facebook in which she compared black people to monkeys.

In addition, in September 2016 a strong precedent was set when she was convicted of *crimen injuria* and handed a R5000 fine or 12 months imprisonment. She was further sentenced to an additional two years, which was wholly suspended for five years, and she was ordered to make a public apology for her remarks. She was not charged with the crime of hate speech, however, as this type of speech is not a specific criminal offence in South Africa.

In that same month, an article co-authored by Dr Botha and the Executive Dean of Law, Professor Avinash Govindjee, was published in the South African Journal on Human Rights, entitled: *The regulation of racially derogatory speech in the Promotion of Equality and Prevention of Unfair Discrimination Act 4 of 2000 (PEPUDA)*.

In concluding their article, they write: *In our opinion, the use of inter-personal racially derogatory speech, such as the terms 'baboon' or 'kaffir' should be regulated as a form of hate speech in*

terms of the narrowed down hate speech regulator proposed for s 10(1) of PEPUDA (as opposed to s 7(a) thereof).

PEPUDA, Dr Botha explains, is a human rights statute that treats hate speech as a human rights violation. It also regulates unfair discrimination as a human rights violation, for example, signs saying no Muslims allowed, or discriminating unfairly against homosexual people. However, PEPUDA does not criminalise hatred. In October 2016, the Prevention and Combating of Hate Crimes and Hate Speech Bill, 2016, was gazetted for public comment in South Africa. The Bill introduces two new concepts a) a hate crime, for example the 'corrective rape' of a lesbian, in other words, an existing crime with a biased motive against a particular group. The sentence imposed on the perpetrator will then be increased; and b) a hate speech crime. So, while PEPUDA regulates hate speech, it does so at a different level. The Bill creates a criminal offence for hate speech, which could attract a jail sentence.

Dr Botha adds that various forms of hate speech, such as EFF leader Julius Malema talking about 'killing the whites' or, as is increasingly happening internationally, people calling for the destruction of

Arab or Muslim people because they are "terrorists", should be criminal offences as this type of speech damages social cohesion and incites harm. She explains that in Europe hate speech is dealt with extremely firmly and the mere denial of the holocaust attracts criminal sanctions in the form of a fine or jail sentence. In a similar vein, it could be argued that DA politician Helen Zille's comment about the 'merits of colonialism' should be regulated.

The conclusion of Dr Botha and Prof Govindjee's article elaborates on all these examples: *This type of speech is dehumanising and vitriolic and has the potential to undermine the societal standing of vulnerable groups and cause systemic discrimination. It is incomparable with hurtful speech or robust criticism and should be treated as a form of prohibited speech.*

As a transformative human rights statute, we believe that PEPUDA is best suited to overcome the harms caused thereby and that PEPUDA should be applied in a manner which not only provides the victims of racially derogatory epithets with adequate redress, but also permits the implementation of positive measures aimed at promoting tolerance, civility and respect in public discourse.

"I propose a more nuanced, communitarian model of free speech, which permits the criminalisation of hate speech because of the harm it causes to our society."

– Dr Joanna Botha



Dr Joanna Botha

Dr Botha adds, however, that PEPUDA is inadequate to deal with speech that incites severe harm against marginalised groups in our society. She comments as follows on the new Hate Crime and Hate Speech Bill:

"I commend the publication of the Bill as it was long overdue. It introduces the concept of a hate crime and provides for the criminalisation of hate speech but the proposed threshold test for the hate speech offence is overbroad, with the result that a wide range of speech is prohibited," says Dr Botha who emphasises that this is deeply problematic as any such bill cannot in any way compromise free speech and its importance for the democratic process.

She explains: "The current section in the Bill criminalising hate speech is completely unacceptable as it stands. The Department of Justice and Constitutional Development, who drafted it, ignored all the recommended legal guidelines for the criminalisation of hate speech. Insulting and offensive speech is included in the ambit of the test. Additionally, 'trade and occupation' is listed as a prohibited ground, over and above the more usual grounds such as race, gender, and religion. The result is that in its current form, if you ridicule a politician you could find yourself in jail for ten years. This is intolerable and undermines the basis of the right to freedom of expression entrenched by our Constitution. There is ample jurisprudence internationally and from our Constitutional Court that says political criticism and satire must be protected speech."

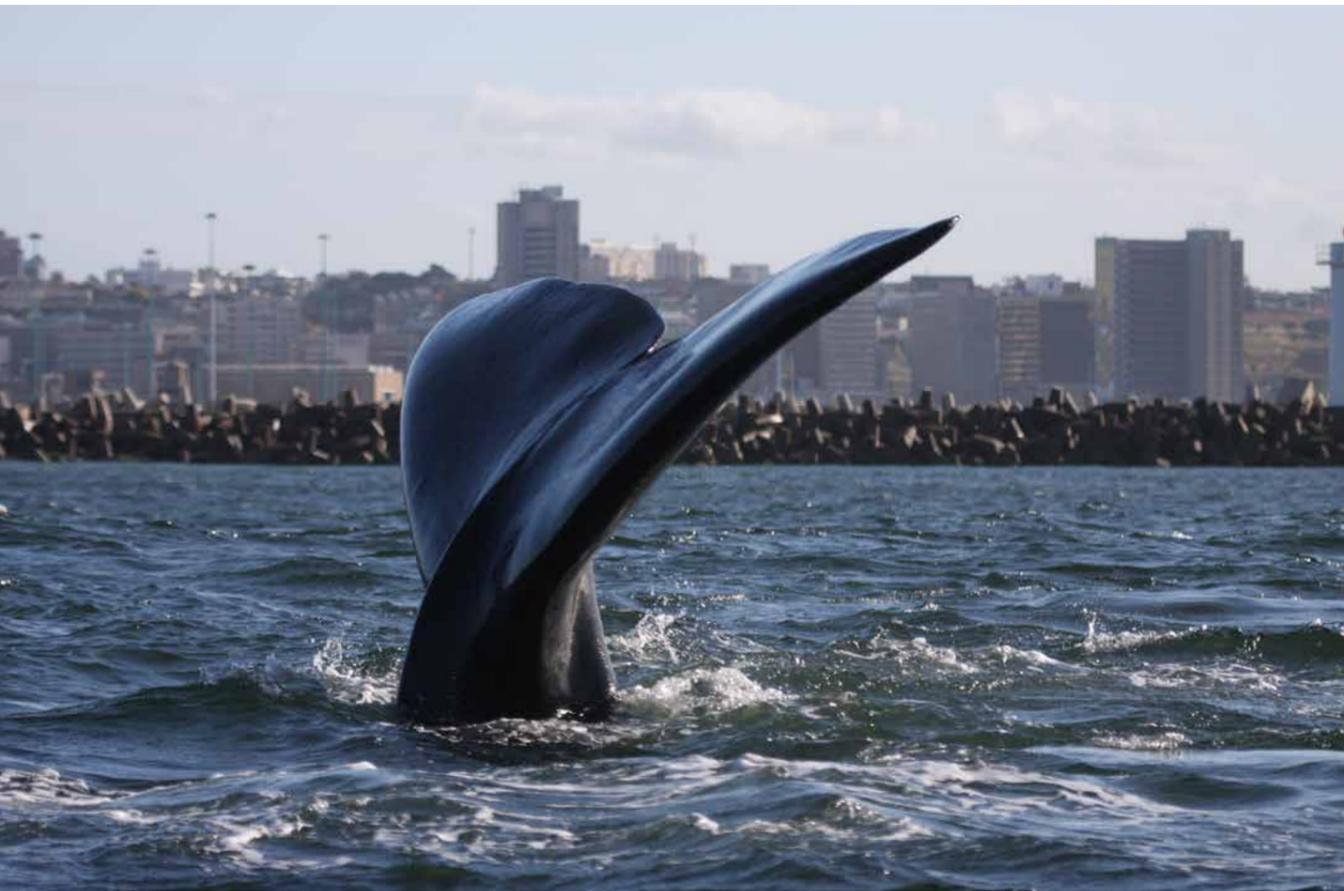
She adds that many academics use the Bill's overbroad definition of hate speech to argue there should not be any criminal sanction for hate speech; that this would give government a free hand

to sanction political criticism. Her argument is that the criminal regulation of hate speech, if properly and strictly defined in terms of South Africa's Constitution, would be valuable to all people in South Africa, because the absence of an appropriate penalty dangerously polarises groups.

"I propose a more nuanced, communitarian model of free speech, which permits the criminalisation of hate speech because of the harm it causes to our society. While the South African Constitution protects individual libertarian rights such as freedom of expression and the right to human dignity, it also protects socio-economic rights, and requires that South Africans be united in our diversity.

"Our Constitution is special. It is a transformative 'communitarian' Constitution aimed at restructuring society and transforming attitudes. As Judge Albie Sachs says, we are not islands unto ourselves and *Ubuntu* is an essential part of the constitutional project. National cohesion is essential to the future wellbeing of all citizens of South Africa. Speech which undermines our constitutional values should not be tolerated.

"The advantage of the communitarian free speech model is that freedom of expression is still promoted to enhance individual self-fulfillment, the pursuit of the truth and knowledge, the integrity of the democracy and tolerance, but with due regard to other important values, including the common good and social harmony. Such a model reconciles the tension between the conflicting rights and provides an enabling framework to facilitate the enactment of constitutionally sound legislation for the criminalisation of hate speech in South Africa."



South Africa has one of the largest maritime zones on the continent with a sea area of approximately 2.5 million km², which is twice the size of the territory of our dry land at about 1.2 million km². How do we govern this?

One of the largest maritime zones on the continent

We know more about the surface of the moon than we know about the bottom of the ocean with its thermal vents, minerals and genetic resources at depths averaging five kilometres or five times Table Mountain's height.

Given the limited marine knowledge and understanding worldwide, the law of the sea is extremely complex. With all eyes on the oceans as a rich resource, and with the South African government's focus on the oceans economy through Operation Phakisa, there is an urgency to create and enforce strong, comprehensive laws for South Africa and Africa's maritime domains.

South Africa and the Law of the Sea, published as recently as 2011, is the first book published on this subject, authored by the leading legal specialist on the law of the sea in South Africa, Professor Patrick Vrancken, who is the SARChI Chair on the Law of the Sea and Development in Africa.

In 2016, Prof Vrancken edited the first edition of a new journal *iilwandle zethu: The Journal of Ocean Law and Governance in Africa* ('our sea' in Xhosa) and in 2016 he produced an update of *The South African Ports Law Handbook* with Nelson Mandela University doctoral student Zintle Siwisa-Thompson.



South Africa has one of the largest maritime zones on the continent with a sea area of approximately 2.5 million km², which is twice the size of the territory of our dry land at about 1.2 million km². How do we govern this?

The SARChI Chair

The SARChI Chair of the Law of the Sea and Development in Africa focuses on three areas:

- South Africa and the law of the sea, including the legal regime governing the South African continental shelf and the exploitation of its resources;
- Development in Africa and the law of the sea, including relevant indigenous law, and research at an international and comparative level on:
 1. The East coast of Africa and the Indian Ocean
 2. The West coast of Africa and the Atlantic Ocean
 3. The Southern Ocean and Antarctica; and
- The legal aspects of marine tourism.

In 2016, he further worked on his contribution as an author and co-author of an 800-page book being published by Juta in November 2017, titled: *The Law of the Sea: The African Union and its Member States*. It has more than 20 authors and is the first attempt at a systematic reference work on the law of the sea in Africa.

Prof Vrancken explains that the legal regime that applies at sea is very different to the one that applies on land.

"The sea is divided into maritime zones with different rules in different zones," he explains. "You have laws governing the internal waters such as our bays; then you have laws governing the territorial sea extending 12 nautical miles (1 nautical mile = 1.852km).

"Beyond this is the exclusive economic zone (EEZ) and many people think it is part of the territory of the coastal state but it is not. For purposes of the resources found in the EEZ, which extends as far as 200 nautical miles from the coastal baselines, the law treats the resources as if they were part of the territory of the coastal state but for all other purposes the zone is subjected to the same laws as the high seas."

Every resource found in the EEZ, from fish to oil, gas and other minerals, belongs to the coastal state, but it cannot prevent any



other nation from navigating through this area. In certain cases, however, if the continental shelf extends further than the 200 nautical miles, a coastal state can claim the seabed and its subsoil up to 350 nautical miles, which South Africa does.

Then there are the high seas and what are the rules of the high seas? How do you limit the freedoms that all nations have on the high seas to ensure the sustainability of our fish populations for example. How do we apprehend people invading our territorial waters and EEZ from the high seas in order to illegally harvest our fish and marine resources?

"A lot of work is being done on this now with the use of technology such as drones, but many African states do not have the means to protect their waters, and to detect ships which are supposed to have GPS navigation locating their position, but which take various steps to avoid detection," says Prof Vrancken whose research includes the legal developments that affect African coasts and the maritime environment, as well as incorporating the international law of the sea into the domestic legal system of African states and into South African law.

South Africa's new Marine Spatial Planning Bill was tabled in parliament earlier this year. "You need to understand international law in order to develop marine spatial planning laws," says Prof Vrancken who was the deputy leader of the marine protection services and ocean governance lab at the Operation Phakisa ocean labs in Durban in 2014.

Prof Vrancken has since been working with the SARChI Chair on Marine Spatial Planning at Nelson Mandela University, which is recommending to parliament several critical legal improvements to

the current Bill before it becomes an Act.

Prof Vrancken is also a member of the International Law Association's Committee on International Law and Sea Level Rise. In 2016 he organised and chaired the law of the sea session at the Biennial Conference of the International Law Association, held in Sandton. It was the first time the conference has been hosted in sub-Saharan Africa.

"With global warming, some island states might have their land territory disappearing. Current international law says if the islands disappear, that island state loses one of the basic elements that define a state. But what about the people with the nationality of that state, where do they go? And does that island state also lose its EEZ and its resources? We have to relook at all these issues as the ocean levels rise. Part of this is to legally examine who is responsible for the islands disappearing, the island state or the major economies fuelling global warming?"

Another pressing legal issue the Chair is researching is the protection of genetic resources at sea. Doctoral student Tanya Wagenaar is researching this.

"It brings us to a completely different idea potentially of how life is created and pharmaceutical companies are spending billions of dollars collecting and analysing marine specimens," says Prof Vrancken.

"But to whom do these organisms belong and if a cure is developed from one or more of them, does the organism and cure belong to the company that has the resources to find it or somebody else? These are some of the complex laws we are addressing as the world fixes its focus on the oceans."

Research Areas

During 2016, the SARChI Law of the Sea Chair had ten PhD and five Master's students working on marine projects in the following areas:

- Labour rights of fishers in Namibia
- Maritime piracy legislation for Nigeria
- Marine scientific research in Antarctica
- Legal aspects of marine spatial planning
- Legal regulation of surfing in South Africa
- The Common Exclusive Maritime Zone of Africa
- Protection of copyright aboard cruise ships at sea
- Decommissioning of offshore installations on high seas
- The safety of navigation and the role of port state jurisdiction
- The intellectual property consequences of marine bioprospecting
- African traditional fishers in the law of the sea and human rights law
- The legal framework of concession agreements relating to Nigerian ports
- The role and efficiency of international conservation instruments for turtles and turtle habitats
- Sustainable strategies for improved implementation of South Africa's marine living resources legislation



“Fisheries crime and the illegal harvesting, processing and trading of fish and seafood globally is so huge that it is in effect a parallel economic system that is undermining sustainable economic growth. Countries are being deprived of taxes; citizens of jobs, food and income; and fisheries and environments are being destroyed”.

FishFORCE – Combatting Fisheries Crime

These are the words of Professor Hennie van As, Director of the Centre for Law in Action (CLA) and a professor of Public Law in the Faculty of Law. An admitted advocate, he is also a member of the international research and capacity-building partnership on fisheries crime between South Africa and Norway, called PescaDOLUS.

Towards addressing fisheries crime, a Fisheries Law Enforcement Academy called FishFORCE was established at Nelson Mandela University in 2016. It is a partnership between the CLA, the Norwegian Department of Trade, Industry and Fisheries and South Africa’s Department of Agriculture, Forestry and Fisheries (DAFF).

“Fish FORCE’s main purpose is to combat sea fisheries crime and related criminal activities,” says Prof van As. “We have started training Fisheries Control Officers (FCOs), police officers and prosecutors in South Africa and Kenya, and we will be doing the same in other countries along the East African coastline. We are also assisting with training along the Indian Ocean Rim, including countries like Indonesia.”

Norway committed R50m over five years for the establishment of FishFORCE. Norwegian Ambassador, Ms Trine Skymoen, and the University’s Deputy Vice-Chancellor: Institutional Support, Dr Sibongile Muthwa, signed the agreement in June 2016 at a high-level conference in Port Elizabeth

on Operation Phakisa and the Oceans Economy. Academic, government and industry leaders in the marine and maritime space from South Africa and Norway, committed to work together to combat fisheries crime.

“Through FishFORCE, we look forward to a close collaboration and the sharing of expertise between Nelson Mandela University, the Department of Agriculture, Forestry and Fisheries, the Norwegian Department of Trade, Industry and Fisheries, and the Norwegian Police Academy, which established the first Master’s degree in combatting fisheries crime over five years back in Norway,” said Ambassador Skymoen.

“The FishFORCE agreement falls under the broader partnership between South Africa and Norway that is being developed through Operation Phakisa and the Oceans Economy. Norway’s economy is based on the ocean, and South Africa is the perfect partner with whom to collaborate and expand our marine and maritime cluster,” she added.

FishFORCE has the buy-in from the world’s largest international police organisation, INTERPOL, the African Union (AU) and the United Nations Office on Drugs and Crime (UNODC) because the oceans links all nations, and porous harbours or borders are a danger to all.

FishFORCE will work to achieve knowledge- and intelligence-led investigations and increase successful prosecutions of criminals

engaged in fisheries crime. It will also enable fisheries law enforcement officers to obtain formal qualifications, including higher certificates, diplomas and postgraduate diplomas, with access to further academic qualifications.

“FishFORCE is critical for South Africa where, as is the case in most developing countries, the training of Fisheries Control Officers (FCOs), police officers and prosecutors involved in fisheries law enforcement is conducted on an *ad hoc* basis. There are no courses specifically designed to train them to fulfill their enforcement duties,” says Prof van As.

“Together with the National Prosecuting Authority, we will be getting to the bottom of why prosecutions for fisheries-related crimes often fail. The regulating, policing and law enforcement of fisheries vessels in the past has been too compartmentalised and full of loopholes because of the large number of different players involved.

“Illegal fisheries vessels take advantage of this. They commit document fraud to under-report catches, they fish illegally and they change their flags (because countries only have jurisdiction on the high seas over vessels that fly their flags) or they transfer illegally caught fish from one boat to another.

“We are now closely collaborating with the South Africa Police Service, Defence Force, Navy, National Prosecuting Authority and Home Affairs to develop a combined offensive.”

About this publication

The adoption of the 2050 Africa Integrated Maritime (AIM) Strategy by the AU Assembly of Heads of State and Government on the 31st of January 2014 marked a sea change in Africa’s consciousness of its maritime domain. The implementation of the Strategy will require tackling a vast range of governance and regulatory challenges. While doing so, numerous opportunities will arise to develop the fields of marine law, maritime law and ocean governance to support the sustainable growth of the African blue economy.

ilwandle zethu: The Journal of Ocean Law and Governance in Africa is a blind peer reviewed journal of note, under the editorship of the South African Research Chair in the Law of the Sea and Development in Africa. The journal publishes submissions relating to marine law, maritime law or ocean governance as they apply to the African continent, or to one or more African states. The journal will create a platform for building a community of knowledge and research on the African continent.

Of interest and benefit to:

- Practitioners in the public and private sectors
- Researchers and students of ocean law and governance in Africa
- Libraries



Caption



South Africa recently amended its legislation to give Municipal Law Enforcement Officers the powers of FCOs. FishFORCE is giving the required training to Municipal Law Enforcement Officers, starting in Cape Town in mid-2017.

In 2016, FISHForce ran five workshops in South Africa to train additional Fisheries Control Officers and Honorary Marine Conservation Officers as part of a public work programme, with former uMkhonto soldiers as part of the group.

In September 2016, FishFORCE co-hosted the high-level International Sea Fisheries Crime Conference in Yogyakarta, Indonesia, which is establishing a counterpart fisheries law enforcement academy. FishFORCE will share training material it has developed with them and it will train their trainers if required.

In November 2016, the University and FishFORCE co-hosted a high-level conference in Mombasa, Kenya, together with the University of Nairobi and the Kenyan Department of Fisheries. Senior government authorities from Kenya, Somalia, Mozambique, Tanzania, Indonesia, Mauritius and Seychelles came together to discuss the combatting of fisheries crime, including significant poaching by Chinese fishing boats.

"South Africa faces the same problem, with several Chinese fishing boats apprehended in our waters, but what people have to realise is that highly organised, well-financed transnational criminal activities are taking place within our waters and within international waters all the time. These activities include a lot of other issues, including human and drug trafficking," explains Prof van As.

Research by the United Nations Food and Agricultural Organisation (FAO) estimates that Southern and East Africa lose in the region of R12.2 billion to illegal and unreported fishing every year. The FAO further estimates that 85% of fish stocks worldwide are now fully exploited, and illegal fishing is one of the main contributors.

"We need to face up to the fact that traditional legal approaches to combatting illegal fishing and the associated illegal activities have met with limited success," says Prof van As. "An alternative approach that is gaining momentum is to approach illegal fishing as a transnational organised crime, and to investigate the policing, legal and policy implications of using transnational criminal law and procedure to strengthen fisheries law enforcement."

Ten days after Professor André Mukheibir's inaugural lecture on 8 September 2016, the second phase of the #FeesMustFall protests started on campus. The portentous subject of her inaugural lecture was Transformative Constitutionalism and Reconciliation - balancing the interests of victims and beneficiaries.

Decolonising legal education and the law of delict

She discussed the imperative of our transformative constitution to radically transform society and she spoke about the failure of the Truth and Reconciliation Commission (TRC).

"The TRC failed in the sense that while victims of gross human violations were heard and the perpetrators of these violations were given the opportunity to come clean and in certain instances prosecuted, the stories of ordinary people were not heard," Prof Mukheibir explains.

"These are the people who were subjected to menial work and who had to endure the indignities of Bantu Education but who suffered in a less prominent manner. At the same

time, the beneficiaries of Apartheid had to a large extent not acknowledged the fact that they had benefited from this system or acknowledged their privilege. The TRC was in this sense an incomplete project."

Prof Mukheibir adds that #FeesMustFall or #FMF protests highlighted many of the shortcomings of the transformation of 1994, including the so-called rainbow nation, and, along with this, they questioned the path taken by Nelson Mandela.

"During the protests it became clear that a certain percentage of white people remain indifferent to what has happened in this country. They have gone on living the way they always

did without recognising the need for reconciliation. We are all living in one country and we all need to work together to rectify the social injustices, as the majority of black people are still living in very difficult circumstances.”

Prof Mukheibir quotes the late Chief Justice Pius Langa who wrote: *The provision of services to all and the leveling of the economic playing fields that were so drastically skewed by the apartheid system must be absolutely central to any concept of transformative constitutionalism.*

As an academic who is also influenced by the notion of Catholic social justice, she says she feels strongly called to play her part in addressing social injustice and, as a law academic, to decolonise legal education: “It cannot be business as usual on South African university campuses anymore. It is difficult to reposition where we are at the moment but we need to do so.”

A specialist in the law of delict and delictual damages (the rules that govern damages claims for harm caused), Prof Mukheibir is currently researching whether the notion of transformative constitutionalism has syphoned through to the law of delict, and how to decolonise the law of delict.

In general, the law of delict covers claims for damages from another party outside of breach of contract. It includes cases of defamation, personal injury, pure economic loss, pain and suffering and post-traumatic stress. The law of delict is commonly used in medical negligence claims.

Prof Mukheibir believes that the decolonisation of the law of delict would require it to be more expansive: “South Africa’s transformative constitution, unlike other constitutions, sets out not only the rules as to how the state should operate, it also places an imperative on the government and the courts to radically transform society,” she explains.

Transformative constitutionalism also requires that the law is not only limited to rich people because legal costs are prohibitive for most citizens. Individuals without financial means are unlikely to claim for compensation unless they have *pro bono* legal representation or if they engage in a class action.

“This impacts on several areas, ranging from the question of reconciliation to the transformation of legal education,” says Prof Mukheibir.

The Faculty of Law is busy with the re-circulation of its LLB degree and part of this process includes dealing with decolonising the curriculum, both in terms of content and structure. Underpinning

these changes is the notion of transformative constitutionalism.

Prof Mukheibir encourages students to explore the decolonisation of law and to challenge legal academics on this, as well as provide input as to what should be included in a decolonised curriculum.

She explains that the structure of South Africa’s law of delict is based on Roman Dutch or European law, which lends itself to transformative constitutionalism, dignity and *Ubuntu*, particularly when the medieval Canon Law (the law of the Catholic Church) roots of these systems are explored.

“I encourage students to assess what is good about our law of delict and what is not; to interrogate the legal definition of the ‘reasonable person’ and how or whether this aptly applies to - or does not apply to the majority of people in South African society.”

This is all part of the transformation of South Africa’s legal culture, which Chief Justice Langa wrote about in 2006. Prof Mukheibir quotes Langa and says what he said then is relevant to today, and needs to be accelerated to advance the decolonisation of legal education and the law:

The way we teach law students and the values and philosophies we instill in them will define the legal landscape of the future. Most of us here today are familiar with a traditional legal education that focuses predominantly on private and commercial law and rewards the rational deduction of inevitable conclusions from

unquestionable principles. That is how we were taught and it is a vital part of any lawyer’s arsenal. We would be failing in our duty to both the students and the public if we did not pass on the tradition of analytical argument and a full knowledge of the legal principles that govern everyday human interaction and form the main part of a lawyer’s work.

However, that education is no longer enough. We can no longer teach the lawyers of tomorrow that they must blindly accept legal principles because of the authority. No longer can we responsibly turn out law graduates who are unable to critically engage with the values of the Constitution and who are unwilling to implement those values in all corners of their practices.

A truly transformative South Africa requires a new approach that places the Constitutional dream at the very heart of legal education. It requires that we regard law as part of the social fabric and teach law students to see it as such. They should see law for what it is, as an instrument that was used to oppress in the past, but that has that immense power and capacity to transform our society.

“I encourage students to assess what is good about our law of delict and what is not ... ”
 – Professor André Mukheibir



Professor Azwinnidini Muronga

Executive Dean’s Report

The Faculty of Science continues to be the frontrunner in research outputs, with more than 50% of the University’s total research outputs emanating from the Faculty, which is home to six SARChI Chairs and 92 research associates. We pride ourselves on the fact that 64% of our academics have PhDs, 28% have master’s degrees and 8% other qualifications.

Faculty of Science: highlights

In 2016, seven of our researchers were rated positively by the National Research Foundation (NRF), adding to our host of NRF-rated researchers and entities that continue to lead the cutting edge of innovation. There is a long list of innovations of which the Faculty is incredibly proud.

InnoVenton’s range of projects tangibly promise a brighter future for South Africa and the world, including green energy with Coalgae®. The recently late Professor Ben Zeelie achieved so much towards the development of this in his brilliant career.

The Centre for High Resolution Transmission Electron Microscopy’s (HRTEM) impressive cutting edge research is making waves worldwide with the ability to investigate

materials down to the atomic level and solve 70 to 100-year-old problems, such as how radioactive silver escapes from fuel particles used in pebble bed type reactors and why diamond drill bit inserts in oil drills degrade during drilling operations. Their importance escapes the non-physicist but they are critical to the future of science and industry. This kind of research has advanced our Faculty to the competitive edge nationally and globally, with our researchers (some utilising the HRTEM), publishing their work in prestigious journals such as *Nature*.

The Faculty’s academics continue to feature impressively in our engagement initiatives, as highlighted by the University’s Engagements Awards, with Professor Raymond Auerbach from our School of Natural Resource Management and the Centre

of Excellence for Food Security being named the 2016 Engagement Excellence Award Winner. We also have engagement centres like the Govan Mbeki Mathematics Development Centre doing outstanding mathematics development in both urban and rural areas.

With the University launching its first-for-Africa, dedicated Ocean Sciences Campus in September 2017, more than 90% of the current Ocean Sciences research is conducted within the Faculty of Science. The Institute for Coastal and Marine Research (CMR) has considerable capacity to aid the mission and vision of the University's Ocean Sciences ambitions.

This new campus will provide an important platform for the Faculty's researchers to interact with one another and with researchers from other faculties and other universities in South Africa and globally. The Faculty's academics will advance a collaborative culture on campus and assist Ocean Sciences in terms of developing the curriculum as well as research and engagement to support the country and the continent's blue economy.

The Faculty has also made headway with its *Shaping the Future of Science* engagements. As part of this, the Faculty is committed to issues of curriculum transformation; cutting edge research, knowledge generation and engaged scholarship. We are using this opportunity to shape ourselves into a 21st African Faculty of Science at Nelson Mandela University.

Our strategic priorities will focus on 1) student access and success 2) resource stewardship 3) engaged, innovative scholarship 4) transformative culture 5) engaged staff 6) enabling systems, processes and infrastructure.

We are strategically positioning ourselves locally, regionally, and globally. We will do this by 1) looking at what differentiates our Faculty from the rest. In other words, we will define our academic identity 2) boldly positioning the University to embrace Nelson Mandela's challenge to be caring, responsible and innovative, and to recognise the importance of continuously growing and adapting in the pursuit of knowledge, emancipation and lifelong learning 3) accordingly articulating our intellectual identity and culture to inform our programmes and initiatives 4) developing graduate attributes for the 21st century and a relevant curriculum framework that reflects this 5) developing staff leadership attributes and a Faculty leadership paradigm.

The Faculty arranged two days of strategic sessions to start the process of coming up with a solid five-year plan. The process has been inclusive of all students and staff, and we aim to have a full draft plan by the end of 2017.

One of the challenges faced by the Faculty of Science is transformation. The Faculty community will have to take collective responsibility in embedding transformation objectives, indicators and targets in our strategic plans. In addressing curriculum transformation issues, one of the Faculty's interventions is to hold discussions towards establishing a *History of Science* programme.

Another challenge is the sustainability of the Faculty, and we will need to review our funding, investment, resource allocation and utilisation, and incentive models and benchmarks. In order to boost our research publications, the Faculty will identify key research themes to foster transdisciplinary collaborations among academics in the Faculty and beyond. We will also need to create more time for emerging researchers to write papers. We will identify new emerging research niche areas where there is already appetite to venture into particular directions.

Postgraduate-wise, for the year 2016/17, the Faculty saw 42 master's students and 26 doctoral candidates graduating in April 2017, compared to 42 master's and 17 doctorates graduating in 2015/16. We are intent on increasing the number of postgraduate students.

To achieve this, we need to increase the number of academics with PhDs, and ensure that we have a pipeline of future science students. From 2016, the Faculty has established a Science Education, Outreach and Communication (SEOCP) programme to facilitate Science Education and Science Communication within the Faculty and outside the University. In 2016, the Department of Science and Technology awarded the hosting of the National Science Week 2017 launch to Nelson Mandela University, driven by the Faculty of Science.

My goal is to see learners from the Eastern Cape featuring among the top maths and science learners in South Africa. I want to see our Faculty admitting increasing numbers of learners from throughout the province who pass matric with distinctions in maths and science. Hence, the SEOCP will be a flagship project. The programme focuses on science education from Grade R learners to undergraduate university students, with outreach programmes for learners, teachers and communities across the province.

Significant successes are possible, and to achieve this we are partnering with a range of educational engagement activities in the province already being run by various departments within the University. Having worked in maths and science advancement for many years, I am motivated by the potential in the Eastern Cape.

Professor Azwinndini Muronga
Executive Dean
Faculty of Science

"We are strategically positioning ourselves locally, regionally, and globally ... "
– Professor Azwinndini Muronga



"Humans have been intricately linked to the ocean for tens of thousands of years. Our University recognises this and is advancing faculty-wide research to understand the ocean environment and how this couples with coastal livelihoods and human impact on our ecosystems." – Professor Nadine Strydom, 2016 Researcher of the Year.

Four fish or 15 000 fish – the choice is in our hands

Stocks of some of our iconic angling fish species – such as red and white steenbras, black musselcracker, dageraad, kabeljou (kob) and seventy-four – are now so overexploited that they fall within the red list of threatened species as tracked by the International Union for the Conservation of Nature (IUCN).

Marine biologist Prof Strydom wastes no time getting to the heart of the crisis. "Many coastal linefish species can live for over 30 years but because of over-fishing, their populations have either collapsed or the numbers of older, mature adults have dangerously plummeted. Their survival response is that the smaller, younger fish are becoming sexually mature at

a younger age, which is not good for the species because they do not produce nearly the same amount or size of eggs which affects the survival of offspring.

"Less than 0.1% of all spawned, fertilised linefish eggs make it through to adulthood. If we look at the dusky kob as an example, at 10 years it can produce 4000 eggs per spawning season once a year and only 0.1% or four of their offspring will survive to adulthood under natural conditions. A 30-year-old dusky kob can produce 15 million eggs per spawning season once a year and 0.1% will survive, which is 15 000 fish."

That's an alarming eye opener, and there are many. Another example she provides is the black musselcracker (commonly called the 'poenskop'). The entire population is female for the first 18 years of their lives and become males thereafter. Targeting the largest, mature fish completely derails the species' sex ratios.

These examples illustrate the importance of Prof Strydom's research, which uniquely explores fish reproduction across the inseparable matrix between wetlands, rivers, estuaries and the ocean. An NRF C-rated scientist, her work also forms part of the SARChI Shallow Water Ecosystems Research Chair at the university, chaired by Professor Renzo Perissinotto. "Shallow water ecosystems are defined as anything less than 20m of water depth," she explains.

Her speciality, which is a scarce skill worldwide and she is Africa's leading expert in this area, is focused on the early developmental stages of fishes that are so tiny they can only be viewed under a microscope. She tracks the larvae of fishes – monitoring their movement from the sea (where fish spawn) to the surf zone (where fish larvae are part of the plankton) to estuaries (where they grow into juvenile fish) and in some cases, even up-river where certain marine fish make use of unique nursery areas.

Her research on the larval stages of temperate southern African fish species spans a geographic study area extending from the middle of the Transkei coast all the way to Angola.

Why this research is so important, is because an understanding of fish larvae and juvenile survival can help with predictions about the size of future fish populations. "It's a well-known scientific phenomenon that the success of any fish population is underpinned by the success of the larval phase, which is directly related to environmental conditions, habitat threats such as pollution and overharvesting of breeding adults.

"Because we understand how devastating it is to remove the oldest fish, which are the best breeders, producing larger eggs and stronger offspring, part of our work is to encourage anglers to release the prime stock they catch."

There are approximately 2.5 million active recreational anglers in South Africa from every socioeconomic, age and gender group. They play a major role in conservation of our fish stocks. The definition of recreational angling ranges from catching fish from the shore to catching from rowing boats or ski boats or with spear guns.

While the Department of Agriculture, Forestry and Fisheries monitors the catches of the 22 commercial fisheries in South Africa, there is inadequate effort in the monitoring of the catches in recreational angling, other than the number of permits sold and various surveys with fishers along our large coastline.

"Policing of recreational fishing is almost non-existent. People are taking undersized fish and taking more than they are legally allowed and our natural resources are struggling to recover from

the pressure," says Prof Strydom.

An important part of her work is to educate the fishing and coastal communities about fish, their life cycles, pollution and how we are directly threatening the sustainability of species which feed and support millions of people and are vital to the functioning of our ecosystems."

She is on the management committee of the Swartkops Conservancy, an environmental education NGO in the Nelson Mandela Bay Metro. They are on a major engagement drive to meet with citizens living in the vicinity of estuaries to talk about sewerage, industrial and agricultural pollution, plastic and microplastics, which are posing a major risk to our marine life. She gives presentations and provides educational material to coastal communities and schools about overharvesting of resources and how pollution affects river systems and estuaries and ultimately the food we eat.

In 2016, Prof Strydom studied the effects of agricultural pollution on fishes in Eastern Cape estuaries that are experiencing algal blooms or eutrophication, a global research focus. "South Africa is lagging behind in this but the knock on effects of poor water quality in the environment is critical to integrated systems management," says Prof Strydom.

She is also pioneering the use of specialised biochemical analyses used in northern hemisphere fisheries and applying this to ecology in estuaries in South Africa in collaboration with GEOMAR Research Institute in Germany. "We are using a fisheries tool in an ecological context to understand the body condition of fish in nursery areas that are under threat waters polluted by agricultural runoff and



sewerage," she explains.

PhD student Daniel Lemley, who is being supervised by the Director of the Institute for Coastal and Marine Research (CMR) Professor Janine Adams, has found that algal blooms from sewerage differ to those from agricultural nutrients or industrial pollution. Together with Prof Strydom they are researching their respective effects on the food chain in estuaries.

Prof Strydom's work has already shown that young fishes that are being consumed in the recreational fishery on the Swartkops Estuary are contaminated with heavy metals such as cadmium. Fishes that are contaminated in their nursery areas subsequently swim to neighbouring estuaries as adults where the contamination is extended.

Another area of concern that falls within Prof Strydom's research domain is the shortage of freshwater flow from the river system into estuaries because of large dams like those on the Kariega, Bushmans and Krom rivers. The inflow of fresh water is essential to estuary health. "Many people don't realise the life link between rivers and estuaries is necessary for marine ecosystem survival. Many of our key linefish species use estuaries as nurseries, including the Dusky Kob, White steenbras, Garrick, Spotted grunter and many others," Prof Strydom explains.

"Many fish species also cross multiple habitats in their lives. The moonies, for example, spawn at sea, and use the estuaries and mangroves as their nursery areas. As juveniles they can even move up rivers and feed on insect larvae and when they reach maturity they go back out to sea."

In Prof Strydom's field it often takes years to gather the different parts of the life cycle puzzle for different species and put them together to start understanding the bigger picture of how fishes use their environment from hatching to adults, many of which become part of fisheries. South Africa has exceptional marine biodiversity with approximately 2700 fish species; many are endemic and are found only in southern Africa and our knowledge of the full life cycle of many fish species is still unknown.

"There is so much that still needs to be investigated about even our best known coastal fishes. Key aspects of their biology and ecology are still unknown such as where they are spawning. We are busy with cutting edge research but at the same time we are trying to plug the leaking holes created by pollution and over-fishing."

What makes for a researcher of the year?

"You need to be a passionate thinker with a love for exploring and working in the unknown," says Prof Strydom who was named Faculty Researcher of the Year in 2015 and the University's Researcher of the Year in 2016.

"I'm constantly asking questions about how the natural environment works and how fishes function in their natural habitat and in response to human pressure - this is extremely important from a biodiversity, harvesting and food security perspective."

Prof Strydom is also committed to growing the number of postgraduate students in marine biology and encourages publishing with all her science students. Recent student work with graduated Dr Paula Patrick in the journal, *Marine Ecology Progress Series* – an international marine science journal – has made some important advances in understanding fish spawning. In the article entitled: *Predicting spawning locations and modelling the spatial extent of post-hatch areas for fishes in a shallow coastal habitat in South Africa*, results indicate that spawning occurs closer to shore than what was previously thought. *Eggs and larvae typically remained in close proximity to their spawning origin. Larval fish distributions, although variable among all study species, correspond to known adult distributions and potential reef habitats in the study region.*

Prof Strydom confirms that many nearshore habitats are underexplored and are extremely important spawning and nursery areas for fishes that we are relying on for food. The value of the Eastern Cape as a fish nursery hotspot in South Africa is underestimated and there are a plethora of habitats along the coast that are poorly studied often because they are dangerous to work in. The province is home to the large Agulhas Bank in the ocean and the most open estuaries in the country, as well as many small bays and surf zones that are key fish areas. All this needs to be taken into consideration in marine spatial planning initiatives that serve fish conservation in a changing world.



Professor Janine Adams

Over 40 years of coastal and marine research at Nelson Mandela University led to the 2016 launch of the transdisciplinary Institute for Coastal and Marine Research (CMR), which will be the largest institution in the Ocean Sciences Campus.

40 years of coastal and marine research

"We have over 160 researchers and four SARChI Research Chairs in the CMR, which will be based at the new Ocean Sciences Campus," says Professor Janine Adams, who was appointed Director of the CMR in 2016 and took up her post in 2017. She is a professor in the Botany Department and her specialist research field is on estuaries.

"The CMR and Ocean Sciences Campus have been driven from the top by the Vice-Chancellor and Deputy Vice-Chancellor of Research and Engagement. Excellent systems are in place and we can look forward to substantial growth in inspiring research areas and partnerships in the marine and maritime field.

"We have substantial capacity and opportunities across faculties and through our research chairs. The new Ocean Sciences Campus will provide a multi-and transdisciplinary space where we can interact and explore collaborative opportunities across faculties and with our national and international partners."

Prof Adams says an important part of their work is to generate interest among researchers and students across faculties to

focus on the marine and maritime environment.

"We are also engaging with government, learners and citizens about Ocean Sciences. For example we invite school groups to open days on our campuses and on outings where we do demonstrations of our sampling and research on site such as at the Swartkops Estuary."

In 2016, Prof Adams co-edited a special issue in the *South African Journal of Botany* on the biodiversity and ecology of estuaries, and a large percentage of the papers were from Nelson Mandela University with several postgraduate students having their first papers published.

"South Africa has approximately 300 estuaries nationally," she explains. "Estuary health, conservation and management is critical because they are: the meeting place of land and sea; nurseries for many important marine species, including linefish; zones of economic activity for coastal cities and towns - such as fishing; and buffers against sea level rise and coastal erosion.

"Many of our estuaries are polluted or destroyed by development and we are working closely with the Department of Water and Sanitation (DWS) and the Department of Environmental Affairs: Oceans and Coasts, to improve this. The deterioration of water quality through wastewater and pollution going into our estuaries is the biggest threat. South Africa has excellent national environmental legislation on estuaries but we need to implement it.

"We have to fix our wastewater treatment plants and sewage management systems, and constantly monitor estuarine water quality. One of our PhD candidates, Gerhard Cilliers, who is a resource manager from the DWS, has put together an estuary-monitoring programme for South Africa that is being implemented in over 20 areas. This will significantly assist in monitoring whether water quality is improving or deteriorating throughout the country."

It is a good example of the link between science, policy and management that the CMR encourages. As part of this, in March 2016 Prof Adams and her team organised a workshop in Port Elizabeth on coastal water quality with funding from the Water Research Commission. The workshop brought together 40 specialists and students to allow for debate and interaction on the presentation and interpretation of water quality data for estuaries and coasts.

The CMR draws on many areas of its research to inform policy and to transfer knowledge and expertise through training programmes to various government departments. The SARChI Chair in Marine Spatial Planning is playing a key role in commenting on and helping to improve the draft Marine Spatial Planning Bill released in 2016, the aim of which is to achieve better regulation of the ocean space.

The Chair's Professor Mandy Lombard explains it is highly complex as there is all sorts of existing legislation, such as for fisheries, Marine Protected Areas (MPAs) and some oil and gas legislation, but the legislation doesn't converge and this is what the draft Marine Spatial Planning Bill is supposed to do.

To understand the complex legislation she is collaborating with the leading legal specialist on the law of the sea in South Africa, Professor Patrick Vrancken, who holds the SARChI Chair on the Law of the Sea and Development in Africa. "The draft Marine Spatial Planning Bill had fundamental problems that have to be addressed, and with the focus on the oceans economy, it is crucial that the Bill is extremely well conceived," says Prof Adams who submitted the Chair's comments in August 2016.

Research Diving Unit

The Research Diving Unit (RDU) is consolidating its operations under the CMR and will be housed on the new Ocean Sciences Campus. The RDU conducted a total of 104 operational days, facilitating subtidal and marine research between 8 February and 21 December 2016 (comparable to 106 days in 2015). This equates to 2.1 diving operations a week for various research projects and service level agreements.

The RDU continued to support the emergency medical care (EMC) department by providing practical crew training for the second and third year paramedic students for their water rescue module. The RDU will continue to promote the Class 4 diver qualification as a credit-bearing module in line with the equivalent qualification within UK higher education institutions. The development of a marine technician qualification is ongoing.

In 2016, a diving medical emergency service provider serviced the RDU for the first time, to meet the requirements of the Occupational Health & Safety Act and Diving Regulations, giving the RDU 365-day medical support, including aero-medical evacuation. In addition, commercial diving medical cover was put in place for the dive team to meet the shortcomings of the injury on duty (IOD) system.

The RDU's commercial diving school was audited by the full Department of Labour (DoL) Advisory Board in March 2016 and achieved a 91% result.

SARChI Chairs in the CMR

SARChI: Shallow Water Ecosystems
Professor Renzo Perissinotto

SARChI: Law of the Sea
Professor Patrick Vrancken

SARChI: Marine Spatial Planning
Professor Mandy Lombard

SARChI: Oceanography and Food Security
Professor Mike Roberts



Dr Valentine Chabata

Dr Valentine Chabata is the first doctoral graduate of the Centre for Broadband Communication. He graduated with a PhD in Physics in April 2016 and talks about light, life and the research team that is working to bring the internet into all of our homes by 2020.

Waving at light

Our internet future is being designed in the basement of the Physics building. Here, in the Centre for Broadband Communication, leading physicists are developing new optical fibre technology that will be able to send and receive vast amounts of data to and from our universe.

To give you an idea of the speed of the internet connectivity the research team at the Centre is working with, you could download a CD or DVD in under a second.

Their technology will be used by the world's largest radio frequency telescope, the Square Kilometre Array (SKA) and its precursor, MeerKAT, currently being constructed in the Northern Cape. But it will also be used by you and me, because an equally important goal of the Centre is to

help ensure the technology is in place to connect all South Africans to the internet by 2020, which is what the South African government has promised.

The Centre was established in 2015, and grew out of the Optical Fibre Research Unit at the University, which produced several master's and PhD graduates. Its research is supported by the Department of Science and Technology (DST), the Centre for Scientific and Industrial Research (CSIR), the SKA and leading international and local industry players, notably CISCO, Telkom, Dartcom and Lambda Test Equipment.

Inside the Centre – a laboratory strewn with electronics, wires and outsize reels of optical fibre cable - students and researchers are working night and day on impossibly

complex physics problems. Dr Chabata's PhD research, funded by the African Laser Centre, was on the use of light to transfer and receive big data.

"I succeeded in my objective, and managed to transmit and receive 20 Gigabits a second over hundreds of kilometres," says Dr Chabata who was supervised by the Director of the Centre, Professor Tim Gibbon.

"Light is complex and intriguing and there is so much we still need to understand about it. Sometimes it behaves like a particle and sometimes like a wave. Its dual nature has puzzled scientists and philosophers for centuries," adds Dr Chabata, who is a Physics lecturer at the National University of Science and Technology (NUST) in Bulawayo, Zimbabwe.

"The research that Dr Chabata has done is critical for our preparatory research on advanced modulation formats, where we are looking at methods of encoding data signals into a light wave in unique ways," says Prof Gibbon.

This will provide the bandwidth that will enable scientists to seek and retrieve information from our universe by looking back in space and time over billions of years. At the same time it will help to create a more emancipated society by developing the technology required for facilities such as online learning or eLearning in every school in South Africa, including the deep rural areas.

It will also enable other critical functions, such as eHealth, where nurses, doctors and health workers countrywide and internationally will be able to diagnose and discuss health issues online. This will help to address the severe shortage of doctors and specialists that we face in South Africa and Africa, because the remotest rural clinics will be able to conduct video consultations with top specialists in South Africa and worldwide from the patient's bedside.

"In Africa we have a wide range of challenges, from telecommunications to basic issues, like securing food and water," says Dr Chabata. "A PhD in Physics provides me with the tools to tackle the challenges in my field and other fields. It also equips me to supervise postgraduates at my university and to develop course material for undergraduate and postgraduate studies in optical communication. There are a number of physicists in Zimbabwe but I am the only one specialising in optical fibre."

Doing his doctorate meant being away from home for three years, and not seeing his family for long stretches at a time. At the age of

44, this meant that Dr Chabata and his wife Stella had to make family sacrifices. They have been married since 2000 and have three children, two girls and a boy, aged 16, 10 and 4.

"I needed to further my academic career in South Africa because I could not do this research in Zimbabwe," says Dr Chabata. "My wife was very supportive of me and I am so grateful to her because she had to be mother and father, and run the home while I was away.

"I would go home twice a year on the bus, which is a three-day trip from Port Elizabeth to Bulawayo," he explains. "My youngest daughter was two weeks old when I started my studies and I only saw her again when she was six months old, and, of course she didn't recognise me. Fortunately we have the internet and skype and my family and I could frequently communicate."

Dr Chabata says he could not have chosen a better Centre and University to complete his PhD. "I thrived on the international flavour in the Centre, which has researchers from all over Africa and the world. We got to know each other well because everyone in the Centre works incredibly long hours. It is normal to start at 5am and finish at 10pm and to work over weekends, but it was really worth it. I also appreciate the support from Prof Gibbon who is an unbelievable researcher and physicist, and yet is able to simplify complex scenarios in a way that even novices can understand."

Over and above the academic research demands, doing a PhD in Physics requires faith, trust and tenacity, as Prof Gibbon explains: "You have to maintain an optimistic outlook because breakthroughs don't come easily. Valentine has all these qualities," says Prof Gibbon. "Even when his equipment broke, which is part of science, he never gave up. Tenacity is essential in our field and he has plenty of it."

Now that he has a qualification that can take him anywhere in the world, Dr Chabata remains committed to making a difference in Zimbabwe and seeing future generations benefitting from his knowledge: "I will remain in close contact with Prof Gibbon and I will be sending my students to the Centre for short courses."

Prof Gibbon adds: "We look forward to extending the relationship with Dr Chabata and his students. Several scholars from African universities come to The Centre for Broadband Communication because they don't have these facilities at their universities. It is important for us to help grow Physics skills on the continent."

"I succeeded in my objective, and managed to transmit and receive 20 Gigabits a second over hundreds of kilometres ... "

– Dr Valentine Chabata



It is not safe to build a nuclear project at Thyspunt, and far more baseline research is required before any decisions should be made. These were the findings of a critical research report released in 2016 by the Africa Earth Observatory Network (AEON) institute at Nelson Mandela University.

Nuclear site Thyspunt 'not safe'

Based on hard scientific data, postgraduate research guided through AEON has shown the geology and geomorphology in and around Thyspunt (10km west of St Francis Bay and 90km from Port Elizabeth) makes it high risk and irresponsible to build a nuclear power station at this site.

AEON's NRF-A-rated scientist and a UK Chartered Geologist, Professor Maarten de Wit, explains:

"For more than three decades Eskom and national and international consultant teams have studied the rock foundations across the Thyspunt area and collected a vast amount of data to determine its geological, tectonic and

environmental suitability to host a nuclear power-station here that can generate some 4000 MW.

"As part of this research, they drilled down over 270 times to see where the hard rock lies because nuclear power stations need to be built on the hard rock under the dune fields, below sea level. Based on their research they have said that Thyspunt is technically and environmentally safe for a nuclear plant.

"What they did not pick up, but which one of my master's researchers, Debbie Claassen, has since meticulously detailed, is the presence of four ancient or palaeo canyons and valleys, cut into the hard bedrock at approximately 20m

below sea level at Thyspunt, and the adjacent Tony's Bay, Cape St Francis and St Francis.

"She has unequivocally shown that these canyons and valleys are hidden beneath the dune sands and soft sedimentary sequences, and that they extend inland well below the present day sea level. The Thyspunt palaeo-valley, for example, cuts into an area of more than 1000 m² of bedrock to a depth of 16m below sea level."

What this means is that if you build a nuclear plant below sea level here, which it would be, you only need one earthquake causing a tsunami (these can be nine metres above sea level) or powerful storm waves or spring tides (these can reach over two metres) and, because of the presence of the canyons and valleys, Thyspunt is at great risk of flooding from below. With climate change, this risk can only increase.

Prof de Wit emphasises that the risk of earthquakes and tsunamis needs to be regarded as a significant natural hazard in this region.

The most imminent threat of tsunami hazards along the South African coast comes from mega-earthquakes associated with the plate-boundary between the Indian Ocean and Southeast Asia from Indonesia to Burma and, especially for South Africa, flanking Sumatra and Java.

The devastating effects across the Indian Ocean of the 2004 Sumatra-Andaman tsunami, generated by a magnitude 9.2 earthquake was a rude re-awakening to the reality of tsunami hazard along the east coast of the African continent. Modelling shows that Port Elizabeth and Durban are particularly vulnerable to such tsunamis; the worst-case scenarios are based on ruptures along the full extent of seismogenic faults in the historical record.

While seismic noise has not been detected locally at Thyspunt, there is evidence of regional and far-field tectonic activity that should be evaluated far more seriously than has hitherto been acknowledged.

Geoscience postgraduate researcher, Mark Goedhart, recently revealed a surprising history of devastating local seismicity, reviving models of recurring seismic activity along so-called 'dormant' faults extending inland and seaward from Nelson Mandela Bay, which in turn may trigger submarine landslides and associated local tsunamis.

"An extensive fault system runs some 600km along the Cape Mountains from Ceres via Kango and Baviaanskloof to Coega, and offshore to St Croix Island in Algoa Bay, Eastern Cape; and then an additional 113km along the St Croix Fault. Past faulting along this fault system suggests that the entire south-eastern coast could be considered vulnerable to its future seismic events," says Prof de Wit.

AEON's report confirms that palaeo-seismic data is a necessity for seismic hazard analyses before building a nuclear power station at Thyspunt. It will also be necessary to monitor submarine seismic noise through the deployment of ocean bottom seismometers that onshore recording stations cannot detect in the southwestern Indian Ocean. Such data is clearly required to assess potential flooding of the Thyspunt area.

The new research further implies that the hazard for the southern to southeastern Cape should now be upgraded, to include 7.2 magnitude seismic events. If in future, for example, an earthquake of this magnitude or more occurs along the extended St Croix Fault offshore, it is likely to generate a large submarine slump, and a possible significant local tsunami that would affect the coastal region, including Thyspunt.

Prof de Wit states: "Based on this AEON/NMMU research, it would be irresponsible to even consider building a nuclear power station at Thyspunt without investing in further, substantive baseline research.

"At this stage the research that Eskom and the government has undertaken is inadequate and the risk factor is huge; it could literally become a Fukushima, prone to flooding from below. Thyspunt would require the most cutting-edge, innovative technology to contain its core, including the construction of a vast wall or dyke along the coast, which is still no guarantee of protection in the

case of natural calamities that we might reasonably expect during the life span of a nuclear power station as planned."

Making decisions based on hazards is not simple. The 2011 Fukushima disaster was caused by natural phenomena that challenged the technology and the technology was not good enough. For example, there were no special domes or core catchers to contain the core in event of a meltdown. So there are natural hazards and engineering hazards. After this disaster, new standards now require cutting-edge technology in new generation plants.

Yet Eskom has declared they can afford to have new nuclear power stations built, provided they do not introduce the new, cutting-edge standards being implemented elsewhere after the Fukushima disaster.

"If South Africa cannot afford the best cutting-edge technology and if we do not undertake the required, additional baseline research, then we must not do it," says Prof de Wit.

"What we need now is transparent stakeholder discussions between us as to what is best for not only Thyspunt but South Africa's entire energy mix, instead of relying on a small technical group at Eskom that won't release all the nuclear research data."

"At this stage the research that Eskom and the government has undertaken is inadequate ... "

– Professor Maarten de Wit



By 2050 there will be nine billion people on Earth, with populations growing fastest in the low-lying coastal regions. Many of these communities rely on the oceans for food security, but the oceans are warming and food security risks are rapidly rising.

New oceanography and food security innovation bridge between SA and the UK

What sustains marine food security, what are the underpinning ecosystems and how do they function in this era of climate change and changing global oceans?

How does this impact marine upwelling systems in the Western Indian Ocean, which extends all the way up the eastern coast of Africa, including Somalia, Kenya, Tanzania, Mozambique, South Africa, and the island states of Comoros, Madagascar, Seychelles, Mauritius and Réunion?

These questions are the focus of marine specialist scientist Professor Mike Roberts' SARCHI Research Chair in Ocean Science and Marine Food Security. The Chair is jointly hosted

by Nelson Mandela University, the University of Southampton (UoS) and the Southampton-based National Oceanography Centre (NOC) - the United Kingdom's leading marine science research and technology institutions.

Upwelling, Prof Roberts explains, is the upward movement of deep, cold, nutrient-rich water to the ocean surface, encouraging the growth of phytoplankton (microplants which form the base of the marine food web), which ultimately provides energy all the way up the food web to reach the top marine predators. Upwelling and the ocean physics causing it, directly underpins marine food security.



As the planet's climate is changing, so is the ocean's upwelling system, strongly affecting all levels of the food chain in the Western Indian Ocean (WIO) — a region Prof Roberts is focusing on. Here, over 60 million people are directly dependent on the ocean for their food and livelihoods. In addition to climate change, the region is also experiencing the rapid deterioration of the marine environment caused by overfishing, destructive forms of fishing such as with the use of dynamite, and high levels of pollution.

"To find answers as to how to address this requires an intensive transdisciplinary research approach from physics to fish to forecasts. 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 who spent 26 years working as a specialist marine scientist for the South African government's Sea Fisheries Research Institute (SFRI), Marine and Coastal Management (MCM) and Department of Environmental Affairs' Oceans and Coasts Division.

The Chair's research programme, called the Western Indian Ocean Upwelling Research Initiative (WIOURI) embraces transdisciplinary research and uses modeling to determine how and by how much climate change and a changing ocean is going to impact food resources in the WIO.

The WIO's counterpart, the Eastern Indian Ocean Upwelling Research Initiative (EIOURI), supported by Australia, India, Japan and China, is well-developed, but research in WIOURI is only really getting going now, with the first seven postgraduate candidates and postdoctoral fellows participating in the research required by the WIOURI. Student numbers will increase annually as the research programme builds momentum.

The link with the University of Southampton (UoS) and the National Oceanography Centre (NOC) creates an invaluable new innovation bridge between Southampton and Nelson Mandela University

in South Africa, which is ideally positioned to conduct WIOURI research.

The innovation bridge will have a continuous flow of people and research between the northern hemisphere and Africa, with regional projects extending from South Africa all the way up Africa's eastern coastline.

A large part of the Chair's work will involve the collection of data using ships, automated subsea gliders, moorings, satellites and ocean models. The aim is to exponentially grow research capacity and, in addition to the research exchange, the UoS and NOC are generously loaning us costly research technology."

A number of postgraduate students from Mandela University have already spent time at the UoS and NOC to acquire specialist technical skills not yet available in South Africa, and Nelson Mandela University's first research cruise, to collect data off Madagascar, took place in November 2016.

"By offering our students the additional exposure to researchers and facilities at the UoS and NOC, we are creating a WIOURI Centre of Excellence in Ocean Sciences and a PhD production pipeline at Nelson Mandela University," says Prof Roberts.

"Few African universities outside of South Africa have anywhere near sufficient numbers of ocean scientists with PhDs; essential for building the research capacity required to innovate Africa's solutions to food security and other ocean challenges.

"What further highlights this is that the countries with the top-ranked 1000 universities in the world based on research output and a wealth of PhDs are the countries with the greatest national wealth; with the exception of Australia, they are all in the northern hemisphere. Apart from a handful of South African universities, no other African universities are ranked in the top 1000, with a corresponding lack of PhDs, research resources and wealth."

“ ... we are creating a WIOURI Centre of Excellence in Ocean Sciences and a PhD production pipeline at Nelson Mandela University”

– Professor Mike Roberts

The comparative example he provides is the new Indian Ocean Marine Research Institute (IOMRI) in Perth, Australia, which has 132 staff members, 82 with PhDs and a new research ship. By comparison one of Africa’s chief research institutes, the Institute for Marine Science (IMS) in Zanzibar, established in 1978, uses a ski boat as a research vessel and has 20 staff members and 15 PhDs.

The lack of good research infrastructure hugely impacts African researchers’ capabilities to do good research that matters.

“Time is not on our side. Food security and climate change problems are worsening and the WIO is the fastest warming of the world’s oceans. Already early measurements show planktonic food in the WIO is declining and coastal and pelagic (offshore) zones are becoming a lot less productive. We have a humanitarian disaster busy unfolding and poor coastal communities have little capacity to adapt for change,” says Prof Roberts who set up a regional hub

in Kenya and Tanzania in February 2016, together with the Kenya Marine and Fisheries Research Institute (KMFRI) and the Institute of Marine Sciences in Zanzibar, which is part of the University of Dar es Salaam.

Through the Chair, he has further secured R160 million from the United Kingdom government as a start-up for two large case studies in South Africa and East Africa. The

South African case study will investigate the squid fishery collapse in 2013/2014 off the south coast. The East African case study will build knowledge about the Western Indian Ocean, where almost nothing is known about these tropical, regional marine ecosystems.

“We need to understand, measure model and predict our marine ecosystems and the impact on their human dependents,” says Prof Robert. “We need scientists to come up with a research plan to deal with the situation. Hopefully from this we can come up with mitigation measures and a plan for adaptation.”



The foundation motto for Dr Alastair Potts’ research is inspired by John F. Allen, the father of photosynthesis, who suggested that, “...research presumes dissatisfaction with existing descriptions of reality and explanations of our experience of it – it rests on the desire to do better than the current consensus. Research, therefore, requires freedom to question received wisdom and some background knowledge of why we think we know what we think we know.” (Allen, 2003, Future Medicinal Chemistry, 2:15-20)

Research presumes dissatisfaction

An NRF Research Career Advancement Fellow in the Botany Department, Associate Editor of the South African Journal of Botany and 2016 Emerging Researcher of the Year for the Science Faculty, Dr Potts has a broad array of research interests, including: phylogeography (looking at the history of a species through the lens of its DNA), phylogenetic network theory (how do we visualise evolutionary pathways), vegetation modelling (how have or will plant distributions change in response to environmental change), ecology (looking at the interactions amongst organisms and the environment), and palaeoclimate reconstruction (using natural archives of the past to understand the climate).

He spends much of his time returning to the roots of scientific ideas and questioning “received wisdom”. In 2016, he co-authored two articles investigating one of the widely used methods of palaeoclimate reconstruction, specifically the Coexistence Approach; this method tries to estimate the palaeoclimate using the simple principle of finding the climate in which all taxa found at a given time could coexist.

“Unfortunately, many more assumptions are required, and reconstructions using this method were lamentably misled into identifying erroneous climates,” says Dr Potts whose articles were published in international journals under the titles of *Fables and foibles: A critical analysis of*

the *Palaeoflora database and the Coexistence Approach for palaeoclimate reconstruction and Fallacies and fantasies: the theoretical underpinnings of the Coexistence Approach for palaeoclimate reconstruction.*

"I try to instil an ethos of questioning into how we think the biological world works and I extend this to my students."

The history of the Cape landscapes and the role they played in human evolution excites Dr Potts: "All current evidence points to the Cape south coast as being the ground zero of the human cognitive revolution; where our lineage transformed from anatomically modern (people looking like us) to cognitively modern (people we could share a joke with!)," he explains.

"Evidence for this – spanning the last 170 000 years - includes the earliest forms of artwork, foraging for shellfish, an entirely novel stone-tool technology (termed microlithics) and heat-treatment of stone tools to dramatically improve the quality of the subsequent stone blades. The current working hypothesis is that it was this cognitive leap that enabled early humans to develop the traits that enabled the migration out of Africa and ultimately to almost every corner of the planet and beyond."

"I try to instil an ethos of questioning into how we think the biological world works and I extend this to my students."

– Dr Alastair Potts

Dr Potts is a member of a large international and multidisciplinary team that is trying to understand and reconstruct the environment in which this revolution took place. He works with climate modellers, geologists, archaeologists, anthropologists, behavioural ecologists, and agent-based modellers. His particular role is to oversee the expert-based, correlative and mechanistic vegetation models; these represent different approaches to reconstructing vegetation shifts in response to environmental changes, such as the Last Glacial Maximum, which is currently being used as a proxy representative for the many other ice ages that have occurred during the last 2.6 million years.

"Each approach has its own strengths and weaknesses, but the use of this ensemble of approaches will provide the most scientifically robust understanding of vegetation shifts," he says. "These methods suggest that the PalaeoAgulhas Plain – a landmass the size of Ireland that was exposed during the lowered sea-levels at

the heights of glacial periods, held a flora and ecosystem that is entirely at odds with the way we perceive the Cape today. The flat plain was nutrient-rich, contrasting to the mountainous and nutrient-depauperate Cape landscapes of today, supported a widespread dune vegetation with more grasslands and riverine (or delta-like) habitats. This, in turn, supported a now extinct mega-fauna, such as the Giant Cape Long-Horn Buffalo, Giant Zebra and Giant Warthog."

Dr Potts is also involved in research that involves determining the plant resources available from different vegetation types (such as forest or fynbos). Coupling this understanding of resources with the palaeovegetation maps produced by the vegetation models, can then feed into an agent-based model that predicts how foragers would use the landscape on a seasonal and annual basis.

"This, in turn, can be used to make predictions about what we should find in the archaeological record," he explains. "Thus, the abduction method currently used to reconstruct the history of humans, using the evidence from the archaeological record to infer human behaviour across the palaeolandscape, is turned

on its head, and we use first-principle understanding of climate, vegetation and human behaviour to make predictions that are tested against the archaeological record.

"For example, we know early humans were foraging along the intertidal zone and knew, based on the animals they brought back to the cave, how to predict when spring lows would occur, as these only occur in the lower tidal zones. To do this, they must have made the connection between the lunar and tidal cycles. Agent-based modelling can determine what kind of an evolutionary advantage this would have been by running agents with and without this knowledge."

This was outlined in a paper that Dr Potts co-authored, entitled *A new research strategy for integrating studies of paleoclimate, paleoenvironment, and paleoanthropology* published in 2015 in the journal *Evolutionary Anthropology*. It is an entirely novel approach to palaeosciences research.



Algoa Bay has unusually large group sizes of common and bottlenose dolphins. The reason for this is being researched by dolphin and whale (cetacean) specialist, Dr Stephanie Plön, an Ocean Health Researcher in the Earth Stewardship Science Research Institute.

Whales and dolphins – flagships of ocean health

Algoa Bay has unusually large group sizes of common and bottlenose dolphins. The reason for this is being researched by dolphin and whale (cetacean) specialist, Dr Stephanie Plön, an Ocean Health Researcher in the Earth Stewardship Science Research Institute at Nelson Mandela University.

Dr Plön explains that Algoa Bay and the Eastern Cape is an ideal setting for research on dolphins and whales for a number of reasons, including the presence of about half of the world's recognised cetacean species, and the marine mammal research collection at the Port Elizabeth Museum, which is believed to be the largest in the Southern Hemisphere and the third largest in the world. It is a fascinating, invaluable resource for marine scientists worldwide.

"Our dolphin and whale species are not only important in their own right, they are key indicator species for overall ocean health because they are at the top of the marine food chain. Research on them informs the decisions and actions required to sustainably conserve our oceans and marine species," says Dr Plön, who has researched the Eastern Cape Coast and Algoa Bay's dolphins, whales and marine environment since 1995. "We know so little about the extraordinary marine world and I am interested in finding out about the unknown."

Over the past seven years, Dr Plön and her team have also been researching the pathology of stranded dolphins and comparing them to the dolphins incidentally caught in the KwaZulu-Natal shark nets.

“We know that strandings are in most instances a result of the animal being sick, whereas the by-catch animals should be reflective of the normal, wild population. The pathology investigation therefore significantly assists us in assessing the general health of South Africa’s oceans.”

Since 2009 parasite lesions have been detected in a number of different dolphin species, and both in the stranded animals as well as those caught in the shark nets. The specific parasite is yet to be identified, but marine parasites are increasingly being linked with ocean pollution.

Human impact on baleen whale mother-calf pairs

PhD student Renee Koper from the Netherlands did her master’s on humpback dolphins in Algoa Bay through Groningen University, supervised by Dr Plön. For her PhD she is currently doing novel research on the human impact on marine mammals, examining the potential impact of shipping noise on baleen whale mother-calf pairs, particularly in relation to Coega’s deep-water port, which is now operational and will become increasingly active.

Baleen whales are adversely affected by the ‘masking effect’ of low frequency noise from shipping, which blocks out the whales’ acoustic calls. She is researching how this affects cow-calf pairs, as it is not yet known whether they communicate vocally or by touching or both. Increasing human impact on the marine environment could potentially have an adverse effect on whale calves bonding with their mothers. She has deployed acoustic loggers in Algoa Bay and also in St Francis Bay as a comparison, as there is no commercial shipping there.

Sighting and re-sightings of bottlenose dolphins

Titus Shaanika started his MSc on bottlenose dolphins in Algoa Bay in 2016, supervised by Dr Plön, and working with photos of bottlenose dolphins collected in Algoa Bay between 2008 and 2011. He is interested to see if he re-sights individual dolphins (which may be resident in Algoa Bay) or if they are only seen once and are therefore simply passing through the Bay. He has already identified a large number of dolphins and his research will help to gain insight into the dolphins found in Algoa Bay and Eastern Cape waters.

A population size estimate from research done in the mid-1990s has indicated that Algoa Bay may house a population of up to 28 000 bottlenose dolphins, but minimal research has been done on these animals since.

“We know little about whether these dolphins simply pass through the bay or whether they visit frequently or even may be resident. We hope to be able to determine in the future whether this estimate is still accurate or whether the number of dolphins may have increased or decreased,” says Dr Plön.

This knowledge is important in order to monitor populations, and while there is currently little concern about bottlenose dolphin populations in Eastern Cape waters, the population of Indian Ocean humpback dolphins (*Sousa plumbea*) in Algoa Bay has

rapidly declined in recent years, leading to the species being declared as ‘endangered’ in South African waters. Many factors may influence whether a population can be considered ‘healthy’ or whether managers and conservationists need to be concerned. For example, previous research conducted by Dr Plön and her students indicated that the sardine run has changed substantially over the past 30-plus years and, as a result, the diet of the main dolphin species associated with the sardine run, the long-beaked common dolphin *Delphinus capensis*, has also changed, to mackerel. However, indicators of nutrition and body condition have not changed over the time period, suggesting that the change in diet is, so far not impacting the dolphin population adversely.



Dr Stephanie Plön

Education and outreach

“South Africa’s marine environment is a global biodiversity hotspot,” she says. “Far more needs to be done to raise awareness about this incredible natural heritage, and the need to experience and conserve it,” says Dr Plön. To share information about dolphins and whales, her team hosts exhibitions at Port Elizabeth’s oceanarium, Bayworld. They also give talks to ocean-focused sectors, such as the Surfski Club and Coega Environmental Management Committee, and they lead workshops for Eastern Cape Parks and Tourism rangers to promote citizen awareness about dolphins, whales and ocean health.

“We have so many factors to consider when we talk about ocean health, which includes global change,” says Dr Plön. “It is not simply the warming of the oceans that is of concern, we also need to understand other anthropogenic impacts on the oceans, such as associated changes in the marine food web as well as noise pollution, chemical pollution, plastic pollution. The interplay between these factors and the effect it is having on the health of marine mammals, both at the individual and at the population level, is a critical research field in ocean health and sustainability.”

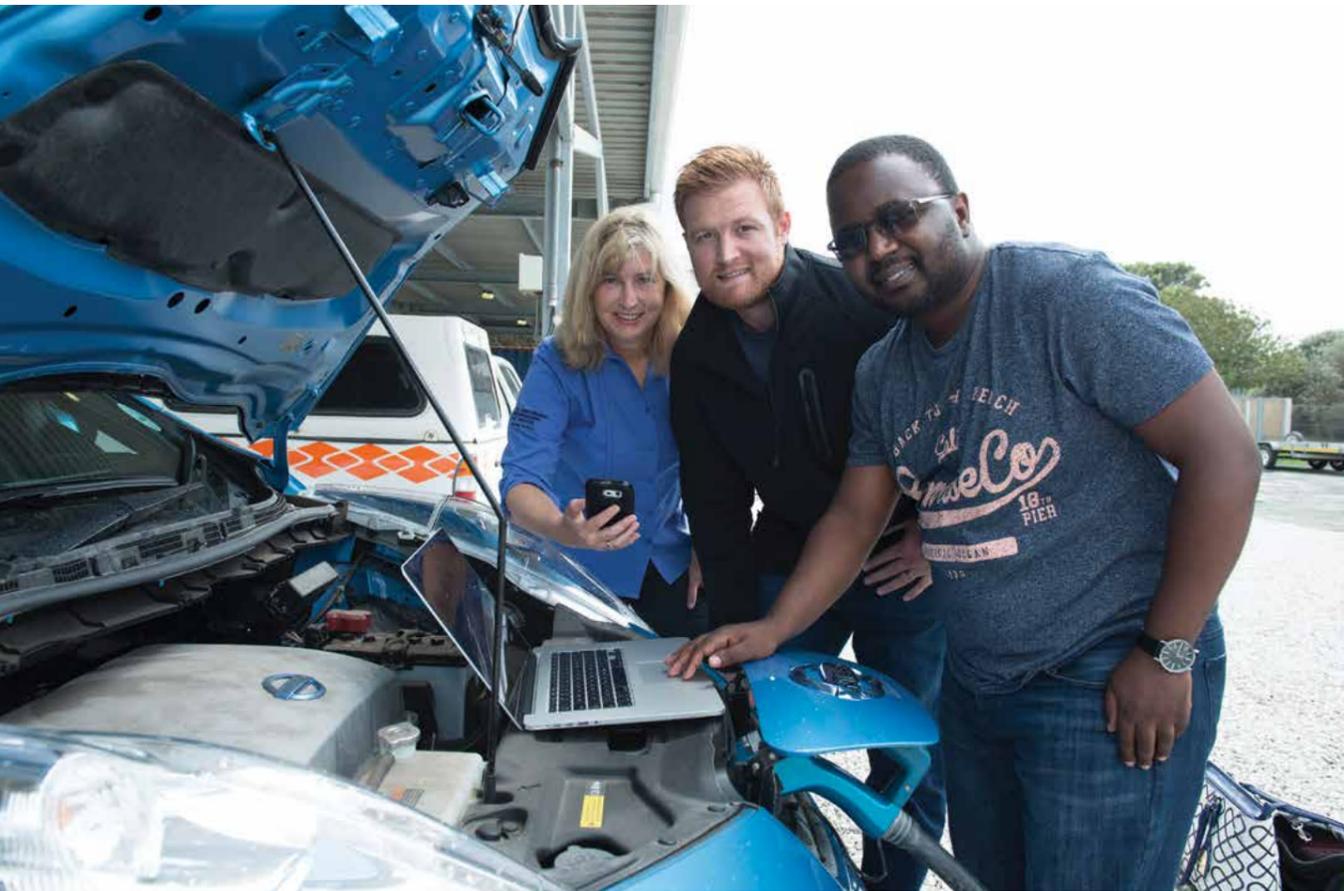


The Port Elizabeth Museum

The Port Elizabeth Museum’s collection, established in the late 1960s, holds important material for a number of marine mammal taxa. These resources are particularly important for species of marine mammals that are difficult to study. In addition, it reflects the high marine biodiversity we found off the Eastern Cape coastline.

The opportunity to use samples and data from the museum collection, which have been collected over the past forty years, and combining them with information gained from contemporary field studies in Eastern Cape waters in order to study and document change is what excites Dr. Plön about marine mammal research in the Eastern Cape.

Over the past twelve years Dr Plön has supervised and co-supervised numerous postgraduate student projects (both with Rhodes University and Nelson Mandela University), utilising material from the museum collection as well as conducting field studies. Since joining Nelson Mandela University in 2013, she has remained a research associate with Bayworld and the Port Elizabeth Museum, and continued to teach a number of courses to veterinary students about marine mammal research at Bayworld/Port Elizabeth Museum. She also participates in stranding response and necropsies of marine mammals (including seals) and partakes in the annual research trip to the KwaZulu-Natal Sharks Board to necropsy dolphins incidentally caught in the shark nets.



Dr Brenda Scholtz and PhD candidates Martin Smuts and Dumisani Nyumbeka.

Water management, energy efficiency, waste management, sustainable mobility, education on sustainability and sustainability entrepreneurship are the six major research- and practice-focused areas being explored by the Hub for Education on ICT for Sustainability (HEdIS).

Big data for sustainability

HEdIS is a collaborative project of Nelson Mandela University, the University of Cape Town and Carl von Ossietzky University, in Oldenburg, Germany, that is being run through these South African universities' Computing Science Departments over four years, primarily funded by the German Academic Exchange Service (DAAD).

"The project brings together multi-disciplinary experts to find big data solutions for critical sustainability issues (such as the shortage of energy and water) in our communities and how ICT can be used to facilitate such solutions," explains the Head of the Department of Computing Sciences, Dr Brenda Scholtz. "The exposure and knowledge gained by our students involved in this project is immeasurable."

Dr Scholtz' research focus is in the area of enterprise systems, business intelligence and business analytics that can be used to derive value from the vast amounts of data collected in all fields, known as big data, thus facilitating knowledge advancement and improved decision-making for organisations and individuals worldwide.

"It gives me great satisfaction to see our postgraduate students develop research skills that result in the upskilling of communities, growth in expertise in sustainability-focused developments for German and South African institutions and partners, and reduced resource consumption and costs," says Dr Scholtz.

Two of the three postgraduate HEdIS students are being supervised by Dr Scholtz and Professor Jane Wesson, Head of the Centre of Excellence in the Department of Computing Sciences. They are: Dumisani Nyumbeka and Martin Smuts. The third student is Clara Mloza Banda, who is doing her master's and is supervised by Dr Scholtz.

PhD candidate Dumisani Nyumbeka

"My interest is in data analytics and I am working on a scheduling model for the charging of electric vehicles via public access, microgrid charging stations along all major routes that are powered by solar or wind energy as part of the drive towards sustainable mobility," Nyumbeka explains.

"The number of electric vehicle charging stations is growing in South Africa and the University's uYilo eMobility programme is a key project in the energy-efficient charging of electric vehicles (EVs) through battery storage and energy management. Researchers in our department are closely collaborating with them to develop an integrated charging station system across South Africa.

"For eMobility to grow, drivers have to know where the next charging station is situated and how long it will take to recharge their vehicle. For my research I am creating an app that informs drivers where the closest charging station is situated and how many charging points are available. If there is only one, for example, it is going to take me too much time and so the driver can then look for an alternative and plan accordingly."

PhD candidate Martin Smuts

"I love the field of big data science, which is booming as everything is digitalised and all companies and organisations that want to lead their field or remain competitive have to employ data scientists who can analyse patterns and trends.

"I am currently developing an algorithm to assist drivers of electric vehicles to achieve as much range as possible on one charge. The existing range for electric vehicles in South Africa is 120 to 200kms and Smuts looks at a range of factors that give drivers greater piece of mind that they will have sufficient charge to get to their destination or a charging station.

"The project brings together multi-disciplinary experts to find big data solutions for critical sustainability issues."

– Dr Brenda Scholtz

"The factors include traffic flow, gradient, weather, headlight and windscreen wiper use and driver behaviour – how hard or fast are you driving your car, how much acceleration, deceleration and your average speed. The faster you drive or the more you accelerate, the more energy you use," Smuts explains. "My algorithm-based model will be customised for any electric vehicle and range."

Master's student Clara Mloza Banda

"For my master's project I wanted to do something community-based that would be appropriate for my home country of Malawi, and so I decided on the use of mobile technologies by citizens for the management and monitoring of water resources.

"To achieve this, I am investigating incentive models to encourage citizens to contribute data on poor water quality and to assist with the management of water and sanitation, such as contamination and leaks.

"I am collaborating with the Department of Botany as they deal with estuary pollution and water monitoring, which requires citizen assistance. So I am developing crowd-sensing paradigms (the use of mobile devices and citizens as sensors) to develop a smart community where citizens can report water and sanitation issues in real time on any cellphone and work hand in hand with officials to rectify the problems.

"My app is both a technical and social design that motivates citizens to participate. The strongest incentive is money but this is not sustainable, hence we need to find ways to motivate people to act for the common good. These include using gamification, developing the prestige of being a citizen scientist and educating people that if they dump rubbish into the natural environment, such as Lake Malawi, tourists won't want to come to the country, and this directly affects their income.

"My approach is also about encouraging the authorities to improve their water and sanitation management and to establish government-citizen forums to partner in cleaning up water sources and improving sanitation systems on an ongoing basis."

Nelson Mandela University

Awards 2016

Faculty Emerging Excellent Teachers

Shelley Saunders
Candyce Clark
Tina Hokwana
Dr Richard Betz

Faculty Excellent Teachers

Dr Paul Tai-Hing
Dr Shervani Pillay
Dr Sue Petratos
Samantha Kahts
Prof Mark Tait

Faculty Emerging Researchers of the Year

Dr Primrose Mfene
Tony Matchaba-Hove
Dr Eileen Scheckle
Roy Cumberlege
Dr Margaret Williams
Dr Leah Ndimurwimo
Dr Richard Betz

Faculty Researchers of the Year

Prof Derek Taylor
Prof Miemie Struwig
Dr Lyn Webb
Prof John Smallwood
Prof Ilse Truter
Prof Andre Mukheibir
Prof Graham Kerley

Emerging Excellence Engagement Award

Gareth Williams

Engagement Excellence Project Award

Missionvale Community Psychology Centre

Engagement Excellence Team Award

Destination NMB

Engagement Excellence Team Award

AEON/ESSRI

Engagement Excellence Award

Prof Raymond Auerbach

Teaching and Learning Excellence: Team Award

67 Hours Team - Kim Elliott to collect on behalf of Team

Commendations for Teaching Excellence

Dr Sue Petratos
Dr Margie Childs
Samantha Kahts

Distinguished Teacher Award

Dr Sue Burton

Research Excellence Awards

Prof Ilse Truter
Prof Andre Calitz

Note: Twelve of these award recipients are featured in the section that follows.

Faculty Researcher of the Year 2016 and Research Excellence Award 2016

Professor Ilse Truter

Faculty of Health Sciences

Department of Pharmacy

School of Medicinal Sciences

Drug Utilisation Research Unit (DURU)



In 1993 I graduated with a DCom in Business Management from what is now Nelson Mandela University; in 2000 with a PhD in Pharmacy Practice from the North-West University. I am a registered pharmacist with the South African Pharmacy Council and a National Research Foundation (NRF) C2 rated researcher. I lecture in pharmacy practice and clinical pharmacy, and I am the research coordinator for the Department of Pharmacy.

I lead the Faculty of Health Sciences Interprofessional Health Research Network (IPHRN), I Chair the Faculty Postgraduate Studies Committee (Health Sciences) and I was conference Chair for the South African Association of Health Educationalists (SAAHE) hosted at the Boardwalk Convention Centre in Port Elizabeth in June 2016, which was attended by 174 delegates.

I am a founding member of the Medicines Utilisation Research in Africa (MURIA) Group, formed in January 2015 at Nelson Mandela University by my research unit (DURU) to bring drug utilisation researchers from various African countries together to facilitate collaborative studies with the focus on capacity

building and publishing.

My research focus areas are pharmacoepidemiology (encompassing drug utilisation research and pharmacoconomics) and the management aspects related to medicine. I am collaborating with researchers in Australia, Saudi Arabia, England and several African countries.

My research focuses on improving the rational and cost-effective use of medicines. The research ultimately benefits the patient, and this is what is driving my research – to improve health care for each and every person.

Achievements in 2016 include being re-rated by the NRF, having 12 articles published and accepted for publication in peer-reviewed journals, and conducting drug utilisation training in three African countries. Quo vadis? To keep on conducting relevant and useful research, to get recognition for my work and to advance universal health care.

Faculty Researcher of the Year 2016

Dr Lyn Webb

Faculty of Education

Mathematics Education; Language diversity in mathematics education

Research Associate



Mathematics is a complicated language in itself, but when one has to translate abstract ideas into one's own vernacular, the task becomes exponentially difficult. Worldwide we have to formulate strategies to make mathematics comprehensible and relevant to today's youth – or technological development will falter.

For years I have been researching strategies to minimise the effect of teaching and learning in English in mathematics classes where neither the student nor the teacher utilises English as his/her first language. Because of the nature of migrations throughout the world, my research has resulted in visits to South America, Korea, Norway and Namibia.

In South Africa, I have been involved in pre-service and in-service education of mathematics teachers in projects spanning vast areas of the country. When Mathematical Literacy was introduced as an FET subject, Nelson Mandela University rose to the challenge and developed the Advanced Certificate of Education (Mathematical Literacy) and BEd FET (Mathematics) curricula. My colleague Sharanjeet Shan of the Maths Centre and I delivered these as far afield as Limpopo, Mpumalanga, KwaZulu-Natal, Northern Cape

and the deep rural areas of Eastern Cape. The contact sessions took place in rural, peri-urban and urban settings in diverse language situations.

In 2016 I enjoyed a wonderful collaboration with renowned researchers from the University of Florida, as well as South African colleagues, on two chapters published in 2016 in international Sense and Springer publications.

Going forward, I would like to continue an ongoing collaboration with fellow researchers in Scandinavian countries on multilingualism and language diversity in mathematics. There is a wealth of experience and knowledge that we can share and disseminate. I have also been invited to be a co-researcher in an exciting NRF-funded study in South Africa for the next three years. The study aims to support mathematics teachers to develop communities of practice, together with developing their pedagogical content knowledge. It includes an international collaborator from Harvard School of Education. The envisaged output is a book on case-based teaching for the South African mathematics context.

Faculty Researcher of the Year 2016

Professor Miemie Struwig

Faculty of Business and Economic Sciences

Department of Business Management



I lecture on business research methods at the postgraduate level, present short courses to master's and doctoral students in research methods and I have developed a post graduate module in corporate citizenship, focusing on how we can create shared value in businesses through sustainability, social entrepreneurship, relationship management and ethics. I regard myself as a leader in business sustainability research and am involved in a number of multi-disciplinary research projects (in healthcare, hospitality and construction).

I believe that one can only be a good teacher if you conduct research that you can bring to the classroom. I get inspired when I see how many people I have empowered to do research. I am blessed to work with wonderful students and colleagues in this regard. During the graduation in 2017, nine of the PHD graduates were either my students or my former students' students. It's a great motivator to see your efforts paying off. International organisations has recognised the research that my PHD students completed which further rewarded my efforts.

To do research is not always easy as one needs alone time, and I have therefore worked most evenings and weekends. I am passionate about research and always share my research skills.

Going forward, I am planning to focus on two areas of research:

- Research on the poor in the South African context. Most business research focuses on Western principles and neglects the poor and the African context. I am starting a research group of academics and practitioners who will conduct research on the stratification of our society in Africa. Once an acceptable African definition for the poor is formulated and the demographics are proposed, relevant research will follow, including sustainable businesses for the poor.
- I have teamed up with a marketing practitioner to start compiling and writing a marketing research textbook applicable to the African context. Data from one the most successful market research companies in South Africa will be used to illustrate examples and clarify the content.

Faculty Emerging Researcher of the Year

Dr Leah Ndimurwimo

Faculty of Law

Department of Criminal and Procedural Law



I hold a PhD in Public International Law from the North-West University, an LL.M in Labour Law from Nelson Mandela University and an LLB from the Open University of Tanzania.

I have been a lecturer in the Faculty of law at Nelson Mandela University since 2006. I lecture the undergraduate LLB students and I supervise law and non-law research for undergraduate and postgraduate students in public international law, labour law and multidisciplinary studies.

In 2016 I received the National Research Foundation (NRF) grant on Knowledge Interchange and Collaboration (KIC) - African Interaction. I have since identified potential research collaborative opportunities between Nelson Mandela University, the University of Dar es Salaam and Sokoine University of Agriculture in Tanzania.

My research interests are: international human rights, transitional justice in Africa, labour law, international humanitarian and refugee law.

My achievements include being recognised by the Golden Key International Honour Society for outstanding academic achievement at the North-West University in 2015. I was a guest lecturer in the Department of Political and International Studies at Rhodes University in 2016 and 2017, and I presented the Kiswahili lessons organised by the International Office at Nelson Mandela University in 2016. The LLB treatise by Nicole Chalira that I supervised in 2016 entitled *Violence against Women: A Comparative Analysis between Malawi and South Africa*, was selected as the Nelson Mandela University Faculty of Law's LLB Treatise of the Year in 2017.

Apart from academic responsibilities, I engage in community outreach activities such as raising awareness about human rights in a wide range of communities. I also facilitated the Commission for Legislative and Regulatory Framework at the Eastern Cape Liquor Industry Summit in March 2017. And I am one of the adjudicators of the Ismail Mahomed Law Reform Essay Competitions for 2016 in the LLB and LL.M categories organised by the South African Law Reform Commission.

Faculty Emerging Researcher of the Year 2016

Tony Matchaba-Hove

Faculty of Business and Economic Sciences

Family Business Unit

Department of Business Management

School of Management Sciences



I am a lecturer in the Department of Business Management where I am involved in a number of teaching, research and engagement activities. I have supervised 20 postgraduate student research projects, including Honours and master's students with research specialising in entrepreneurship, family business and financial planning.

My current research interests are in indigenous African family businesses, entrepreneurial orientation and financial planning. Globally, family businesses perform a crucial role in the creation of economic and social wealth. For my doctoral research I am developing a framework for enhancing the transgenerational potential of indigenous African family businesses, as very little research has been conducted in this area.

In terms of my interest in financial planning, in South Africa the combination of national and global economic pressures, rising health care costs and other societal factors, have caused the vast

majority of the population to remain underprepared financially. I would like to make a significant difference to society through my research and this is what drives me in all my endeavours.

My goal is to complete my doctoral studies, further my research into indigenous African family businesses and make a notable contribution to the Successful Transgenerational Entrepreneurship Practices (STEP) Project - a global applied research initiative that explores the entrepreneurial process within business families and generates solutions that have immediate application for family leaders. The project has over 40 institutions and more than 200 scholars involved in researching transgenerational entrepreneurship in family enterprises worldwide. Nelson Mandela University through the Family Business Unit is the first university from Africa to be an affiliate of the STEP Project. It presents an enormous research opportunity for the University to put the Eastern Cape, South Africa and Africa on the map in the field of family business.

Excellent Teacher of the Year Award 2016 and Faculty Excellent Teacher Award 2016

Dr Paul Tai-Hing

Faculty of Business and Economic Sciences

Department of Management Practice



I am a lecturer and programme co-ordinator for the NDip and BTech Management qualifications. My main area of teaching is business management and entrepreneurship and my main area of research is in social entrepreneurship. This was also the focus of my PhD thesis.

I have been a permanent member of the department for seven years. Prior to this, I was contracted on a part time basis to the Department for 16 years. I gained my industry experience at Cadbury (Pty) Ltd, as well as the Cape of Good Hope Woolcombers in Uitenhage. I was employed in the private sector for a period of 12 years.

The biggest driving force which motivates me each day is knowing that I have the freedom and support to be creative in my approach to teaching and developing young students to become the future leaders of business. My personal teaching and learning philosophies are:

Give a man a fish and he'll eat for a day but teach a man to fish and he'll eat for years (Chinese proverb)

Through education you can break the shackles of poverty (Paul Tai-Hing)

The greatest gift that my parents gave me in life was an outstanding education. The sacrifices they made to afford this can never be repaid. It was through education that I was able to break my own shackles of poverty to become the person I am today.

My biggest achievement in 2016 was to complete my PhD (Business Management), as well as being awarded the Lecturer of the Year Award. Going forward, I would like to implement an entrepreneurship module in every course at Nelson Mandela University. In addition, I would like to implement another two sustainable projects on campus to ensure a steady stream of income into the university's alumni bursary fund for financially marginalised students.

Faculty Excellent Teacher Award 2016

Dr Sue Anastasia Petratos

Faculty of Engineering Built Environment and Information Technology

School of ICT



I am the Director of the School of ICT and I am also an academic team member of the Centre for Community Technologies (CCT). I have been at this University for more than 30 years, including my student years. It has played a major part in shaping who I am and I live by the values of the University in my daily life, on and off campus. I regard ethics, moral behaviour and loyalty very highly.

My research area is in health informatics and I am involved in the CCT's projects for people with disabilities, as well as my own research area, which is diabetes. The focus of these research fields is to improve the lives of people with disabilities and chronic illness through the use of ICT interventions.

For the past ten years I have been involved in teaching computer skills to first year students on our various campuses. Many people would not want to teach this type of course because of the repetition and varying level of skills in the class. I, however, find it

to be the most rewarding of all the courses I have taught over the years. To witness students who have never seen a computer before coming to Nelson Mandela University and developing these skill is an incredible experience.

I am driven by a passion for education and I am a servant leader by nature. I am inspired by the truth that one person can make such a difference to so many others. I encourage people to always look at where they have come from and where they are now and measure themselves against that, not against others.

I am humbled to have been named the Faculty of EBEIT Excellent Teacher for 2016 and to have been commended for Teaching Excellence. I am proud to be acknowledged for the contribution I make to the future of our country and society through my love of teaching.

Faculty Excellent Teacher Award 2016

Associate Professor Mark Tait

Faculty of Law

Department of Mercantile Law



As an Associate Professor in the Department of Mercantile Law, I have taught law of contract, specific contracts and consumer protection and credit law for a number of years. From 2017 I became Head of the Department of Mercantile Law, as well as the Chairperson of the Law Faculty Research, Technology and Innovation Committee (FRTIC).

I have a master's degree in Business Leadership (MBL) through Unisa's School of Business Leadership and an LLM and LLD through what is now Nelson Mandela University. My main research focus is consumer protection law, particularly the protection of consumers in the context of the tourism industry.

In an era where Google has (almost) all the answers available at the fingertips of every student, it is a challenge to get students to think critically and to ask the right questions. The true value of what we do is not in providing knowledge, but rather in facilitating the development in our students of the ability to discover knowledge for themselves.

The year 2016 will be remembered for #FMF and the challenges it presented in completing the academic programme. The Faculty of Law decided to go the Moodle way. In a very short space of time we *Moodlerised* our modules, as well as the assessment thereof. The Faculty also decided to have 'normal' final examinations to enable our students to complete the year. This was successfully achieved late in December. I was struck by the incredible outcomes that can be achieved when motivated people work together in the achievement of a common goal.

The Faculty is currently involved in the process of curriculum renewal of the LLB programme, following the national review of all the LLB programmes offered by South African tertiary institutions. This is a fundamentally important task that will impact the LLB programme that Nelson Mandela University offers. It will also influence the legal graduates we educate, and, through them, the legal profession in all its forms, and ultimately *The Law*. This may well be the most significant legacy this generation of legal academics leaves, and it is most exciting to be part of this.

Faculty Excellent Teacher Award 2016

Samantha Kahts

Faculty of Health Sciences

Department of Human Movement Sciences
School of Lifestyle Sciences



I am part of the Next Generation Initiative (NGI) scholarship programme in the Department of Human Movement Sciences. I strive to be a scholar of my own teaching practices who gives back to the community in which I work through applying Participatory Action Research (PAR) principles.

I am a qualified Biokineticist with a master's degree in the fundamental movement skill status of children aged 9 to 12 years. I am currently completing my doctoral degree aimed at equipping in-service Foundation Phase teachers in lower socio-economic schools with technology enhanced physical education content through PAR.

This is my sixth year as a lecturer in the areas of motor development, physical education and systematic review research methods. My teaching philosophy is all about *following your passion, taking responsibility for your own learning, engaging with the content and experiencing the application thereof in the real world, whilst reflective learning emerges.*

There are three highlights for me in the year 2016. The first was engaging in a doctorate grounded in PAR. The second was establishing a community of practice with colleagues at the Centre for Teaching, Learning and Media aimed at creating a research initiative that merges Nelson Mandela University's values, graduate attributes and the humanising pedagogy with my teaching practices. The third was being part of the South African University Physical Education Association (SAUPEA) national research project aimed at improving the status of physical education within South Africa.

My goals include completing my doctorate whilst giving back to the community of teachers and children I have worked with through mastering PAR principles, and facilitating my students in becoming self-directed learners whilst applying a humanising pedagogical approach.

Faculty Emerging Teacher Award 2016

Shelley Saunders

Faculty of Business and Economic Sciences

Department of Business Management
School of Management Sciences



I have been in academia for six years, first with a private university (1.5 years) and the rest at Nelson Mandela University. During 2016 I lectured on a number of modules at first, second and third year level in the areas of business management, marketing and entrepreneurship. I coordinate the first year module entitled *Introduction to the Business Functions*, which has more than 800 students, as well as coordinate two third year modules (70 students).

In May 2016 I was invited to lecture at Osnabruck University in Germany for a week for my module entitled *Global Marketing Communications*.

I am the blended learning champion for the Department of Business Management (since 2015) and am a member of a number of committees, including the Southern African Institute for Management Scientists and the Nelson Mandela University Family Business Unit.

With regards to research in 2016, I supervised two Honours

treatises and had three international conferences papers accepted and read.

What drives me as a teacher is knowing that what I do for my students helps them achieve their full potential. As part of this, it is so important for me to develop excellent material, such as Moodle quizzes and study guides, and to provide additional content and resources such as multilingual glossaries.

What inspires me in my work is to continue developing, growing and learning both in my teaching and my research. In terms of achievements in 2016, one was the migration to online of my first year module and my two third year modules to ensure the completion of the 2016 academic year. As the department's blended learning champion, I also had to assist my colleagues to migrate their modules to Moodle. Completing this for the entire department was a huge achievement.

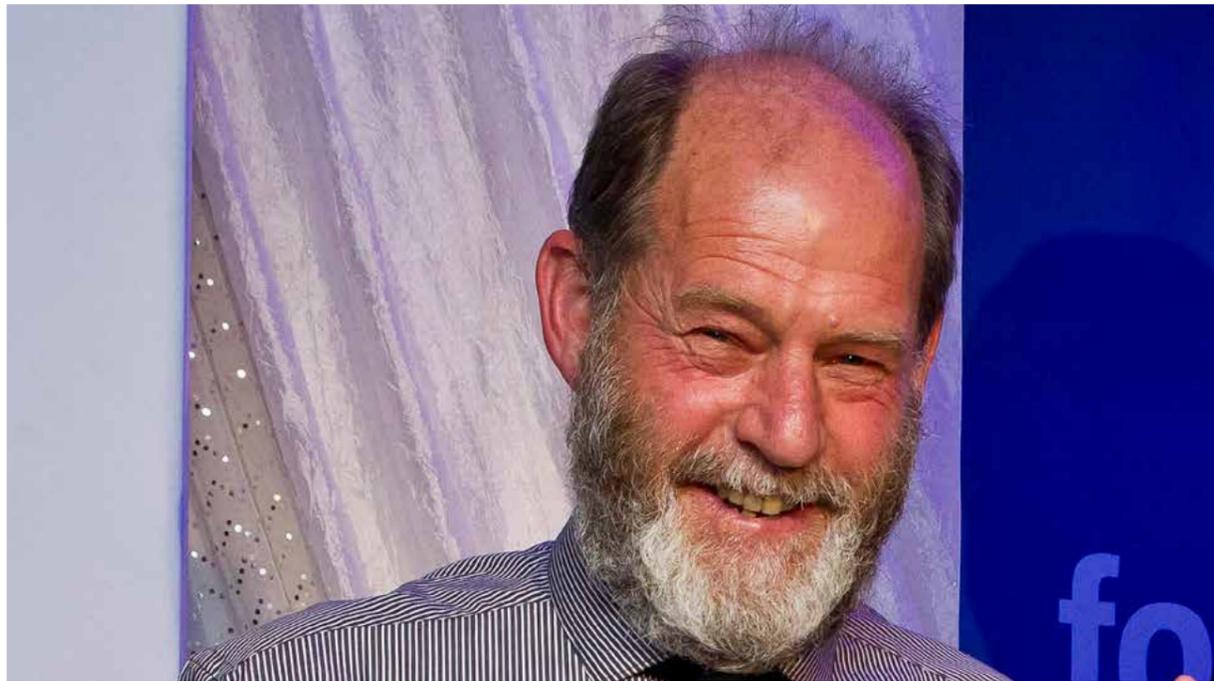
Engagement Excellence Award 2016

Prof Raymond Auerbach

Faculty of Science, George Campus

Agricultural Management Programme

Centre of Excellence for Food Security



My engagement activities include 45 years of involvement in developing the South African Organic Sector. I am a member of the international Organic Food Systems project, which in turn is one of the eight core initiatives of the UN Sustainable Food Systems Programme.

My twin passions are: how can we address rural poverty in Africa, and how can we produce healthy food without degrading farmland and natural resources? The answer lies in agro-ecology, soil biology and organic farming.

I am part of the Centre of Excellence for Food Security (CoE-FS), based at University of the Western Cape, and I run the Crop Production Research Project with joint funding from the CoE-FS and the National Research Foundation's Research and Technology Fund.

Our joint research projects include the African Organic Farming Systems Research project (with doctoral students working in Zambia and Uganda), and the long-term organic comparative

farming systems research trials running on the George Campus, with four master's students working on agronomy, water use efficiency, biological pest and disease control and soil microbiology (with Pretoria University). These trials are starting to draw local and international interest. The soils are changing under organic management and we have been able to close the yield gap, so that the organic yields are as high as the conventional yields, and water use efficiency is better.

One of my most important recent achievements is assisting with the development of the South African Organic Standards and helping to develop participatory guarantee systems that facilitate access to high-end markets for small-scale farmers. A new project, funded by the German government, includes Nelson Mandela University working with local food gardeners, South African organic farmers and the South African Participatory Guarantee Systems Association to understand food security and urban farming issues and opportunities.

Emerging Excellence Engagement Award 2016

Gareth Williams

Faculty of Arts

Department of Music



I am a lecturer in the Department of Music, conductor of the Nelson Mandela University Wind Symphony as well as a live music consultant for TwoTone Music.

After graduating from what is now Nelson Mandela University in 2002, I worked at several schools in Nelson Mandela Bay and Cape Town before taking up contracts with five-star hotels in the Middle East and Far East as part of the TwoTone Duo (a piano-vocal and saxophone jazz duo). On returning to South Africa in 2009 I worked at Grey High School, started TwoTone Music (a music production company) and did contract work for the University until 2015 when I became a full-time lecturer here.

My work is driven by a need to redress the inequality that exists with regards to access to music education across primary, secondary and tertiary levels. Marginalised communities – due to a lack of resources, mainly financial – cannot access formal music education. This inequality needs to be challenged by a new generation of scholars.

Notable achievement in 2016 include:

A world premiere concert produced with Professor Ed Sarath from the University of Michigan called *His Day is Done*. The work was composed for our symphony orchestra, choir and jazz soloists, and is inspired by Maya Angelou's poem commemorating the life of Nelson Mandela. Our concert included more than 70 musicians from Nelson Mandela University, alumni, and community.

A live stream broadcast across the world from the Missionvale Care Centre by the choir of Normoyle Primary School as part of *Friday Afternoons Big Sing 2016*. This is a project of the Aldeburgh Music Festival - where thousands of children from across the world practise songs weekly to enhance vocal singing amongst school children.

Producing and musically directing the first *Divas in Spring* concert in Nelson Mandela Bay, featuring South African pop star Lira and jazz great Judith Sephuma with a 24 piece orchestra comprising professionals and Nelson Mandela University music students.

Facts and Figures: 2016

RESEARCH

Nelson Mandela University ranks among the top 10 South African universities, in terms of the number of researchers who have research ratings from the National Research Foundation (NRF). In 2016 the University had 83 NRF-rated researchers.

- Research Chairs **13**
- NRF-rated Researchers **83**
- Research Entities **27**
- Centres **13**
- Units **10**
- Institutes **4**
- Technology Stations **2**



TOTAL UNIVERSITY STUDENTS **27 849**

GRADUATION



STUDENTS GRADUATED IN 2016 **6 798**

MASTERS **430**

PHDS **95**

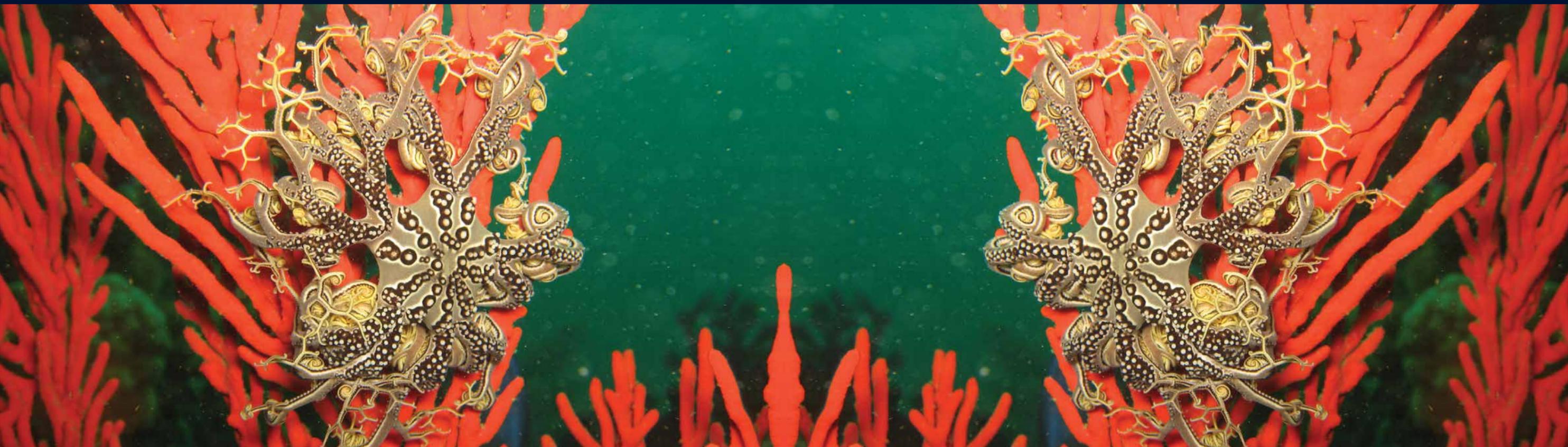
ACADEMICS WHO OBTAINED DOCTORAL DEGREES **278**

TOP NRF-RATED RESEARCHERS

Prof Richard Cowling	A1 rating	Faculty of Science
Prof Maarten de Wit	A1 rating	Faculty of Science
Prof Mark Watson	B1 rating	Faculty of Health Science
Prof Paul Watts	B1 rating	Faculty of Science
Prof Rossouw von Solms	B2 rating	Faculty of Engineering, the Built Environment & IT
Prof Bill Branch	B2 rating	Faculty of Science
Prof Anthony (AJ) Christopher	B2 rating	Faculty of Science
Prof Renzo Perissinotto	B2 rating	Faculty of Science
Prof Stefan Veldsman	B2 rating	Faculty of Science

1 624 INTERNATIONAL STUDENTS

70 COUNTRIES



Produced by Communication & Stakeholder Liaison

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Content: Heather Dugmore

PO Box 77000,
Nelson Mandela University
Port Elizabeth, 6031

info@mandela.ac.za



mandela.ac.za