NEWS LETTER

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HYSA DEPLOYMENT

MOBILE CLINICS

OR Tambo SARCHi

Making sure it's possible

science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

2030 NDP

Content – Making sure it's possible –

BIG welcome to new employees

Bethusile Shongwe is the Personal Assistant Bio-Innovation

Esther Rammutla is the Private Secretary Ministry

Fhumulani Ramukhwatho is the Deputy Director Marine and Palaeosciences

Koketso Mkhwebane is the IT Technician

Makhetha is the Deputy Director Industry and Environments

Mboneni Nethavhakone Assistant Director Data Administrator

Milford Mojalefa is the State Accountant

Mpho Mhlongo is the Assistant Director Research and Development Planning

Mpho Ramakhale is the Assistant Director Special Programmes

Noluthando Madlala is the Senior Secretary Legal Services

Themba Maswanganye is the SCM Practioner

Webster Sihlangu is the IT Technician

Biocultural community protocols to help address injustices of the past

Across the world, local and indigenous communities continue to be vulnerable to biopiracy and misappropriation of their cultural heritage. In South Africa, the Department of Science and Innovation (DSI) is helping these communities to protect their indigenous knowledge resources by supporting them in developing biocultural community protocols.

Biocultural community protocols (BCPs) are instruments that set out clear terms and conditions under which governments, companies, research institutions and non-profit organisations can engage with communities to access their local resources and knowledge. The importance of BCPs took centre stage last week during a webinar organised by the DSI to encourage communities to participate in compiling their own BCPs. The webinar was held under the theme "Making sense of biocultural protocols to protect the cultural and biological heritage of indigenous communities".

The BCP concept is embedded in the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, which came in force in 2014.South Africa is a contracting party to the Protocol, which is the first legally binding international instrument to encourage states to respect the rights of indigenous communities. Specifically, Article 12 requires parties to consider the "customary laws, community protocols and procedures" of communities with respect to indigenous knowledge associated with genetic resources. In South Africa, the BCP approach is reinforced by a number of policies that recognise the role of indigenous communities in biodiversity conservation and food production and the value of their resources. Most importantly, the Protection, Promotion, Development and Management of Indigenous Knowledge Act, 2019 (IK Act) makes it mandatory for any party wishing to use a community's indigenous knowledge to consult with the community under the terms and conditions of a BCP.

This was applied most recently when scientists and researchers seeking possible leads in response to COVID-19 were required to engage with communities on the basis of a BCP.

Addressing the webinar, panellist Shumi Pango of the DSI emphasised that the Department does not itself develop BPCs, but rather plays a facilitating role in this process. Pango said it was vital for communities to develop their own

protocols, based on local needs and conditions, to ensure that the benefits gained from the use of their resources were equitably shared. Pango further explained that BCPs were conditions set out by a community for gaining access to their land, resources and knowledge – and not a guarantee that the community would consent to an external intervention or project.

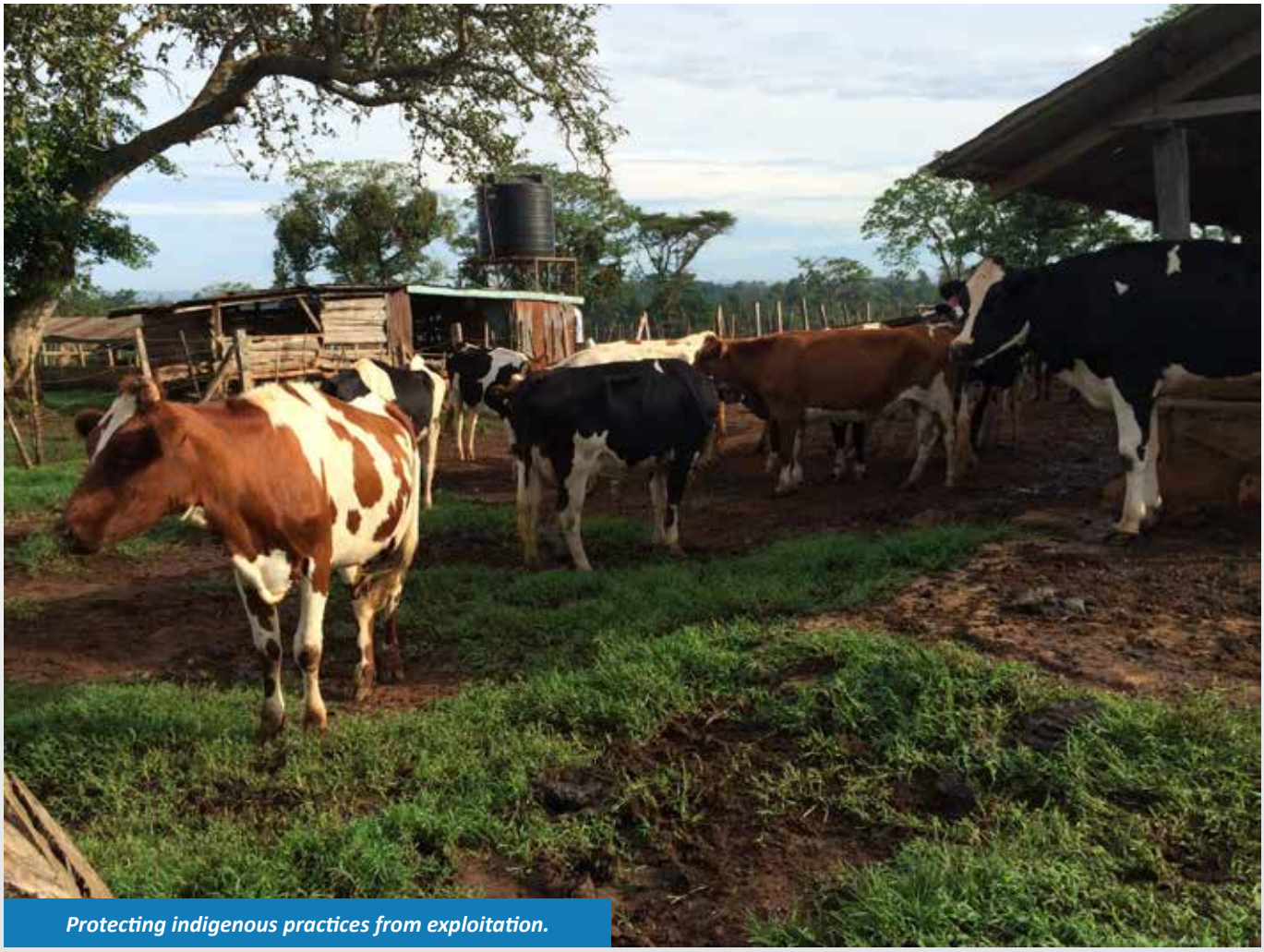
"The preparation of a community protocol is a participatory process that brings together indigenous communities to discuss and determine their rights over traditionally used resources and knowledge," Pango said.

Donald Lefatshe from Lefatshe Holdings, who also participated in the webinar, stressed that communities had to be provided with all relevant information, in a language they understood well, and with enough time to consider the information, before they made a decision. "Permission to third parties to access communities' resources should be granted by the communities themselves, and the process should free from intimidation," Lefatshe said.

Dr Motheo Koitsiwe, Acting Director of the Indigenous Knowledge Systems Centre at North-West University, said BPCs introduced a new paradigm in conducting research in local and indigenous communities. "The concept of research has a western orientation, and many researchers doing research in our local communities do not use our African indigenous methodologies but rather use their own methodologies, which are exploitative."

Dr Koitsiwe welcomed the IK Act and the facilitation of BCPs with local communities. "North-West University together with the DSI has been actively involved in raising awareness of BPCs in local communities," he said. "We have been to Ledig in North West, Khayakhulu, KwaZulu-Natal and the Northern Cape."

The DSI, working in collaboration with the Attaqua community in the southern Cape, recently completed its first government-led BCP. □



Protecting indigenous practices from exploitation.

Northern Cape learners win global recognition for fruit-drying innovation

High-school learners developed a class project to address challenges in the agricultural sector.

What started out as a basic science project by two learners from Hoërskool Duineveld in Upington, Northern Cape has grown into an innovative product that has won international recognition for the benefits it offers to fruit farmers.

Lené Matthee and Zanri Smit developed their Ultra-Drying Tunnel concept with support from the Department of Science and Innovation's Office of Technology Transfer at Vaal University of Technology and Raisins South Africa, a farm and factory based in the town of Kakamas outside Upington.

The two Grade 11 learners grew up in Keimoes outside Upington, an area well known for grape-farming and secondary industries such as the production of raisins for local and international markets. As part of their school project, Matthee and Smit conducted research with local farmers on the various methods of drying raisins, and observed the impact of the area's erratic weather conditions on the amount of time and money spent on this process, as well as the quality of the final product. They then developed a method that not only makes the drying process quicker, less labour-intensive and more affordable, but can also be modified to make it more manageable and to suit different climatic conditions. Their Ultra-Drying Tunnel uses heat, wind and other natural elements to speed up the drying of fruit while reducing the impact of risk factors such as rain, thereby ensuring higher-quality final products that can be sold at higher prices. The tunnel can be adapted for use in any province and can function effectively throughout the year. Noting that similar products are available in the market, Smit said: "We differentiated our product by adding solar as a power source, as well as heating elements, fans and mist sprayers to ensure more control and a better-quality product."

Matthee added that seeing their project through from start to finish had taught them "that we can always do better, and that learning is unending". In August 2019, the two learners entered their innovation in the Eskom Expo For Young Scientists, where learners are selected from 35 regions nationwide to compete against young scientists from around the country and the world. They received a gold award for their project. They then entered the iMBEWU Science Expo Northern Cape, where projects from across the province are judged by a team of industry experts. They received a gold medal and were selected for entry in the SAYESS National Science Fair in Pretoria in November 2019. Here they received a silver award.

On the strength of their achievements, Smit and Matthee were invited to compete in the 2020 Hong Kong Student Science Project Competition. Presenting their project virtually on 1 August 2020, the two learners raised their game, achieving an outstanding second place out of 39 entries from around the world. "We are very proud of the accolades we have received," Smit said, "as from the inception of our project, we have put in a lot of effort, heart and soul, to receive remarkable outcomes." □

South Africa urged to redouble efforts to improve its innovation trajectory

Urgent steps need to be taken for South Africa to realise its economic growth and human development targets and to place the country where it ought to be among the world's nations. This sentiment emerged during the release of the 2020 South African Science, Technology and Innovation (STI) Indicators Report which reveals that the current state of STI in South Africa is less than ideal.

The launch of the report recently, was accompanied by a policy forum on the state of innovation in the country. This included a presentation on the reviews of the National Research and Development Strategy (NRDS) and the Ten-Year Innovation Plan (TYIP), as well as a presentation on the Agricultural Business Innovation Survey 2016-2018.

The gaps identified in the STI Indicators Report provide a starting point for role players to take South Africa's national system of innovation (NSI) forward to meet the country's STI and development targets. In producing the annual report, the National Advisory Council on Innovation (NACI) reviews the state of STI in South Africa over time and in a global context. Thus, it provides all stakeholders, including the government, private sector, civil society and academia, with critical feedback on the country's strengths and weaknesses in the STI domain.

The 2020 STI Indicators Report reflects progress on some indicators, while pointing to areas of concern. Although South Africa's research system, particularly public institutions such as universities and science councils, has shown a steady increase in scientific publications over many years, more recent performance indicates a decline. South Africa's publications per million of the population declined from 371 in 2017 to 360 in 2018. Improvements continue to be evident at school level. The National Senior Certificate pass rate in Physical Sciences improved from 58,6% in 2015 to 75,5% in 2019, while the Mathematics pass rate improved from 49,1% in 2015 to 58% in 2018, before declining to 54,6% in 2019. Most of the doctoral degrees produced in South Africa are in the field of the natural and agricultural sciences, with 1 051 doctorates produced in 2018. Only 7% of doctoral degrees produced are in the field of engineering. The number of researchers within the business and higher education sectors increased by 14,7% and 15,7% respectively between 2016/17 and 2017/18. Unemployment is lower among those with higher levels of education. Among those with master's and doctoral degrees, unemployment increased from 2,4% in 2018 to 2,8% in 2019.

Financing of the NSI continues to be a challenge. In 2017/18, South Africa's gross domestic expenditure on research and development (GERD) as a percentage of gross domestic product (GDP) was 0,83%, which remains below the 1,5% target. Business expenditure on research and development (BERD) as a percentage of GERD declined from 58,6% in 2008/09 to 41% in 2017/18, and as a percentage of GDP, declined from 0,52% in 2008/09 to 0,34% in 2017/18.

In contrast to the business sector, GERD in the public sector increased from R4,1 billion in 2008/09 to R13 billion in 2017/18 – an increase of 85% in 2010 rand-value terms. Increased funding of universities contributed to an increase in both the number of postgraduate students (a national long-term objective) and the number of publications from universities. The number of master's degrees (by research) also increased, from 6 460 in 2013 to 8 610 in 2018, while the number of doctoral graduates increased from 2 051 in 2013 to 3 307 in 2018. The report suggests that, if the underlying forces during the past period remain intact, the number of doctoral graduates will reach the target of 5 000 per annum by 2030, with partnerships between science councils and universities contributing to the significant enrolment and graduation of both master's and doctoral candidates. NACI Council Member and CEO of the Water Research Council, Mr Dhesigen Naidoo, said an "extraordinary" effort was needed to improve South Africa's innovation situation. "We are now looking at a point in this country where we have never had so many highly skilled people unemployed. It is a travesty, and the youth dividend is definitely at risk," said Mr Naidoo. Noting the 2,8% unemployment rate among master's and doctoral graduates, he added that, given South Africa's current structural socio-economic challenges, the country could not afford to have even a single unemployed graduate.

Mr Naidoo cited the GERD and BERD trends as additional cause for concern, as well as the relationship between the technology balance of payments, the trade balance and economic growth. Discussing the reviews of the NRDS and TYIP, Prof. Johann Mouton, Director of the Centre for Research on Evaluation, Science and Technology at Stellenbosch University, said the original objectives of the two technology-related strategies – to contribute towards the transition to a knowledge-based economy, to improve the sector's competitiveness through advanced manufacturing and innovation, and to leverage resource-based industries – were still valid. What had changed over time, he said, was the introduction of new technological initiatives in areas including fluoride-based electrolytes, additive manufacturing and advanced materials. "Technology changes are fast-moving and are often linked to new challenges resulting from fundamental shifts in social dynamics. It would thus be prudent for the Department of Science and Innovation (DSI) to revisit its current portfolio of technology programmes, in light of recent global developments as well as the recommendations of the Research Foresight Exercise," he said.

He also urged the DSI to undertake an in-depth review of existing funding instruments targeting business and innovation in order to achieve optimal coordination and efficiency. In building the next generation of scientists and scholars in the country, Prof. Mouton said a study should be conducted to investigate possible synergies between the investments of universities, funding agencies such as the National Research Foundation (NRF) and the South African Medical Research Council (SAMRC), and government departments such as the Departments of Higher Education and Training, Water Affairs and Forestry, and Health.

Releasing the results of the Agricultural Business Innovation Survey 2016-2018, Dr Glenda Kruss, Executive Head of the Centre for Science, Technology and Innovation Indicators (CeSTII), said the fisheries sector invested over 60% in research and development, and more than 80% in marketing of innovations across all fish farming categories. Agriculture only invested 40% in research and development, with 20% going to marketing of innovations. Much of the investment, accounting for 60%, went to training, followed by procurement of farming equipment. □

DSI deploys hydrogen fuel cell systems
to power COVID-19 field hospital

Government, in collaboration with the private sector, is putting plans in place to roll out hydrogen fuel cell technologies (HFCT) in various parts of South Africa, as alternative energy sources to the country's electricity grid.

In August, the Director-General of Science and Innovation (DSI), Dr Phil Mjwara, unveiled the HFCT at the 1 Military Hospital in Pretoria, where the government has set up a field hospital to prepare for a potential increase in COVID-19 patients. The DSI unveiled seven hydrogen fuel cell systems as the primary power source for the field hospital, which has facilities for testing and screening, as well as life-saving equipment such as ventilators in the intensive care unit. Addressing the event, the DG said that such partnerships would enable government to take alternative energy to rural areas, contributing to the growth of the country's green economy. The project is a partnership between the DSI, the Department of Public Works and Infrastructure, the Department of Defence and private companies like Bambili Energy, which is committed to commercialising intellectual property developed through the DSI's Hydrogen South Africa (HySA) programme. Hydrogen fuel cell technologies are globally recognised for their potential to decarbonise the energy and transport sectors. Fuel cells produce electricity by means of a chemical reaction, using hydrogen as the basic fuel and platinum-based catalysts. Besides being efficient and reliable, fuel cells can be deployed rapidly and scaled up easily as the need arises, and their maintenance costs are relatively low.

"Bambili Energy is working on an initiative to take some of these fuels cells to rural areas in the Eastern Cape and KwaZulu-Natal. This is the start, but the idea is to roll the project out to various parts of South Africa," said Dr Mjwara. South Africa's Secretary for Defence, Ambassador Sonto Kudjoe, remarked that the field hospital was now operating using only the fuel cell systems, while the Eskom electricity grid served as back-up. "It is encouraging that there was an opportunity to scale up the project. We can extend the systems to many parts of country and relieve the burden on Eskom, while transferring skills in the development of hydrogen fuel cells in the country," said Ambassador Kudjoe. The support provided to 1 Military Hospital will be complemented by hands-on training, involving government officials and unemployed college graduates with N4 electrical engineering (light and heavy current) qualifications.

Zanele Mavuso Mbatha, CEO of Bambili Energy, expressed excitement at leading the deployment of the fuel cell systems to contribute to government's response to the COVID-19 pandemic.

"This is also an opportunity to demonstrate the potential role alternative energy sources can play in our everyday lives, given South Africa's growing energy challenges," said Ms Mavuso Mbatha. "Bambili Energy believes this collaboration further illustrates the importance attached to the development of the hydrogen economy in South Africa. The growth of this sector also stands to have a material impact on the economy, particularly in regard to employment creation and the development of complementary industries, in its supply chain and many others," said Ms Mbatha.

Further contributions in the form of methanol and hydrogen for the fuel cell units were received from Air Products South Africa, Protea Chemicals and Sasol. "We look forward to this exciting partnership, and to working with the Bambili group and the various government departments involved in the project, as well as doing our bit to contribute towards the ongoing fight against COVID-19," said Pieter Swart, Protea Chemicals Interim Managing Director. Given its experience in the production and handling of hydrogen, which it uses to produce liquid fuels, fuel gas and chemicals, Sasol will be donating 10 000 litres of methanol and 600 kg of hydrogen monthly until April 2021 to help power the field facility.

"We are deliberately pursuing renewable energy sources through technology, innovation and collaboration, and sustainably produced hydrogen is integral to reducing our carbon footprint across our operations," said Charlotte Mokoena, Executive Vice President for Human Resources and Corporate Affairs at Sasol. Other partners in the initiative include South Africa's HyPlat, Air Products, Singapore's Horizon Fuel Cell Technologies, the US company Element One, and Powercell Sweden. General Manager for Packaged Gas at Air Products, Sizwe Nkonde, said their company invests in innovative solutions and supports these clean energy projects. "Furthermore, we are committed to join the fight against the spread of COVID-19". □

South African scoops first prize in BRICS Young Innovator competition

A waste management innovation earns top BRICS award

The use of cutting-edge data science and digital tools to improve waste management proved to be a winning formula for young South African innovator Gift Lubele, founder of technology company Kudoti, who walked away with the first prize of US$25 000 in the 2020 BRICS Young Innovator competition.

The winner was announced during the fifth Brazil, Russia, India, China and South Africa (BRICS) Young Scientist Forum, which took place virtually under the theme "BRICS partnership of young scientists and innovators for science progress and innovative growth". The BRICS Young Innovator Prize promotes quality research and innovation, including the use of artificial intelligence, in environmental protection and materials science. This year's event was hosted at South Ural State University in Russia from 21 to 25 September and saw 20 competitors, four from each BRICS country, vying for the top prize. Lubele is the proud founder of Kudoti (IsiZulu for "in the trash"), a Johannesburg-based company established in 2019. Kudoti helps waste management and recycling companies to optimise their operations, making them more efficient and cost-effective, through the use of cutting-edge data collection tools. "An Uber for waste recycling," is how Lubele describes Kudoti. Waste companies of all sizes can improve their operations by using Kudoti's cloud-based platform, which digitises and automates waste management operations from start to finish through SMS interactions and web-based interfaces. "Our digital platform provides an end-to-end solution, replacing manual and paper-based work with a simple-to-use, effective digital solution," says Lubele. The platform also helps companies to improve their client management – which Lubele regards as essential in waste management, as it is in other industries – by enabling them to keep track of and communicate directly with their clients.

One of Kudoti's clients is Distell, a global business with South African roots, which produces and markets a diverse portfolio of award-winning alcoholic brands. Growing up in Tembisa, a large township situated to the north of Kempton Park on the East Rand, Lubele came to understand the challenges that many communities experience with waste, and was inspired to do something about it. Describing his journey, he says he had the opportunity to speak to informal waste workers, including a woman who was putting her two children through school by collecting recyclable waste, and grew to appreciate the value they were providing to society. "This sparked an interest in learning more about the waste industry and the opportunity that it represented for development. Through extensive research, I realised that technology could significantly improve how waste is managed, and saw that it was underutilised in the waste industry. From there I began my journey with Kudoti, to find value in waste recycling through technology."

To better understand the challenges facing companies in Africa, and how technology can help, Kudoti is currently engaging with a number of companies and organisations across the continent. One of these is a plastic recycling centre in Uganda, a project of the Global Livingston Institute, which has recycled over 75 000 kilograms of plastic since 2018. The company is also looking to expand its offering to enable users to make recyclable waste transactions, and to grow this into a marketplace for recyclable materials. "Our goal is to create technology tools that empower companies, individuals and governments to better manage waste and recycle more, utilising the capacities that are in place for waste collection and recycling", says Lubele. In March 2020, Fast Company South Africa named Kudoti one of the 25 Most Innovative Companies in the country. In 2019, Lubele was listed as one of Fast Company SA's top 20 entrepreneurs under the age of 30. He has also won recognition from the United Nations and the President of Mauritius. □

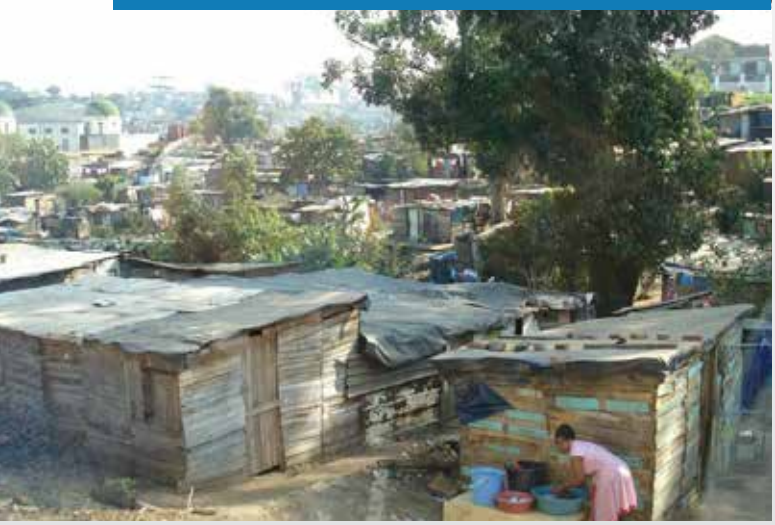
SA researchers WIN BIG
in global science competition

Boosting productivity and employment in informal settlements with off-grid, safe and stable renewable energy proved a winning concept for Dr Jiska de Groot of the University of Cape Town, who scooped the prestigious 2020 Newton Fund Chair's Prize, valued at £500 000.

The £1 million Newton Fund celebrates the best partnerships between the United Kingdom and Newton Fund countries, while encouraging new international collaborations to address some of the world's most pressing challenges. The Department of Science and Innovation (DSI), through its entity the National Research Foundation, is the main contributing partner for the Newton Fund project in South Africa.

De Groot developed the winning project together with Dr Federico Caprotti of the University of Exeter in the UK. The project sought to develop bespoke energy solutions based on the specific needs of people living in informal settlements. De Groot, who is a Senior Fellow at the African Climate and Development Initiative, said the project targeted lack of access to affordable and clean energy as this was one of the major obstacles to socio-economic development worldwide.

Townships need clean energy to enable development



Dr De Groot developed a winning project to address energy need in the township.

De Groot and Caprotti held numerous discussions with stakeholders in Johannesburg, Polokwane and the UK, meeting with non-governmental organisations, community representatives and UK energy organisations to come up with solutions based on local needs. This led to the of testing solar mini-grids in Philippi, an informal settlement in Cape Town, where the mini-grids were found to produce energy up to 40% cheaper than current energy sources. By pairing the mini-grids with an app-based, pay-as-you-go model, the team aim to scale and replicate solar innovations to plug the energy gap across South Africa.

The project has yielded further funding to install mini-grids in the Philippi area, and has also been pivotal in connecting innovative local businesses to government funding opportunities. For the next phase of the project, the team want to implement a solar refrigeration capacity, and through this to provide women in informal settlements with a source of income based on sustainable refrigeration businesses.

"Energy is an enabler of development," said De Groot, whose vision is a world in which everyone has access to appropriate energy for their needs. "Lack of energy does not just create a health impact, but also huge inequalities for people to develop." Another feather in the cap of South African research was an innovation developed by Prof. Michael Roberts of Nelson Mandela University that scooped one of five Newton Fund country prizes, each worth £200 000.

Roberts partnered with research fellows at the University of Southampton for his project, which tackled food insecurity in the Western Indian Ocean (WIO).

With over 60 million people dependent on the WIO, a humanitarian crisis is looming, as the ocean is warming faster than any other and coastal and marine ecosystems are rapidly declining in the region. If the current trend persists, these ecosystems are likely to collapse within the next 15 years. Roberts' project has established an Innovation Bridge and Regional Hub Network to provide eight developing WIO countries with immediate access to skills and infrastructure needed to tackle this challenge. The network applies satellites, ocean models, marine robotics and other of state-of-the-art technologies to study these complex and remote ecosystems.

Roberts said the biggest impact of the project had been making countries aware of the situation. "By providing governments with information, we are hoping for a seamless movement of people away from dependence on the ocean to trying to diversity their food security systems and livelihoods," he said.

The DSI's Deputy Director-General for International Cooperation and Resources, Mr Daan du Toit, hailed the collaborative project as an example of what the world urgently needed. "From the onset of the COVID-19 pandemic, it has been evident that collective efforts are increasingly needed to sustain global economic recovery and to achieve the Sustainable Development Goals," Du Toit said.

In South Africa, the Newton Fund aims to foster world-class collaborations between academics and innovators from the UK and South Africa to address critical development challenges.

UK Science Minister Amanda Solloway said international collaboration improved the quality of research. "The projects shortlisted and celebrated through the Newton Fund prizes are testament to this ambition. They show what can be achieved when collaboration is supported – as well as the real-world impacts that partnered research delivers across a wide spectrum of challenges." ☐

We need to preserve our oceans

Mobile clinics to boost health care services

for disadvantaged students in KZN

The Minister of Higher Education, Science and Innovation, Dr Blade Nzimande, officially launched a roving fleet of mobile clinics in Ulundi, KwaZulu-Natal on Friday, 18 September.

The Ministry of Higher Education, Science and Innovation District Campus Health and Wellness fleet will provide primary health care to underserved technical and vocational education and training (TVET) and community education and training (CET) colleges, as well as rural and disadvantaged university campuses in the province. The service will increase the capacity of the Ministry of Higher Education, Science and Innovation to provide health care services to post-school education and training institutions. The Department of Higher Education and Training (DHET) and Department Science and Innovation (DSI), which fall under the Ministry, collaborated on securing the fleet of 10 fully furnished and equipped mobile clinics on a four-year lease at no cost to the Department of Health, which will be managing the project on behalf of the Ministry.

The Minister visited Nkonjeni Hospital in Ulundi as part of the Cabinet's deployment of ministers and deputy ministers as District Champions of various municipalities. Minister Nzimande was deployed as District Champion of Zululand District Municipality along with KwaZulu-Natal Transport, Community Safety and Liaison MEC Bheki Ntuli, Zululand District Municipality Mayor Cllr TD Buthelezi, and Prince Mangosuthu Buthelezi. The visit focused on the district's COVID-19 response plans, interventions to eradicate gender-based violence, and infrastructure and skills development in the region. The government is using the recently adopted District Development Model (DDM) to institutionalise an integrated, district-based development approach aimed at fast-tracking service delivery and ensuring that municipalities work together and are adequately supported and resourced to carry out their mandate.

The DDM is a vehicle for ensuring that service delivery is refocused and implementation strengthened through a well-coordinated and coherent national programme of action. The model seeks to eradicate inefficiencies and duplications caused by the various spheres and branches of government operating in silos. □

Minister of Higher Education, Science and Innovation, Dr Blade Nzimande was joined by IFP Leader Dr Mangosutho Buthelezi in KZN.

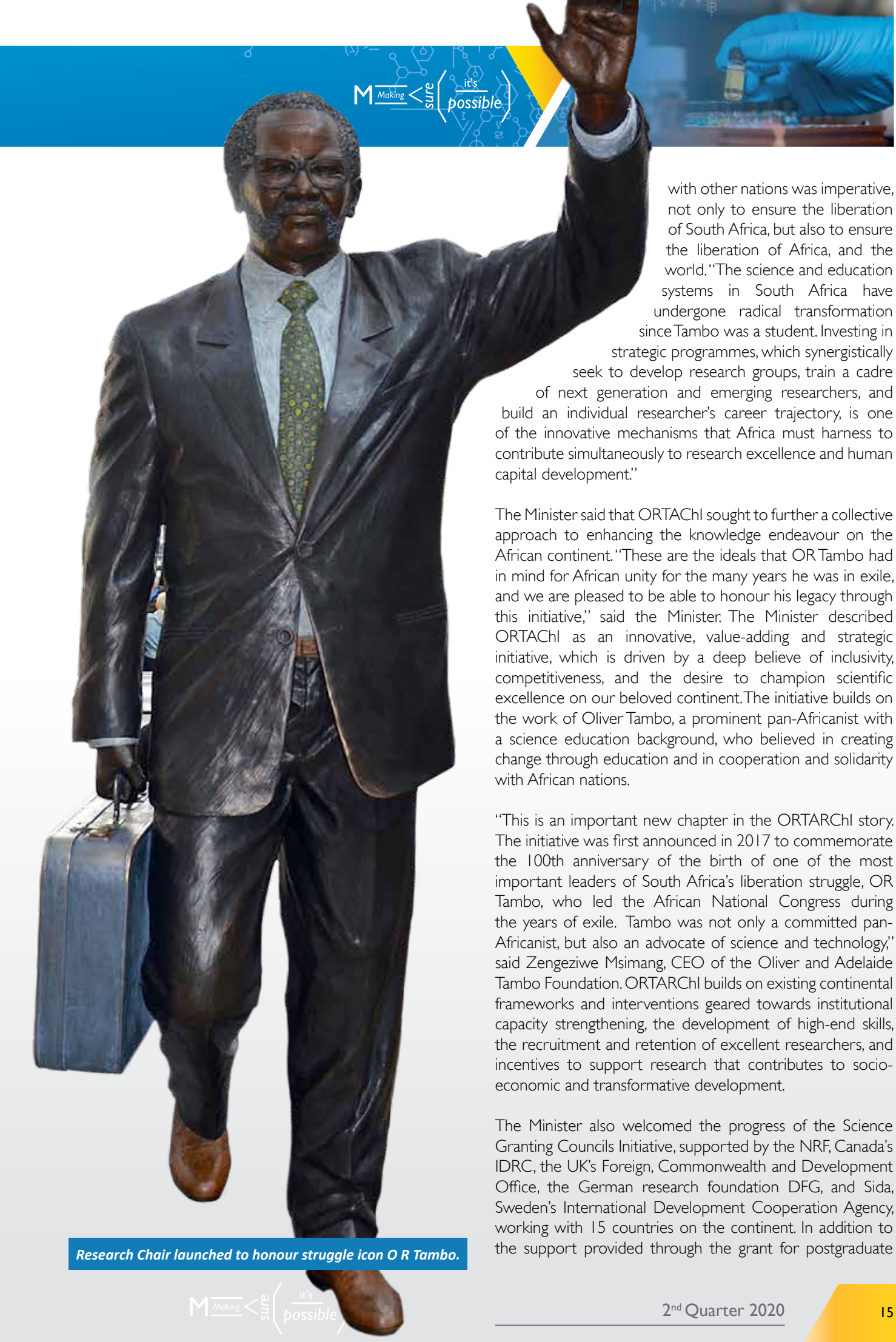
Research chairs honour
the legacy of OR Tambo

The Minister of Higher Education, Science and Innovation, Dr Blade Nzimande, launched the OR Tambo Africa Research Chairs Initiative (ORTARChI) on 27 October 2020.

Named in honour of the former African National Congress leader, Oliver Reginald Tambo, the research chairs are intended to meet political, development and higher education objectives on the African continent.

Ten host institutions and individual holders of research chairs, across seven African countries, were selected after a rigorous review process. They will conduct research and support high-end skills development in areas such as climate, public health, entrepreneurship and youth employment. ORTARChI will provide five years of funding, amounting to approximately US$15 million. ORTARChI is an initiative of the Department of Science and Innovation (DSI) and its entity the National Research Foundation (NRF), in partnership with the Oliver & Adelaide Tambo Foundation, Canada's International Development Research Centre (IDRC), and seven councils of the Science Granting Councils Initiative in Sub-Saharan Africa.

Addressing a virtual event, the Minister described Oliver Tambo as an educator, a prolific and influential leader, and an internationalist who understood that building strong bonds



Research Chair launched to honour struggle icon O R Tambo.

with other nations was imperative, not only to ensure the liberation of South Africa, but also to ensure the liberation of Africa, and the world. "The science and education systems in South Africa have undergone radical transformation since Tambo was a student. Investing in strategic programmes, which synergistically seek to develop research groups, train a cadre of next generation and emerging researchers, and build an individual researcher's career trajectory, is one of the innovative mechanisms that Africa must harness to contribute simultaneously to research excellence and human capital development."

The Minister said that ORTAChI sought to further a collective approach to enhancing the knowledge endeavour on the African continent. "These are the ideals that OR Tambo had in mind for African unity for the many years he was in exile, and we are pleased to be able to honour his legacy through this initiative," said the Minister. The Minister described ORTAChI as an innovative, value-adding and strategic initiative, which is driven by a deep believe of inclusivity, competitiveness, and the desire to champion scientific excellence on our beloved continent. The initiative builds on the work of Oliver Tambo, a prominent pan-Africanist with a science education background, who believed in creating change through education and in cooperation and solidarity with African nations.

"This is an important new chapter in the ORTARChI story. The initiative was first announced in 2017 to commemorate the 100th anniversary of the birth of one of the most important leaders of South Africa's liberation struggle, OR Tambo, who led the African National Congress during the years of exile. Tambo was not only a committed pan-Africanist, but also an advocate of science and technology," said Zengeziwe Msimang, CEO of the Oliver and Adelaide Tambo Foundation. ORTARChI builds on existing continental frameworks and interventions geared towards institutional capacity strengthening, the development of high-end skills, the recruitment and retention of excellent researchers, and incentives to support research that contributes to socio-economic and transformative development.

The Minister also welcomed the progress of the Science Granting Councils Initiative, supported by the NRF, Canada's IDRC, the UK's Foreign, Commonwealth and Development Office, the German research foundation DFG, and Sida, Sweden's International Development Cooperation Agency, working with 15 countries on the continent. In addition to the support provided through the grant for postgraduate

students and postdoctoral fellows, the NRF and the Oliver and Adelaide Tambo Foundation will provide funding for 55 female African doctoral students studying under the supervision of the respective chair holders. "Through international and regional strategic partnerships, the chairs will contribute to the development of long-term, mutually beneficial, research collaboration on the African continent," said Dr Jean Lebel, President of the IDRC. In South Africa, the OR Tambo Chairs complement the successful DSI-NRF South African Research Chairs Initiative (SARChI), which was established in 2006 as a strategic intervention to attract and retain research excellence and innovation in South African universities. Since inception, over 240 SARChI chairs have been awarded, some established through bilateral and trilateral international partnerships, or with private sector partners. The lessons learned over the past decade and the foundations built through SARChI paved the way for the establishment of the OR Tambo Africa Research Chairs, which is seen as a bold and forward-looking approach to building capacity, promoting excellence and leveraging longstanding partnerships for science to contribute to development in Africa. □

The table below holds more information about the 10 chairs.

Chair holder	Institution and country	Thematic area	Research focus
Prof. Gizaw Mengistu Tsidu	Botswana International University of Science and Technology, Botswana	Climate change	Climate change and adaptation in water, vegetation and livestock resources
Prof. Almeida Sitoe	Eduardo Mondlane University, Mozambique	Climate change	Ecosystems for arid and semi-arid zones
Prof. Olga Lompo and Dr Samiratou Ouédraogo	Université Joseph Ki-Zerbo, Burkina Faso	Health sciences	Cancer and public health
Prof. Firibu Kwesi Saalia	University of Ghana	Food security	Food safety and quality
Prof. Nathaniel Boso	Kwame Nkrumah University of Science and Technology, Ghana	Humanities and social sciences	Entrepreneurship and youth employment
Prof. Gerald Misinzo	Sokoine University of Agriculture, Tanzania	Food security	Animal health
Prof. Noble Banadda	Makerere University, Uganda	Food security	Sustainable agriculture
Prof. Stephen Syampungani	Copperbelt University, Zambia	Environment and development	Environmental management
Prof. Imasiku Nyambe	University of Zambia	Water research	Water quality and catchment protection
Prof. Hulda Swai	Nelson Mandela African Institution of Science and Technology, Tanzania	Nanotechnology	Antimalarial drug delivery

Impact of solar towers on birds investigated

Research conducted into the impact of solar towers on bird populations.

It is possible to reduce the impact that concentrating solar power (CSP) towers might have on bird populations by managing the infrastructure well, especially during downtime when it is not generating power. So says HP van Heerden, after completing research at South Africa's only concentrating solar power tower.

Van Heerden's study was the first to focus on birdlife around the Khi Solar One facility near Upington in the Northern Cape. He received his MSc in Conservation Ecology from Stellenbosch University earlier this year. Van Heerden's fieldwork showed that the solar tower does have an impact on the typical bird populations found in the area throughout the year or seasonally, but less so than was expected. Various species make their home in and around the facility. "When considering renewable energy options, one must always consider the pros and the cons for the environment and the impact it may have on the plants and animals," Van Heerden explained the rationale behind his study.

Van Heerden took his lead from similar studies previously done in the USA and Spain. He did surveys on the solar tower site of 315 hectares, as well as on adjacent open veld. It stands amid typical Nama Karoo veld, in an area that receives around 150 mm of rain per year. Throughout two seasons he recorded all bird species in sight:

- 57 different species in total
- 2380 individual birds
- In winter 49 species were recorded, none of which were of conservation importance.
- The only birds of conservation importance noted in summer were lanner falcons (a vulnerable species).
- More species (53 against 45) were observed in the adjacent veld than around the solar tower site itself.
- Most species flew no higher than 10 m, the exception being pied crows, Egyptian geese and korhaan.
- Birds were less inclined to breed on the site and around the buildings. On the site itself four sociable weaver nests and those of a korhaan, two dove species, a Namaqua sandgrouse and a southern common fiscal were recorded.

The erection of the solar tower had an influence on the composition of bird species typically found in the area. Evaporation ponds attracted water birds such as flamingos which had not previously been found on the farm where

it had been built. Wood- and shrubland species, as well as species usually found in urban areas, are nowadays found in greater numbers around the tower area than in the adjacent veld.

Van Heerden also surveyed the area for possible fatalities and injuries:

- 324 injured or fatally injured birds (representing 34 species) were recorded around the greater solar tower. Of these, 285 were found inside the heliostat area (the so-called solar field) and the rest around the power generation unit and the evaporation ponds.
- 61% of incidences were caused by birds colliding into structures, while 14% of birds were singed.
- Most dead birds were seed-eating resident birds like the red-billed quelea and lark-like bunting which are fairly common in the area. Apart from one lanner falcon and one white pelican, no birds of conservation importance were among the casualties.
- Camera traps showed that some of the dead birds were eaten by pied crows, Cape foxes and yellow mongooses.

"Most birds collided against structures in the area where the freestanding heliostats are, and mostly along the lower quarter of these structures, roughly 3,2 m above the ground, involving the last two panels of each heliostat," Van Heerden explained. "That's at about the normal flight height of birds like red-headed finches and lark-like buntings." Most incidents occurred early in the morning or around sundown when birds are most active. According to Van Heerden, the collisions possibly occurred when the heliostats stand at a 90-degree vertical position for a limited period during sunrise and after sunset. "It creates the illusion of an unbroken landscape and can completely confuse the birds," he reasoned.

Most often it was migrating birds and species that hunt their prey in the air that were fatally singed during summer months by the so-called solar flux – a concentrated beam of sunlight that radiates from the heliostats past the central receiver and can reach temperatures up to 800 degrees Celsius. "The bright light radiating from the mirrors of the towers can attract insects and, in the process, also insect-eating birds," continued Van Heerden.

"When something like a moving bird perhaps flies through the solar flux, it can be singed because the sunlight from the heliostats collides with an object and is converted into thermal energy." Most of the singeing incidents were recorded during a time that the heliostats were not in use, owing to power plant downtime. The heliostats stood in a standby position, which resulted in a kind of halo effect and singeing (solar flux) in the air above the tower. Some media reports from the USA that claim that up to one bird per minute (which would amount to 28 000 birds per year) could die due to solar towers, Van Heerden said: "My findings do not support such claims. These are more likely made based on anecdotal evidence rather than good data."

"Based on data from the current study, these claims seem exaggerated," agrees Prof Karen Esler, one of van Heerden's study leaders and chair of Stellenbosch University's Department of Conservation Ecology and Entomology. "For perspective on the real impact of solar towers, one should compare bird fatalities around the site with those caused by other human activities in the area, such as farming, mining or the road network." A study conducted in 2014 estimated that between 98 million and 980 million birds die annually in the United States after colliding into buildings or windows. Up to 3,7 billion are caught by cats, and between 89 million and 340 million die because of traffic-related incidences.

"Some impact by solar towers on the environment is almost unavoidable, but can be minimized if managed right," reasons Van Heerden.

He therefore recommended the following to operators of CPS facilities:

- Heliostats should not be positioned at exactly 90 degrees during early mornings and late afternoons when birds are most active.
- The intensity of the concentrated energy or solar flux radiating out above solar towers could be reduced when the heliostats are in standby position and not operational.
- Heliostats should preferably be set in a horizontal position when solar power is not being generated by the facility.

Khi One Solar lies approximately 18 kilometres south-west of Upington, where its 215-metre-high tower stands out across the landscape. Construction began in 2012, and it has been operational since February 2016. It can generate 50 MW of clean energy to around 45 000 households. To generate the same amount of energy, coal-burning power stations emit roughly 183 000 tons of carbon dioxide per year.

Concentrating solar power (CSP) facilities constitute one of four ways in which solar power can currently be converted to electricity. Sunrays are focused onto large mirrors (known as heliostats) and are then reflected to a receiver as thermal energy. Here it is concentrated and converted to electrical energy by way of a conventional thermoelectric power cycle. □

"Satellites improve life" in celebration of World Space Week 2020

South Africa joined the rest of the world this week to mark World Space Week (WSW), celebrating the 2020 theme, "Satellites improve life."

This year's theme highlights the importance of satellites in daily life. More and more every aspect of our lives is affected by satellites, including communications, environmental monitoring; transportation; weather forecasting; telemedicine, and science, to mention but a few.

In South Africa, the Department of Science and Innovation has made huge investments in growing its satellite build programme. In 1999 the 64kg SUNSAT was developed by Stellenbosch University, and launched from a United States of America (USA) vehicle, a few years later in 2006 the 81kg SumbandilaSAT was developed by Sunspace, and launched in 2009 from a Russian vehicle, in 2013 TshepisoSAT was developed at Cape Peninsula University of Technology (CPUT), and launched from a Russian vehicle, the institution launched another cube statelite in 2018, ZACUBESAT-2.

Developing a thriving satellite industry is part of Government's economic recovery programme. The current overarching priorities of Government for strong, sustainable and inclusive growth are: Poverty alleviation; Address inequality and Job creation. In 2015, South Africa identified a nine-point plan aimed at diversifying the South African economy. In five of the areas identified, satellites can play a significant role to enhance their contribution to the GDP. They include, (i) agriculture and agro-processing; (ii) private sector investment; (iii) stimulating small, township and rural enterprises; (iv) Operation Phakisa (ocean's economy); and (v) energy security. Therefore, Space Science and Technology will make an immense contribution to the National Development Plan particularly in addressing the geospatial legacies of apartheid and alleviating the triple challenges.

The primary rationale for the satellite programme is to leverage the benefits that space science and technology can deliver to a host of socio-economic applications. This rationale remains central to empower better decision making through the integration of space-based systems with ground-based systems for proving the correct information products at the right time; and to use space science and technology to develop applications for the provision of geospatial, telecommunication, timing and positioning products and services.

Last month, the Minister of Higher Education, Science and Innovation, Dr Blade Nzimande, briefed the media about

CPUT students worked on the ZACUBE 2, a project funded by the Department of Science and Innovation.

the establishment of the Space Infrastructure Hub. The Department's entity, the South African National Space Agency (SANSA), was awarded R4,47 billion in additional funding over the next three years to develop a Space Infrastructure Hub as part of the government's Sustainable Infrastructure Development Symposium (SIDS) initiative. The SIDS initiative is mobilising private and public funding for infrastructure development in support of economic growth and job creation.

The Minister said the R4,47 billion grant would include a number of satellite builds for Earth observation and space science missions, a new ground station, an expanded data segment and new data visualisation centre, the activation of a satellite-based augmentation system over Southern Africa, the development of products and services for use across all spheres of government, and human capital development and training.

Dr Nzimande, highlighted the importance of transformation in the establishment of the Space Infrastructure Hub, noting that the space sector has historically been inaccessible to black people and women. "Black participation is a must and a non-negotiable. Innovation is everywhere and must be sourced from every part of South Africa, whether in urban or rural areas." The Minister emphasised that the hub would support localisation across the entire value chain. "This is very important, particularly because South Africa has the capacity to build satellites. These skills must be increased and expanded to support localisation."

Dr Nzimande, added that partnerships with industry and academia – and, in the future, technical and vocational education and training (TVET) colleges – would be key to building the required skills base, particularly among black people and women. The Space Infrastructure Hub project marks a significant milestone in the development of an indigenous space capability that will serve the needs of all South Africans, while ensuring that the country grows its capacity and infrastructure to continue to champion world-class space science research and innovation.

Digital infrastructure investment had become a high priority due to society's increasing dependence on technological systems that rely on space infrastructure, such as satellites and ground stations. Daily weather forecasts, instantaneous worldwide communication, navigation systems, and the constant ability to record high-resolution satellite images are all examples of space infrastructure applications that are in increasingly high demand. Even basic commodities such as food and energy resources are facilitated through the application of space-based technologies.

World Space Week is a United Nations declared celebration of space which is held annually, from 4 to 10 October. According to the organisers of WSW, it is the largest space event on Earth, last year over 8,000 events were reported, which took place in 96 countries. The annual event sees thousands of organizations, including space agencies, aerospace companies, astronomy clubs and museums organising a host of activities.

During the WSW two milestones are celebrated, the first being, the 4th October 1957, which saw the launch into outer space of the first human-made Earth satellite, Sputnik 1, opening the way for space exploration. And the second, is the 10 October 1967, which saw the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies entered into force.

The purpose of the WSW is to educate people around the world about the benefits that they receive from space, encourage greater use of space for sustainable economic development, demonstrate public support for space programs and foster international cooperation in space outreach and education. □

CSIR asks for more resources as it implements new strategy

Parliament's Standing Committee on Appropriations has undertaken to approach National Treasury to ensure adequate funding for the Council for Scientific and Industrial Research (CSIR), one of the entities of the Department of Science and Innovation.

This follows a presentation to the committee by CSIR Executives last week on the impact of COVID-19 on the CSIR's operations, with the main issues being budget cuts, under-funding, and procurement and tendering for work. In the virtual meeting, committee member Ms Dipuo Peters commended the CSIR for the work it had done and would go on doing within the entity's limited budget, particularly in response to the COVID-19 pandemic.

Peters pointed out that if institutions like the CSIR were not adequately funded, they could not help the country fight poverty. She said that the Committee needed to engage with National Treasury about the need to increase expenditure on research and development to above 0,83% of GDP, because South Africa depended on proven innovation to move into the "new normal" post-COVID. She said it was important for the Committee to look at how it could help the CSIR to secure the funding it needed.

The CSIR received the bulk of its income from the public sector and core Parliamentary grants. About 11% of funding came from the private and international sectors, and two per cent from royalties, licences and other income. It was important for the CSIR to diversify more for the local and international private sectors, and to commercialise technologies in order to balance its income from the public and private sector. Ten years ago, the Parliamentary grant made up 29% of CSIR's income, but in 2020 only 26%. The innovation, commercialisation, technology transfer and diffusion programmes were affected by the R8 million cut. Support portfolios had been impacted by R29,2 million.

The CSIR CEO, Dr Thulani Dlamini, said that the CSIR was facing challenges in delivering on its mandate because of the constraints it experiences with regard to public procurement, the Parliamentary grant and the need for its recapitalisation and investment requirements. The Chairperson of the CSIR Board, Prof. Thokozani Majozi, told the committee the organisation was implementing a new strategy, which had a stronger focus on industrialisation, compared to its previous emphasis on scientific research. The CSIR was tasked with conducting directed multidisciplinary research and technological innovation in order to foster scientific and industrial research, with the ultimate goal being to improve the lives of ordinary South Africans.

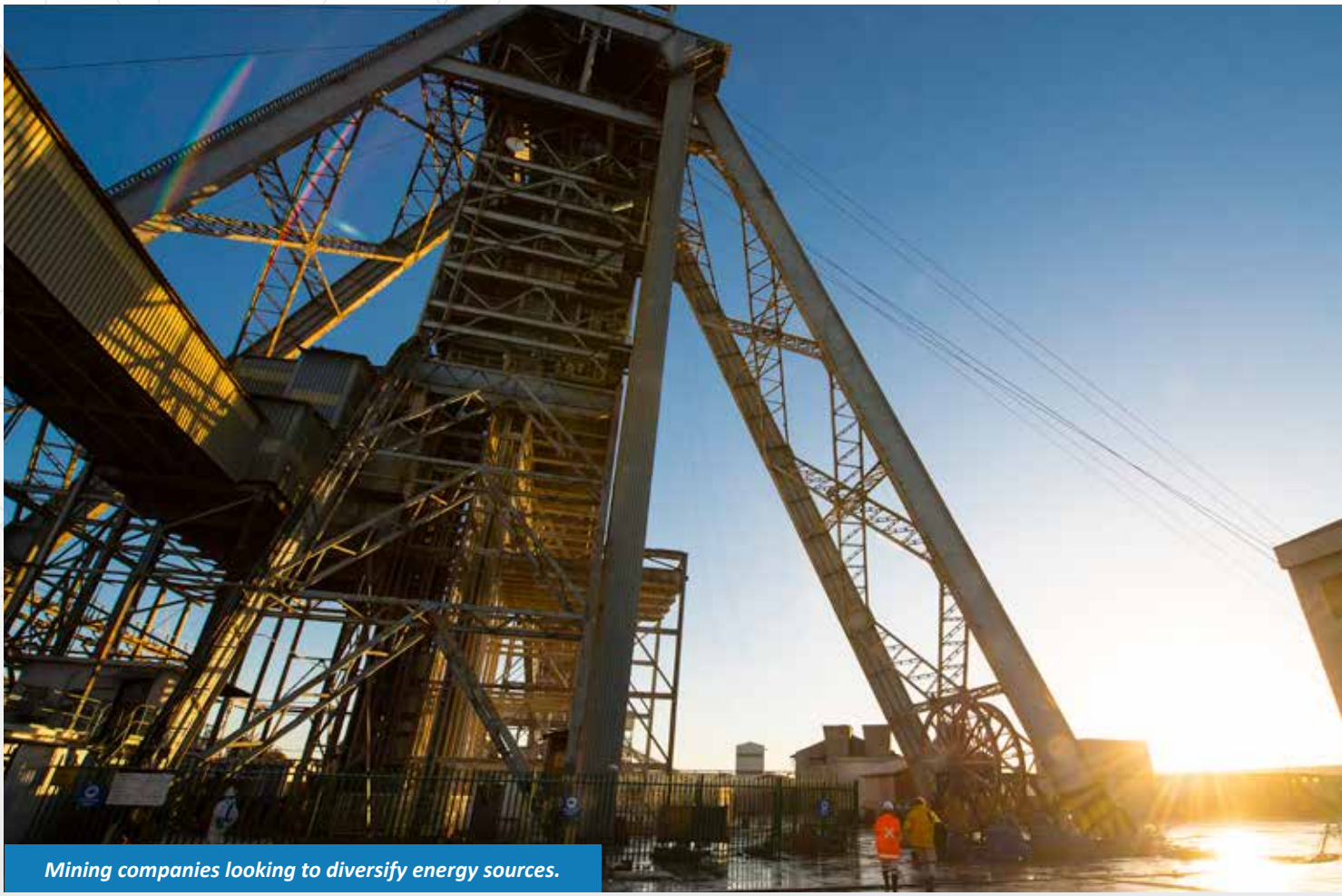
"The CSIR is mindful of the strong industrial and scientific research component integrated into the new strategy, but it will need more government investment to implement the strategy. If the strategy is well implemented, the CSIR will be self-sustainable in the future," said Prof. Majozi. The drivers for the successful implementation of this strategy were business development and commercialisation, technology transfer and diffusion, governance, values, ethics, people, culture, the fourth industrial revolution and emerging technologies. The implementation plan guided the investment of the Parliamentary grant received by the CSIR. The key pillars of the plan were strategic clusters, capability development, human capital development and strategic infrastructure.

To implement CSIR's strategy, a total of R4,72 billion has been allocated to these four pillars. The investment will support the development of new capabilities and the strengthening of existing capabilities to ensure the CSIR remains globally competitive and relevant. It will also support investment in infrastructure and the development of human capital.

Dr Dlamini said what had set the CSIR apart from academic institutions was its ability to foster industrial and scientific development, but in recent years this ability had been lost and not enough was being done to rectify the situation. "The CSIR needs to do more, especially in terms of industrial development. The CSIR wants to accelerate socio-economic prosperity according to its vision by collaboratively innovating and localising technologies, reducing dependence on imported technology. It has also contributed greatly to government and society through knowledge and research," Dr Dlamini told the committee. □

New research study to promote a more energy-efficient mining sector

With electricity costs on the increase, and power utility Eskom experiencing ongoing constraints, mining companies should be looking to diversify their energy supply through alternative self-generation technologies such as renewables.



Mining companies looking to diversify energy sources.

This is the view of researchers who have been commissioned by the Mandela Mining Precinct to develop, through directed research and development, an energy-efficiency guideline for South Africa's mining industry. Mandela Mining Precinct programme manager Martin Pretorius, speaking at a virtual workshop on 17 September, said the research team was investigating current systems in the industry "with the aim of structuring alternative energy sources and optimising energy supply strategies for efficient energy utilisation". Pretorius added that team, representing a number of universities and science councils, was working closely with industry experts to ensure that the resulting framework and guideline gained

industry support and uptake. The research theme is led by Dr Xianming Ye, senior lecturer at the University of Pretoria's Centre for New Energy Systems. Ye, also speaking at the workshop, said the study focused on both the financial and technical viability of renewable energy options available to the industry.

Dr Peter Klein, an energy expert from the Council for Scientific and Industrial Research (CSIR), noted that South Africa had been experiencing rapidly rising electricity costs since 2008, and that these had been difficult to absorb for many mining operations. "The 2019 Integrated Resource Plan indicates that the cost of electricity will continue to increase in real terms up to 2050 as the ageing coal fleet is replaced with new generation capacity."

While grid electricity prices continued to rise, Klein said, the costs of renewables such as wind and solar photovoltaic (PV) energy would continue to decline, presenting new opportunities for industrial users to consider embedded generation – i.e. to consider producing on-site, on a small scale, their own electricity.

However, as going off-grid was currently cost-prohibitive, an optimal solution would likely include a mix of grid electricity supplemented with embedded generation using renewable sources. Regarding the availability of renewables for self-generation, Klein said that climate models indicated the presence of good solar resources in South Africa's gold and platinum mining regions. Regarding wind power, while there were poor resources in the identified mining regions, a good wind resource existed in an area of the North West that was within 100 kilometres of a number of mines.

Klein explained that there were three main options for generating power using solar sources. This could be done through solar PV technology; through concentrated solar power (CSP) technology, which converts solar energy into heat using concentrating collectors to drive a steam turbine and thereby produce electricity; or through solar thermal systems that generate heat for industrial process heating.

From a technical and financial perspective, Klein said that a mix of solar and wind offered the most cost-effective mix, due to the complementary nature of solar and wind sources

The DSI is investing in mining research to modernise and made the industry safer.

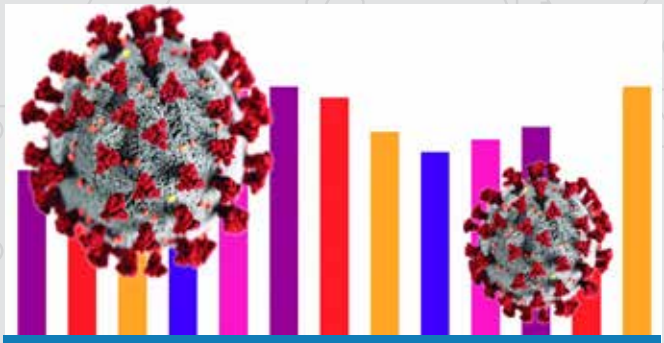
and the decreasing costs of the associated technologies. Solar and wind could also be supplemented with gas and biomass, while energy storage systems, together with demand-side management, could be used to offset the variabilities of solar and wind.

Dr Farshad Barzegar, also from the Centre for New Energy Systems, said that a number of energy storage options were available, offering various lifetimes and capacities, that should be considered in line with energy demand. Dr Henerica Tazvinga, a researcher at the South African Weather Service, said South Africa's energy mix would look very different by 2030. Coal, which currently accounts for 71% of the total mix, is expected to represent only 43% by 2030, followed by wind, which is expected to increase sharply from its current 4% to 23% of the energy mix.

The Mandela Mining Precinct is a public-private partnership between the Department of Science and Innovation and the Minerals Council South Africa. The Precinct is managed and hosted by the CSIR. □

SAWISA WEBINAR SERIES

The Department of Science and Innovation (DSI) has partnered with the Organization for Women in Science for the Developing World (OWSD), Black Women in Science and Nka'Thuto EduPropeller to host a series of webinars starting in this month.



Global study finds that COVID-19 has negatively impacted women in research.

The DSI currently supports the work of these three organisations, which focus on women in science, technology, engineering, mathematics and innovation (STEMI). Every year since 2003, the DSI has held the South African Women in Science Awards (SAWiSA) to recognise the achievements of prominent women scientists and encourage the participation of women in research. The awards are held in August, as part of national Women's Month celebrations, which take place to honour the women who marched to the Union Buildings in 1956 to protest the apartheid system's pass laws. Given the suspension of big public events due to the COVID-19 pandemic, the DSI has cancelled SAWiSA and will instead hold webinars to celebrate women's achievements in science and to engage on challenges that are still militating against the participation and success of women in science and research.

The webinar series features previous SAWISA award winners, who talk about where they are now in their research work, and engage with specific topics related to the participation and experiences of women in science, research and innovation. Women and girls are under-represented in STEMI globally, and there are various problems that need to be addressed if women are to achieve equitable status and representation in research and innovation.

The first webinar will took place on 26 August and dealt with COVID-19 and its implications for women. The pandemic has had a significant impact on society, and has deepened existing inequalities in lives and livelihoods. An unprecedented contribution is required from the science and research enterprise, to make a difference. On 9 April 2020, UN Women released a policy brief on "The Impact of COVID-19 on Women", covering how the pandemic has exacerbated women's human rights in terms of health, economic security, social protection, unpaid care work and gender-based violence, among other things, and suggesting priority measures to be take in response to the situation. The Organisation for Women in Science for the Developing world (OWSD) recently conducted a survey of its members and how COVID-19 had affected their lives and careers.

The OWSD study found that the negative impacts of the COVID-19 pandemic on work, research, or studies were: being unable to travel to conferences or other important work events; being unable to perform experiments or field work; being unable to provide teaching; being unable to follow courses; and the delay of pending publications. Other negative impacts were the delay or suspension of ongoing funding; difficulty finding collaborators; unable to submit funding proposals; unable to submit publications; missing out on business opportunities or clients; and being unable to take exams as scheduled.

The SAWISA webinar event heard that in Africa women researchers are facing an uphill battle since the COVID-19 outbreak. Fanelwa Ngece-Ajayi, a chemistry professor at the University of the Western Cape, said that the South African Young Academy of Science had already seen a dip in publications by women researchers because of the pandemic. This mirrors global patterns whereby the impacts of the pandemic on academic work, especially the loss of child care, have disproportionately affected the careers of women researchers.

"We have to put in triple the effort to just survive," said Nokuthula Sibiya, the deputy vice-chancellor for teaching and learning at the Durban University of Technology. With no end in sight for COVID-19 pandemic, as vaccine trials are still underway, women researchers will continue to suffer as a result of the situation. □

Learning Buddy proves to be a hit overcrowded classrooms

Overcrowding in our classrooms continue to be a challenge for the country's teachers as a lack of space hamper teaching and learning. Tiny classrooms are particularly difficult to contend with in the lower grades as teachers are unable to move through desks to engage pupils on a one on one basis. However, an innovation supported by the Department of Science and Innovation's entity, the Technology Innovation Agency (TIA) and the Product Development Technology Station (PDTS) at Central University of Technology is making a difference.

The organizations, have helped a husband and wife team enhance their research and develop the prototypes.

The Technology Stations Programme (TSP) was established to enable universities to provide technology development services to small and medium enterprises (SMEs). The stations provide innovative science, engineering and technology solutions for complex engineering challenges within the relevant industrial sectors aimed at supporting government's socio-economic priorities. The Department of Science and Innovation provides financial support through TIA, to Higher Education Institutions which house Technology Stations to provide technical support to SMEs in terms of solutions for services and training.

With overcrowding impacting learning the innovation is significant.

The Department of Basic Education reported in 2018 that a quarter of SA's 23 796 state schools were without adequate desks and chairs, meaning that learners still sit on the floor or are crammed in small old desks. Correct sitting posture with support of right furniture is not only a requirement for conducive learning and teaching but an important phenomenon to avert future health problems.

Learning Buddy innovation making a huge difference in overcrowded classrooms.

With the situation not likely to change overnight, teachers have to make do with the current state of affairs. However, an innovation developed by entrepreneur and philanthropist, Marié Janse van Rensburg of the HOLO Foundation in the Western Cape has changed teaching and learning for many teachers and their pupils.

Named the Learning Buddy, the innovation is a low-cost, strong, foldable, two-in-one desk and chair designed to accommodate children from Grades R to Grade 3 or age 6 to 9 years old. The innovation is ideal for cramped environments, providing learners with their own individual desks.

"When we were using old school benches I was unable to move around in class but since we received learning buddies I am able to manage the class well, free up space because they can be stacked in a corner and create space for learners to work in groups when necessary," said Mary Ludho, a Grade R teacher at Excelsior Wine Farm School in Ashton Ludho, said the Learning Buddy is particularly helpful for learners suffering from Attention Deficit Hyperactivity Disorder (ADHD). "Because Learning Buddy is made to accommodate only one learner, they are easy to control, and are unable to disturb others, even when moved there is no noise" added Ludho.

The idea for the Learning buddy came about when Van Rensburg and her husband had quadruplets almost ten years ago. "My husband and I realised that there is such a big need for the most basic needs in families, one of them being a safe sleeping space for a baby. We designed and developed our first product, the Balambie- a convenient additional sleeping cot for babies for indoor and outdoor use.The Balambie project exposed us to organisations that work in the non-profit sector and it was during one of our meetings, that the need for safe learning spaces came up. We started to do some research on basic needs and realised that a safe, strong, single desk will make a difference in school and centres where furniture is limited.

In the current wave on COVID-19, the Learning Buddy is a great furniture to own. It allows social distancing and discourages learners for sharing stationery. Ludho said she made slight adaptation on the desks to accommodate a plastic bag for cleaning cloth and crayons. Van Rensburg concurs that the feedback received so far has been overwhelmingly positive. The best feedback was from teachers who use the Learning Buddies for children with special needs. The Learning Buddy provides a safe space for a child where distractions are limited as the sides of the sitting area are also 'closed in'. Pencils don't fall off the writing space and teachers are putting name tags on the Learning Buddies and the children love this as it is their own space. Another teacher at rural Baden Primary School outside Montagu, who was part of the project for putting learning buddy together can only sing it's praises. Shelly Lourens described the learning buddy as not only beneficial to the learners' health but for teachers too.

She suffered from backaches, therefore moving heavy desks in class was a nightmare. Because the learning buddy is light in weight, she can move them very easily for practical work exercises on the floor. The project started with a basic design that was cut out on a table and with every test prototype it was sent to a school to be tested. It was during this process that a lot of input such as the right height, sitting position and support for the back was received directly from teachers. The prototype was then sent to two independent occupational therapists for testing. All the feedback received was incorporated and that was when the final design was done.

"It took approximately 12 months to have the final design. Every time we received feedback from the teachers or occupational therapists, we went back to the drawing board, made a new sample and had it tested again" explains van Rensburg. As with many new innovations made from recycled material, it is still a challenge to convince the public that the Learning Buddy is a strong and durable product. Learning Buddy is made from corrugated board and there is still a bit of concern from the public regarding the strength of the product. "We do however believe that knowledge is power, and as more and more schools get to use the Learning Buddy, the uniqueness and strength of the product will diminish the concerns regarding the material".

Speaking of other challenges encountered along the journey van Rensburg says that they struggled to get funding and a manufacturer who could produce a small quantity and. "We were unable to find a company who could help us with this as the cutting dyes and process required that we had larger quantities made and financially we were not able to do this. More than 500 Learning Buddies so far have been donated. Van Rensburg wishes to donate Learning Buddies to every school and centre in need of the product, but unfortunately it is not possible because manufacturing and distribution come at a cost.

"We would love to have organisations or companies get involved with the Learning Buddies. If we could sell the Learning Buddies to organisations or companies who then donate them to schools. They could be branded; however, branding will be limited to the sides of the Learning Buddies so that we can ensure that the students are not distracted with images on the writing spaces" □

Bioeconomy SA Portal launched

www.bioeconomy.co.za #bioeconomysaportal

science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

BioEconomy SA
DISCOVER · INVENT · PROSPER

Businesses and individuals involved in bio-innovation are invited to register on the Bioeconomy SA Portal, a web-based platform that collects information from different sources and integrates it into a single, uniform and secure user interface.

The portal, an initiative of the Department of Science and Innovation (DSI), is expected to become a significant tool for facilitating strategic decisions, providing information services, and leveraging expertise and resources to create a value-adding service for the country's biotechnology industry.

The portal stems from the national Bio-economy Strategy, which was launched in 2014 to harness bio-innovation for economic growth and social development in South Africa. The DSI champions the strategy in order to increase the contribution of sectors such as agriculture, indigenous knowledge systems, the environment and health innovation to inclusive economic growth. Dr Maneshree Jugmohan-Naidu, Director of Agricultural Biotechnology at the DSI, believes the Bioeconomy SA Portal is long overdue. "It's a necessary resource to harness bio-innovation for the growth of our economy and the well-being of our people, to make sure that the future is possible," Dr Jugmohan-Naidu said.

The portal was designed to improve the exchange of information among bio-innovation stakeholders, and thereby to stimulate communication, improve cohesion and promote collaboration. Data design and quality management, as well as powerful analytical and reporting capabilities, were incorporated into the design to ensure customised value propositions for all users.

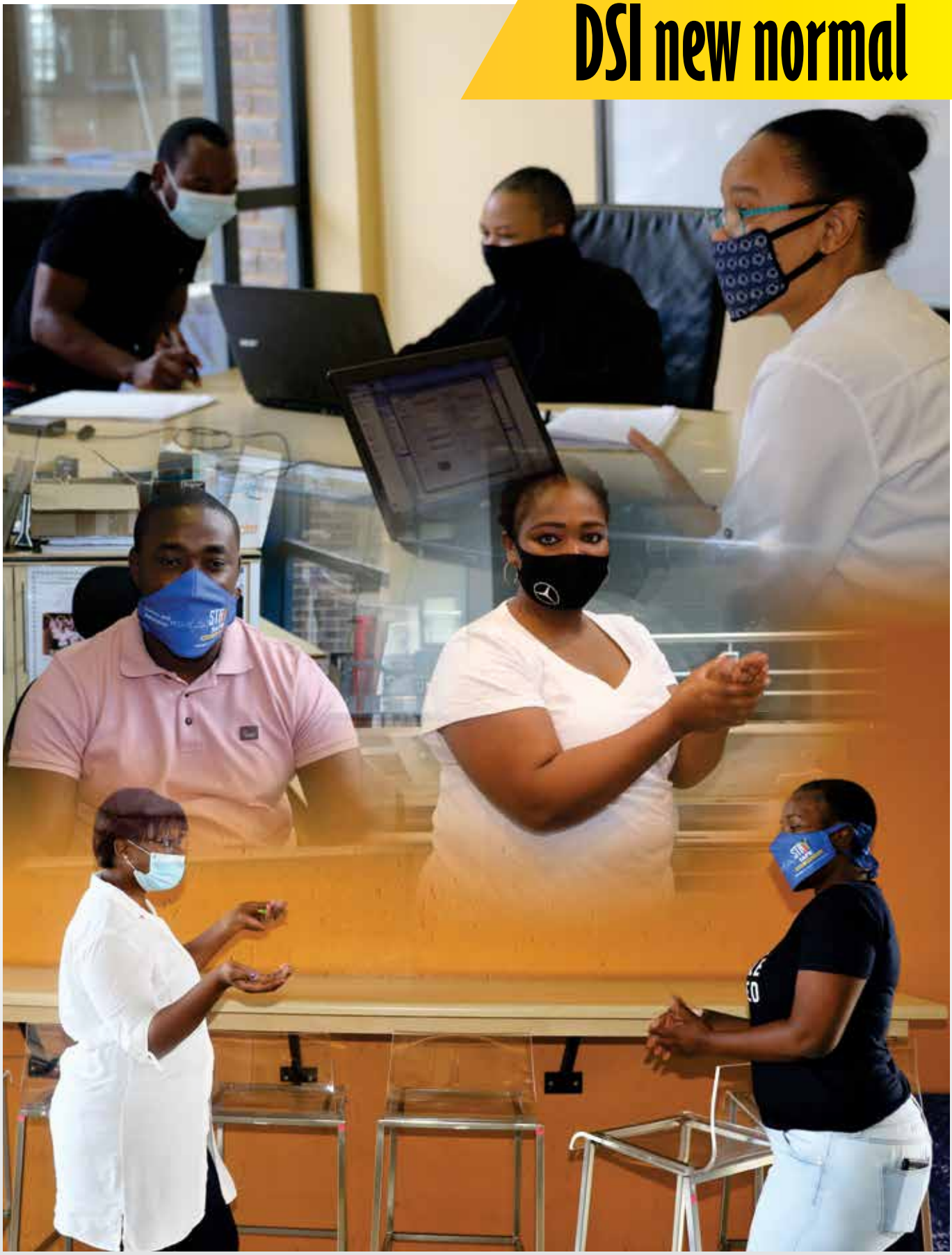
The content of the portal is currently being managed on behalf of the DSI by Biosafety South Africa, a national technology platform within the Technology Innovation Agency. The aim is to provide a national resource that informs both public and private players about the status of biotechnology in South Africa, while contributing to the national value chain by showcasing the bio-innovation ecosystem, resources, opportunities, news and events.

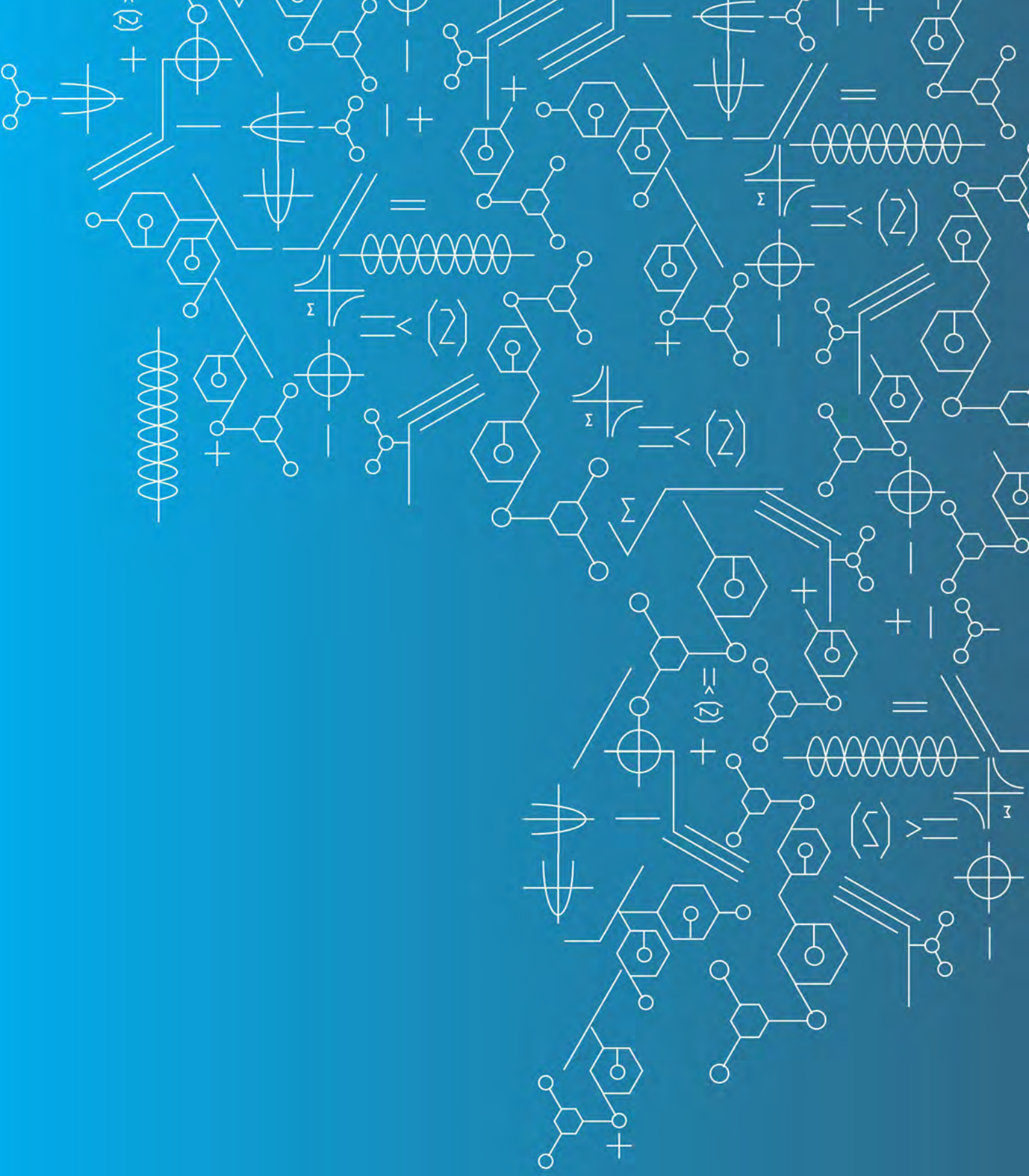
Dr Hennie Groenewald, Executive Manager of Biosafety South Africa, says the success and value of the portal will depend on the participation of the bio-innovation community. "It has therefore been designed intuitively to allow individuals and organisations to easily register and access only the most relevant information," Dr Groenewald said. "Registered members are encouraged to upload content and engage to further build the South African bioeconomy and unlock synergistic value." □

The Bioeconomy SA Portal can be found at
www.bioeconomy.co.za

Bioeconomy SA portal to improve the exchange of information among bio-innovation stakeholders.

DSI new normal





Making sure it's possible

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