

**TIA  
CELEBRATING  
WOMEN IN  
TECHNOLOGY  
INNOVATION**





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## EDITORIAL TEAM:

**Editorial team :** Vusi Langa, Kagiso Ntanga, Lucky Nkosi

**Designer:** Thapelo Marutla

**Contributors:** Xolisa Melamane, Nqangi Mjimba, Caroline Sekgopi, Adele Daniels, Zipho Zwane, Khensani Nkuna, Ashaal Roopchan

**CONTACT US:**  
[newsletter@tia.org.za](mailto:newsletter@tia.org.za)



# FROM THE DESK OF THE CEO

**Dear valued stakeholder,**

**T**he country continues to face economic challenges due to the COVID-19 pandemic and this has adversely affected the livelihoods of many South Africans. Experts agree that technology and innovation will be the primary drivers of any kind of post-COVID-19 recovery strategy and long-term sustained economic growth.

## **TIA CELEBRATING WOMEN IN TECHNOLOGY INNOVATION**

In August, the country celebrated and observed the Women's month paying tribute to generations of women whose struggles laid the foundation for the progress made in empowering women and advancing gender equity. As the country observed this significant month, TIA joined in celebrating the contribution women are making in building and transforming society through technology innovation and entrepreneurship. Of the innovators supported and funded by TIA, 37% are women and this number keeps growing as the agency continues to engage more women who have innovations that can translate South Africa's knowledge resources into sustainable, socio-economic opportunities. The agency embarked on a campaign to shine a spotlight on women innovators supported by TIA. The campaign was carried out through various print, broadcast, and social media.

## **PARTNERSHIPS AND COLLABORATIONS**

TIA is committed to increasing the agency's strategic positioning and brand awareness in the NSI.

A vital element to the success of TIA's strategy to deliver on its mandate is continuous engagement with various stakeholders in the NSI, industry and the public sector. This, we do through establishing mutually beneficial partnerships and collaborating with like-minded organisations, locally and internationally.

In this regard, we can highlight our collaboration with Africa Bio in hosting the 5th Bio Africa Convention in Durban. The Bio Africa Convention showcases Africa's Biotechnology innovation in the health, agricultural and industrial sectors, bringing business leaders, entrepreneurs, researchers, regulatory authorities, and policymakers under one roof.

TIA partnered and was headline sponsor for the SA Innovation Summit held in Cape Town in September. The largest start up event in Africa, SAIS provides various platforms for developing and showcasing African innovation and thought leadership to support start-ups and inspire sustained economic growth across Africa.



The importance of agriculture in our economy and in the daily lives of ordinary South Africans can never be downplayed. To ensure food security, it is important that small holder farmers and the informal market participate meaningfully in this sector. As part of the technology diffusion objective of the ABIPP, TIA in collaboration with the DSI and Cotton SA handed over two locally developed cotton balers to small holder cotton farmers in Matlerekeng Village, Limpopo in August. Access to the baling equipment will cotton farming communities to save on input cost associated with harvesting and transporting cotton.

## **UNIVERSITY OF WITWATERSRAND CELEBRATING 100 YEARS**

One of the country's iconic institutions, the University of Witwatersrand celebrates its centenary, this year. The 100th anniversary is an ideal opportunity to reflect on the impact and the challenges of the university's past, celebrate its impressive achievements, and most importantly, build on its future. Wits and TIA have a long-standing partnership, that entails numerous programmes to promote innovation and we will continue to maintain this relationship. We wish the university well as the institution ventures into its second century.

On behalf of the management of TIA, I would like to thank our employees, partners, and stakeholders for the commitment and support through this challenging economic climate. We can all be proud of our accomplishments while we focus on future opportunities and the path that lies ahead. Collectively, our team will continuously improve to build TIA into a world class agency.

**Patrick Krappie, ACEO**



# BIO AFRICA CONVENTION 2022



The flagship Bio Africa Convention made a come-back as an in-person gathering of biotechnology stakeholders, in August. The convention is an international event that brings business leaders, entrepreneurs, researchers, regulatory authorities, and policymakers under one roof, and was hosted at the Durban ICC from 27 – 31 August 2022. The Bio Africa Convention showcases Africa's biotechnology innovation in the health, agricultural and industrial biotechnology. *"Africa Resilient: Life sciences innovation for achieving health and food security"* was the theme for this year's convention.

Biotechnology is an important component of the African bio-economy and is recognised globally as the future technology for developing food, medicines, feed and fuel resources. The importance of this economic sector is further propelled by the adoption of several national bio-economy related strategies and policies in many African countries. In South Africa, TIA is one of the implementing agents of the national Bio-economy strategy. Through its bio-economy strategic pillar, TIA supports the translation of South Africa's knowledge resources into sustainable bio-based solutions for impact through the convergence of specific focus areas, namely Health, Indigenous Knowledge Systems (IKS), Agriculture and Industrial Biotechnology. In addition, TIA manages cross-cutting Technology Platforms, Technology Innovation Clusters and Programmes. To this end, by collaborating in this flagship continental event, the agency is playing its role as a funder, connector, facilitator and enabler.

TIA, once again, was in full support of the convention evidenced by the participation of TIA management, staff and supported innovators in various tracks and the exhibition. The convention was anchored by

an insightful programme of industry experts and thought leaders sharing experiences, wealth of knowledge and discussing critical issues facing the industry. The programme included panel discussions, partnering, exhibitions and company presentations.

The convention was officially opened on 29 August, by a high-level plenary session chaired by the Director General of Science and Innovation, Dr Phil Mjwara. Participating in the plenary was the CEO of Bio International, Dr Michelle McMurry-Heath. The Minister of Higher Education, Science and Technology, Dr Blade Nzimande delivered the keynote address virtually.

In his remarks, the Minister commended the organisers and supporters of the Bio Africa Convention for the work that was done to ensure the convention happened again after the Covid pandemic.

"The organisers of this year's convention could not have chosen a more apt theme, intended to inspire Africa's policy makers, scientists and social actors to steer our continent away from being only a knowledge consuming region

and turning it into a self-reliant, knowledge generating and innovating one.

"As a country, the objectives of this convention perfectly align with our 2019 White Paper on Science, Technology and Innovation and our Science, Technology and Innovation Decadal Plan 2021–2031, whose key objectives include accelerating the implementation of the pan-African STI agenda and focusing on inclusivity, transformation, SMME support and job creation amongst others," said Dr Nzimande.

The TIA delegation, led by Dr Vuyisile Phehane, played a large role in the programme. Board member, Ms Anati Canca was on the plenary on the second day, that was dedicated to women in the biotechnology space. Ms Canca highlighted the need for collective efforts by innovation system players on the African continent towards closing health access gaps, and achieving food security. Inclusive innovation must take into account the aspirations of marginalised and rural mostly rural communities, for whom women are the majority potential recipients of innovation support. At the same plenary, Dr Phumzile Mlambo-Ngcuka also awarded three young women with the Dr Konji Sebati Female Leaders of Tomorrow Fellowship. The fellowship offers young women scientists a combination of work experience that is focused on several areas within the business of science, from innovation management, strategy, finance, communications to science and innovation policy.

The BIO Africa Convention is an opportunity for exhibitors to showcase new technological advances and innovations in the biotechnology sector to potential investors, other SMME's, industry, and the research community. TIA invited investees in the health, agriculture, industrial biotechnology fields to exhibit at the convention. The selected investees were a good fit for the theme of the





convention.

Among these were technologies such as Osteogenic Bone Matrix (OBM) developed by Altis Biological (Pty) Ltd; and the CapeBio™ Technologies Pty Ltd which has a proprietary large-scale biomanufacturing process for reagent enzymes used in molecular research and in vitro diagnostics (IVD). Other technologies that offered solutions towards food security are Kleinskuur Gravel Barrel Auto Syphon System and AgriViro.

Dr Vuyisile Phehane was the chair of the Health track titled, "Healthcare innovations in the age of pandemics." Within this track were four sub-tracks, namely, Vaccines a platform for development, Diversity in clinical trials, Advance in medical technologies, Pharmaceuticals, and Collaborative research for the translation of research outcomes. The key message from this track was that (i) Africa was to aggressively invest in the development of its own vaccines, from capacity to infrastructure, to not only deliver needed medical interventions, but to establish itself as a hub for manufacturing and global sales, (ii) the opportunities for ensuring diversity in clinical trials were under-exploited, and presented potential for superior clinical trials data of value to pharmaceutical companies (ii) strong political will, consolidation of efforts,



the deliberate support of local manufacture by government procurement, the use of generated data analytics to support clinical trials and the localisation of pharmaceutical and active pharmaceutical ingredients are the critical success factors for the localisation of bio-manufacturing.

The convention took a hybrid format with over 500 delegates attending physically and a further 700 attending virtually.

The mission of the convention is to catalyse and build African innovation capacity. This would enable the development of products that are currently imported, with a focus on local manufacturing. Africa's reliance on the import of lifesaving drugs such as insulin, HIV antiretrovirals and vaccines exposes the continent to major risks like global vaccine nationalism and currency fluctuations.

## CARIBBEAN INDUSTRIAL RESEARCH INSTITUTE **VISIT TO TIA**



**T**he future of TIA lies in the strategic value of purposeful partnerships. International partnerships provides a means for developing intercultural competencies as well as expanding the scope and impact of South African

discoveries and innovations. TIA fosters pioneering collaborations with local and international organisations and institutions to enrich the support it can offer to innovators. The agency was presented with another opportunity to do this with the Caribbean Industrial Research Institute (CARIRI).

TIA hosted a delegation from CARIRI in August. CARIRI is an agency of the Government of Trinidad and Tobago tasked with the development of the country's technological base through the provision of technical and technology-based support services to public and private sector role-players. CARIRI is widely recognised as a centre of excellence that provides innovation support through financial and non-financial instruments.

The visit to TIA was part of CARIRI's benchmarking exercise as the institution is reviewing its impact and processes. The delegation interacted with various institutions in the NSI with the purpose of learning what has worked and what institutions such as TIA have achieved to date.

The parties exchanged views on the funding of SMME's and how to strategically develop, promote and manage inter-organisational relationships and partnership opportunities.

Among the areas of collaboration explored, CARIRI highlighted renewable energy and industrial biotechnology as priority areas and expressed intent to foster collaborations with TIA in areas of mutual interest. For TIA, the visit by the CARIRI delegation is an affirmation of the impact the agency has. It is also an indication that despite the challenges, the work and track record of TIA is recognised far and wide.



# TIA SUPPORTED ICT INNOVATIONS SHOWCASED AT GOVTECH

The National e-Government Strategy and Roadmap, which aims to guide the digital transformation of public service in South Africa states: Information Communications Technology (ICT) is perceived as a key enabler to governments globally in efforts to deliver better services and efficiency while enhancing their relationship with citizens and business. The National Development Plan (NDP) of South Africa stipulates that by 2030, Government will make extensive use of ICT to engage with and provide services to citizens. This will be achieved through "an enabling, coordinated and integrated e-Strategy" that cuts across government departments and sectors.

The aspirations of the NDP place innovations in ICT at the forefront of achieving these ideals. TIA, in supporting the state to deliver on mandates to transform economy and the lives of South Africans has funded and supported some ground-breaking innovations in the ICT sector. Some of these were on display at

## Innovations showcased at GovTech 2022

### Quickloc8

Quickloc8 is a technology company that uses IoT technology, visual algorithms, Machine Learning, and Artificial Intelligence instances to provide software and hardware solutions for the operation and modernisation of the South African taxi and public transportation industry.

The company's patented technology provides private and governmental entities with real-time commuter mobility and behavioural data, daily revenue generation by buses and taxis, reports on trips and kilometres operated, accurate mapping of routes with real time compliance reporting, deep driver profiling with incentives calculation algorithm, fare collection reports, and back-office reporting. The AI-embedded camera solution plays a key role in improving safety for women and children during transit.



### PAISA

PAISA Technology provides Video Management Software with added intelligence video analytics capabilities. PAISA focuses on the creation and market launch of software for intelligent security systems, occupational health and safety, and other fields where safety of people is concerned. PAISA Technology's camera and radar sensors can observe and recognise specific objects including humans, heavy and light vehicles, and traffic cones. The technology aims to reduce risks involved with heavy machinery, vehicles, and equipment in environments to enhance people safety.



### Tsolo

Tsolo are the creators of the first locally developed cloud storage technology. The Tsolo Products Division looks towards the future of cloud storage by developing digital storage products that compete with the major providers by delivering a fully compliant and equivalent storage product at a significantly reduced price point for the South African market. This would make cloud storage more accessible to SMMEs. Tsolo offer a full continuum of technical services to clients and can build computer hardware, craft bespoke software infrastructure and engage in full systems analysis.



the GovTech Conference hosted in Durban in September.

GovTech is hosted by the State Information Technology Agency (SITA). It is an annual meeting platform for representatives from government and industry to connect in serving citizens to better use information and communications technologies. The conference aims to promote knowledge-sharing and fostering dialogue among ICT role players with a common interest in the digital transformation agenda of government. The 2022 event was themed: Reshaping Citizen Experience Through Enhanced Service Delivery.

The key synergy between the objectives of GovTech and the mandate of TIA is the use of innovative technologies to create a better life for South Africans. This would be possible by using ICT innovations in areas such as public service delivery, security, safer transportation, cost-effective access to data storage, and connectivity, among others.

The TIA delegation was led by Head: ICT Thabang Mpye and included three TIA supported companies within the ICT portfolio namely, Quickloc8, PAISA and Tsolo.

"GovTech offered a good opportunity for ICT to showcase its supported innovations, networking and ecosystems building. The conference also allowed us to meet with government decision makers and industry leaders where we were able to engage and understand their pressing needs," says Thabang Mpye.

"It was interesting to validate the importance of our cloud storage platform (Tsolo Red) with the government sector as well as SMMEs. Tsolo obtained various qualified leads most of which came from government entities, specifically municipal authorities. They all were excited about the sovereignty of the data storage as well as price point offered by Tsolo. Quickloc8 made significant strides so much so that they secured a meeting with BCX and other government leaders," he concludes.



# FIELD SCREENING TEST KIT FOR MYCOTOXINS IN AGRICULTURAL COMMODITIES



**M**ycotoxins pose a major food safety hazard when present above certain levels in food. Mycotoxins are produced during growth of mycotoxin producing fungi especially those belonging to the genus *Aspergillus* spp, such as *Aspergillus flavus* and *Aspergillus parasiticus*, which grow naturally in the soil, decaying vegetation, hay, and grains.

Exposure to high levels of mycotoxins such as aflatoxin B1 is associated with fatal human diseases such as development of liver cancer, which is the third-leading cause of cancer death globally, while exposure to fumonisins has been linked to occurrence of oesophageal cancer. According to the National Library of Medicine, the incidence of oesophageal cancer is highest in the Eastern Cape Province, especially in the rural areas such as the Transkei, where the consumption of foods contaminated with *Fusarium verticillioides* is thought to play a major contributing role to the incidence of the cancer.

The Bio-economy Strategy's objective for agriculture is to strengthen agricultural biosciences innovation to ensure food security, enhance nutrition, food safety

and improve health, as well as enable job creation. TIA in implementing the strategy considers innovations that not only enhance food safety, but also have economic impact. Safer commodities would improve international competitiveness for South African produce while ensuring that the food consumed by citizens is safe.

In 2022, the CSIR was funded by TIA to develop three complementary products, a lateral flow rapid diagnostic test kit, mycotoxin standards and recombinant monoclonal antibodies for mycotoxin testing. In the project, led by Dr Nomusa Dlamini, the CSIR is using their proprietary information such as microsphere beads to assemble the testing device. The prototype lateral flow testing kit for aflatoxin B1 has been developed and evaluated at laboratory scale, while production of high purity mycotoxin standards has been evaluated using CSIR fungal collections. The work on production of monoclonal antibodies is in progress.

The levels of mycotoxins in internationally traded agricultural commodities such as wheat, rice, barley, maize, sorghum, soybeans, groundnuts, and oilseeds is regulated by international trade bodies such

as The Joint FAO/WHO Food Standards Programme and the Codex Alimentarius Commission (CAC) (2003), as well as the European Union. In the European Union, the permitted maximum levels of aflatoxins in food ranges from 4-15 µg/kg, depending on the food product. Mycotoxin levels above the recommended levels create a trade barrier for developing countries especially because the hot climatic conditions favour the growth of fungi and subsequent production of mycotoxins. The accurate testing of mycotoxins in agricultural commodities is very important as a safety measure to protect the health of consumers, and as an instrument to facilitate international trade of safe and acceptable food commodities.

The products funded by TIA are positioned to address food safety issues, quality control issues on food and feed commodities especially at export markets. The project will enable localisation of manufacturing, which will lead to skills transfer and job creation. The lateral flow kit will enable small scale and commercial farmers to conduct quality control at production site, thus facilitating access to markets and improved trade. The test kit will also be usable by non-technical workers and is projected to reach markets in the next 2-3 years.



# IK-BASED TEAS AND INFUSIONS FROM INDIGENOUS PLANTS



South Africa is the 3rd most Bio-diverse country in the world, with many of its biological resources existing within rural landscapes of the country. These biological resources have been used for years within traditional knowledge systems to build and strengthen the body, nourish, and rejuvenate the skin and heal ailments. Most of the knowledge of these indigenous resources lies with elderly members of rural communities.

Within the Bio-economy pillar of TIA the Indigenous Knowledge Systems (IKS) is growing and includes the Setsong Tea Crafters project. The project produces indigenous knowledge-based teas and health infusions from wild South African indigenous plants.

The project is a beneficiary of the Natural Indigenous Products Programme (NIPP) Fund. The NIPP Fund is a partnership programme funded by TIA and the Industrial

Development Corporation (IDC). The NIPP Fund was established to fund further development and commercialisation of IK-based innovations. As a funder in the NIPP Fund, TIA had further engagements with external funders such as Department of Trade and Industry Competition (DTIC) to leverage additional funding for these innovations.



Setsong Tea Crafters was co-founded by Retang Phaahla and her mother Nondumiso Phaahla. Working with elderly women from Sekhukhune village in Limpopo, Setsong developed an indigenous tea range infused from indigenous African Flora found in Limpopo province. Their product range, which consists of nine types of teas has created a platform for job creation in rural Sekhukhune. To date twenty permanent jobs, mostly women, and 15 temporary jobs have been created. Several local co-operatives have partnered with the company to supply processed herbal ingredients to the company.

At the height of the COVID-19 pandemic Setsong extended their product line by including the Indigenous Artemisia Tea to their product range. This, they saw as their contribution to aiding respiratory health. In 2021, Setsong entered the Food Lovers' Market Group social enterprise competition and were the overall winners. Winning meant that Setsong is now part of the Food Lovers' Market supplier network through the retailer's Seeds of Change Supplier Development Partnership. The Setsong product range can now be distributed through Food Lovers' Market outlets which presents countless opportunities for the value, growth and reach of the brand. The tea range is available at major stores such as Spar, pharmacies and Bryanston Organic Market.



## CONTACT US

**Retang Phaahla & Sechaba Phaala**

Email: [retang@setsong.co.za](mailto:retang@setsong.co.za) / [sechabap@setsong.co.za](mailto:sechabap@setsong.co.za)



# MEMEZA COMMUNITY SAFETY – HOPE FOR THE MOST VULNERABLE

According to figures released by the South African Police Service Missing Persons Bureau for 2013, a child goes missing every five hours in South Africa. Although most are found there is still the reality of children that are never found, trafficked or found deceased. The spate of crimes against the vulnerable has seen an increase in recent years. Violent crimes committed against women and children recorded alarmingly high and unacceptable levels. More recent statistics show that from April to June 2022, 855 women and 243 children were killed in South Africa. Over 11 000 assault Grievous Bodily Harm (GBH) cases, with female victims, were opened with the police and 1 670 of these cases involved children.

Enter Memeza Community Safety, a black woman owned Social Enterprise that has developed South Africa's first public alarm system. The innovator, Ms Thuli Mthethwa, has a background in software development and developed the system having seen her family and neighbours repeatedly become victims of crime. Thuli developed Memeza, a low-cost alarm system which directly alerts the community and police when a crime of any form takes place. The system is linked

to many Community Policing Forums as well as the South African Police Services (SAPS).

Memeza has been supported and funded through the Innovation for Inclusive Development (IID) to commercialise this much needed security device. The innovation is designed and built for low-income communities who do not have access to the private security industry. The cost of private security in the country is high making it inaccessible for the most vulnerable citizens. Memeza empowers the most vulnerable communities with tangible safety technology linked with Community Policing Forums, neighbours, family, friends, and the SAPS.

Through the support from TIA, the company is making impact in increasing community safety and making safety a reality for victims of crimes such as Gender Based Violence (GBV). The system is endorsed by the National Government and SAPS. It is aimed at the safety of the vulnerable such as women, children, the elderly, and the disabled. The product is designed to reduce the pandemic of missing children, kidnappings, human trafficking, and gender-based violence. With the alarm system, response times from law enforcement and



community safety forums can be reduced from 35 minutes to 7 minutes.

Beyond just children and the vulnerable, the system will also be accessible to public schools and SMME's that would otherwise not be able to afford private security services. The project will manufacture and install 349 community alarm units in Gauteng through its existing endorsement with the Civilian Secretariat for Police. Six youth ambassadors will receive technical product training and product sales training. To date, the company has created four jobs in manufacturing stage and intends on creating six jobs for the installation of alarms.

For more information: [www.memeza.co.za](http://www.memeza.co.za)

## NATIONAL DISABILITY RIGHTS AWARENESS MONTH — 03 NOVEMBER – 03 DECEMBER —



The theme for this year's DRAM is **"Empowering Persons with Disabilities through resourceful, sustainable and safe environments"**.

The Disability Awareness Month offers an opportunity for all of us to remove barriers and improve the quality of life for people with disabilities through concrete action.



# LOCAL COTTON BALERS USHER IN A NEW TECHNOLOGICAL ERA FOR SMALL SCALE FARMERS



Small-scale and emerging cotton farmers in Matlerekeng, Limpopo, and Nkomazi, Mpumalanga, are embracing technology after receiving two cotton balers signaling the end of manual cotton baling.

In the past, the farmers used bags and their feet to bale the cotton. But with the intervention of the DSI and TIA, the farmers received two balers. They will receive training in how to operate and maintain the machines.

An excited beneficiary and farmer, Billy Diale of the Peo-Entle Co-operative, is looking forward to receiving training to use the machine, as it will make his work much easier and cheaper.

"The baling process we are using is lengthy and expensive," he said. "We are now looking forward to reduced costs and a simplified process."

Another farmer, Maria Swele, who has been farming cotton for 18 years under the Swarao Tiise Molemi Agricultural Co-operative, is relieved that manual baling is going to be a thing of the past. She believes that the co-operative will be able to do much more with the help of the technology.

The machines would not only lower the small-scale farmers' input costs by 8-12%, but also increase their contribution to the national crop.

The machines will enable farmers to conduct primary agro processing using a hub-and-spoke model, so that they can leverage economies of scale to aggregate their produce into bales, which the gins can accept without additional costs for the small-scale farmers.

Without the balers, cotton harvested by smallholder farmers is delivered to the ginneries in woolpacks and most of the ginneries have modernised their gins to process round bales aligned to the mechanisation that commercial farmers are using. This means that the cotton ginneries incur additional costs to build special modules for cotton delivered in different forms so that they can process it.

Preliminary investigations indicate that if small-scale farmers could deliver their cotton in round bales, this would result in a saving of 11,1% per kg of seed cotton, which could lead to an additional income of about R1500 per farmer per 2,5 hectares. This is a saving that could have a multiplier effect in terms of socio-economic benefits in their area.

The procurement of the machines was facilitated by Cotton SA with funding from the DSI and TIA through the DSI's funding instrument, the Agriculture Bioeconomy Innovation Partnership Programme (ABIPP).

Cotton is considered one of the best crops for poverty alleviation. One hundred per cent of the plant can be used in various industrial applications. Cotton seed is crushed to

separate it into three products, cotton seed oil, which is used in the food and cosmetics industries, cotton seed meal, which is used in livestock feed, and hulls, which are used in fertiliser fuel and packaging. The rest of the plant – stalks and leaves – is used for pressed paper and cardboard or ploughed back into the soil to enrich it.

The Head of Agriculture at TIA, Sibusiso Manana, says that provision of the balers is aligned with TIA's developmental mandate of supporting the diffusion of technologies to emerging and smallholder farmers for increased participation, productivity and profitability. Particular targets for TIA's support are women in rural areas, the youth and people living with disabilities.

"This kind of partnership is part of the role played by TIA as an industry builder, engaging in value chain interventions that are economically inclusive in their setup," he explains.

Tertius Schoeman, Manager for Transformation and Development at Cotton SA, says that their strategic plan is to increase smallholder black farmers' participation to 20% of the national crop in South Africa by 2026. He expects that the Nkomazi machine will benefit over 70 farmers.

"The Matlerekeng baler machine will benefit farmers from Matlerekeng, Dichoeung, Nokaneng and Rust de Winter," says Schoeman.

Deputy Director for Biotechnology at the DSI, Dr Thabang Bambo, said that the funding of the machines was aligned with the 2019 White Paper on Science, Technology and Innovation, which identifies the importance of access to technologies, as well as enhanced services and processes that support inclusivity and commercialisation.

"To implement the White Paper, the DSI has developed a decadal plan, which provides a strong theory of change for innovation in driving the revitalisation of agriculture. We must take advantage of this recognition to build the agriculture sector," said Dr Bambo.





# TIA DELIBERATE IN SUPPORTING WOMEN TO COMMERCIALISE INNOVATIONS

**W**omen's month provides an opportunity to pay tribute to generations of women whose struggles laid the foundation for the progress made in empowering women and advancing gender equity.

As the nation observed Women's month in August, TIA joined by celebrating the contribution women are making in building and transforming society. The agency supports and celebrates women in the technology innovation sector and recognises their pivotal role and contribution in developing new innovations and growing our economy.

We believe women play an important role in improving the quality of life for South Africans and making our economy globally competitive. More and more women have been making a contribution to the economy through innovation and entrepreneurship.

TIA has been deliberate in ensuring that women are an integral part of the commercialisation of innovations. Of the innovators supported and funded by TIA, 37% are women and this number keeps growing as the agency continues to engage more women who have innovations that would facilitate the translation of South Africa's knowledge resources into

sustainable, socio-economic opportunities. Within the agency there are women who work hard to ensure that innovators receive appropriate support, these are the staff of TIA, a large percentage of whom are women. 59% of TIA's staff contingent are women, this reflects positive strides towards gender equity this is equally reflected in the agency's leadership with the board made up of 60% women.

Within TIA's portfolio there are remarkable women who have risen against all odds to develop exciting innovations in various sectors.

**Innovator:** Dr Nomusa Dlamini  
**Province:** Gauteng  
**Project name:** Development of Mycotoxin Field Screening Tools



## PROJECT OVERVIEW

Rapid Diagnostic Test kit (Lateral flow kit) for quality control at production site and or testing for mycotoxins in food and feed commodities at import and export markets; and for commercial and small-scale farmers.

**Innovator:** Prof Christine Maritz-Olivier  
**Province:** Gauteng  
**Project name:** Evaluation, formulation, and optimisation of next generation cattle tick vaccine



## PROJECT OVERVIEW

Technology package for recombinant protein(s) conjugated to an immunostimulant toxoid protein (produced at sufficient economically viable levels), combined with the most effective adjuvant formulation (producing the least unwanted side-effects) that can be given to cattle hosts via immunisation to confer effective protection against cattle tick infestations.

**Innovator:** Dr Jenny-Lee Panayides  
**Province:** Gauteng  
**Project name:** Development of a continuous hybrid/flow-based process for local production of antimalarial drugs



## PROJECT OVERVIEW

The research focuses on the development and manufacture of integrated, digitally-enabled, flow-based processing technology of antimalarial drugs for the African continent using economical, greener and safer means.

**Innovator:** Dr Amanda Skepu  
**Province:** Gauteng  
**Project name:** Development of a rapid point-of-care screening test kit for acute kidney injury (AKI)



## PROJECT OVERVIEW

AKI is a side effect of Tenofovir disoproxil fumarate (TDF) therapy in HIV patients. Early detection and treatment of AKI can assist with adherence to anti-retroviral treatment. The project aims to develop an alternative, highly sensitive, specific and cost-effective method for early screening and detection of AKI, that can be used at a point-of care-setting.

**Innovator:** Maretha Fourie  
**Province:** Gauteng  
**Project name:** Legacy nuclear waste beneficiation



## PROJECT OVERVIEW

Uranium is a toxic radioactive metal that needs to be decontaminated safely to prevent harmful effects on humans and the environment. The research looks at the removal and recovery of uranium present in historical radioactive waste using hydrometallurgical process steps.

**Innovator:** Prof Maritha Kotze  
**Province:** Western Cape  
**Project name:** The Open Genome Project



## PROJECT OVERVIEW

The project aims to personalise breast cancer treatment options for patients by fostering data sharing, service and research integration between clinicians and geneticists. The algorithm works well and has recently been expanded through creation of the Gknowmix mobile phone app to support healthcare practitioners in applying personalised genomic medicine in routine clinical practice.



Innovator:  
Hafizah Yousuf  
Chenia

Province:  
KwaZulu Natal

Project name:  
Bio-based, anti-fouling  
coating for marine surfaces



### PROJECT OVERVIEW

Marine biofouling is the undesirable accumulation of microorganisms, plants, or marine animals (barnacles, mussels) on submerged man-made surfaces. It is a massive global problem for the maritime and aquaculture industries. The project exploits natural marine associations which will be used to produce nanoparticles as an additive for environmentally friendly antifouling paint/coating to enable easier cleaning and maintenance of submerged marine and aquaculture surfaces.

Innovator:  
Kathryn Malherbe

Province:  
Gauteng

Project name:  
MedSol



### PROJECT OVERVIEW

SMART - a diagnosis method based software algorithm which can identify and correctly term the type of breast cancer depicted on ultrasound. It is an AI based breast cancer diagnostic solution. The solution enables effective diagnosis of cancer with the ability to determine the type of breast cancer upon diagnosis. Med Sol AI will provide General Practitioners diagnostic input for quicker turnaround time, treatment and surgical intervention.

Innovator:  
Prof Namrita Lall

Province:  
Gauteng

Project name:  
GR Active



### PROJECT OVERVIEW

The plant *Greyia radlkoferi* (GR) also known as isdwadwa, umbande or indalu, is native to South Africa, growing in KwaZulu-Natal, Limpopo and Mpumalanga.

The plant is used for infusions in traditional medicine. The aim of the project is to upscale and optimise the process for extracting skin tone actives for the cosmetics market from the "GR Active" plant. Skin tone actives would be used in cosmetic applications to combat uneven skin tone, dark spots, and blemishes.

Innovator:  
Retang Phaahla

Province:  
Limpopo

Project name:  
Setsong Tea



### PROJECT OVERVIEW

Setsong Tea Crafters (STC) was co-founded by Retang Phaahla and her mother Nondumiso Phaahla. The co-founders and elderly women from Sekhukhune village developed indigenous tea infused products from an indigenous African Flora found in Limpopo province. The refreshing tea range is known for its exceptional health benefits with high level of antioxidants, vitamin A, C, E and Zinc. Health benefits range from detoxification, improved digestion, and anti-fatigue. The tea products range from Tepane Black Bush (original) tea, hormonal balance tea, sleepy tea, flu & respiratory treatment tea, detox and nerve calming tea.

Innovator:  
Thuli Mthethwa

Province:  
Gauteng

Project name:  
Memeza



### PROJECT OVERVIEW

Memeza is a black woman owned Social Enterprise that has developed South Africa's first Public Alarm system. The system is endorsed by the National Government and South African Police Service (SAPS). The innovation is designed and built for low-income communities who do not have access to the private security industry. It is aimed at the safety of the vulnerable such as women, children, the elderly, disabled, Public Schools and SMME's.

Innovator:  
Mary Ranketse

Province:  
Gauteng

Project name:  
Genomic characterisation and  
resources for Macadamia nut cultivars



### PROJECT OVERVIEW

South Africa is the largest macadamia nut producer in the world with production increasing by 4000 Hectares a year. The crop is mostly grown in the Limpopo region. DNA fingerprinting is a direct service output to the local industry to enable growers and breeders to uniquely identify cultivars and ensure genetic integrity through the breeding, propagation and deployment stages of cultivar development.

The study will assist commercial and small growers and breeders to leverage the benefits of genomics and molecular tools.

The genomic innovation will support formal breeding programs in the industry. This is an opportunity to support the development of scarce skills specific for macadamia breeders. The technology will also contribute to job security in South Africa.

Innovator:  
Anneri Lotter

Province:  
Gauteng

Project name:  
Comparative genomics view of  
the *E. grandis* and *E. urophylla*  
haplogenomes



### PROJECT OVERVIEW

The innovation contributes to the international competitiveness and job security in the Forestry Sector including over 150,000 direct and indirect jobs supporting the livelihoods of over half a million people, the majority of which live in rural areas close to forestry operations.

Innovator:  
Dr Nanette Christie

Province:  
Gauteng

Project name:  
The Pitro50K SNP chip



### PROJECT OVERVIEW

This SNP chip is the first building block towards genome-assisted breeding in tropical pines, which will ultimately influence gene conservation and forest tree health in South Africa. Since the South African forestry industry is an important industry supporting hundreds of thousands of people, it is crucial to ensure that it remains a feasible and internationally competitive industry.

The technology will in future be useful for genetic resource management in South Africa, which could impact policy regarding afforestation and the development of a sustainable forestry bioeconomy in South Africa.



# ROTOWINNER MOVED TO IMPALA BASE METALS REFINERY FOR BENCHMARKING

South African process-engineering start-up, Free Radical Process Design, recently completed an industrial benchmarking exercise on its Rotowinner® containerised demonstration plant, and installed the demonstration plant at Impala Refineries' base metals refinery in Gauteng.

This marks the first steps towards commercialising this novel continuous-electrowinning technology, which combines electrowinning and cathode stripping into a single continuous operation by reshaping existing parallel-plate electrodes into a rotating cylinder configuration. Successful implementation of the technology will increase the production rate of electrochemically extracted metals, decrease electrical costs, and improve plant safety.

Electrowinning is an industrial hydrometallurgical technique employed world-wide to produce metals from ionic solutions. The standard technology employed across the world is based on intellectual property developed more than 100 years ago; working in a semi-batch fashion, requiring manual operation and heavy lifting equipment.

Dr Ryno Pretorius, founder of Free Radical Process Design, developed "Rotowinner" during his studies at the University of Pretoria. "Rotowinner" is a novel and patented technology that produces various metals, specifically copper, on a continuous basis, negating the need for extensive operator interface and heavy lifting equipment. This makes for higher operating efficiencies and increased worker safety. A license has been granted from UP to Free Radical Process Design to commercialise the "Rotowinner" technology.

The company was funded by TIA as part of the Natural Resources portfolio to commercialise the technology. The project aimed to produce a modular, transportable, demonstration plant capable of showcasing the commercial possibility of the Rotowinner® technology."

The Rotowinner® technology emerged from a project managed by the University of Pretoria (UP) and seed-funded by the TIA. The UP Technology Transfer Office (TTO) evaluated the technology for intellectual property protection and filed a provisional patent application. Currently, Dr Pretorius and UP have concluded a technology licence

agreement for his company to commercially exploit the technology. The TIA awarded funding in the Technology Development Funds to the company, to construct the plant and demonstrate the technology's economic feasibility to potential industry clients.

"With the support from UP and TIA, we were able to demonstrate the commercial and process possibilities of the technology, to such an extent that we were invited to operate our demonstration plant at Impala Refineries, in parallel with its existing Base Metals Refinery circuit. We hope to prove improved performance and safety in a commercial environment," said Dr Pretorius.

The technology was developed from a bench-scale, proof-of-concept model

through several iterations to become the modularised plant it is today. The plant is designed to produce approximately 30 tonnes of copper per year.

Brian Mphahlele, Commercialisation Executive at TIA, said: "With the decline in the productive capacity of the South African economy, the country needs sufficiently differentiated innovations, such as the Rotowinner®, which have enormous potential to compete on a global scale. We are also particularly pleased about the response from big business – particularly Impala Refineries – to the call to collaborate in demonstrating the commercial potential at scale."

According to Wilhelm Botha, Technical Manager at Impala Refineries, the



Copper product produced to date and seamless connections to Impala Metal Refineries electrolyte solution feed

technology has the potential to produce final product on a continuous basis, on a small footprint, and with limited interaction required by operators. The basis of the technology – electrowinning of metals – gives it scope to produce various metals.

Free Radical Process Design plans to supply Rotowinner® plants internationally as fit-for-purpose plants, designed to client specifications, or to offer toll-treatment options to clients who want to make use of a containerised plant for short-term beneficiation.

The use of a mobile electrowinning plant disrupts the current standard practice requirement of limited financial deployment in the mining industry due to life-of-mine being too short to justify capital investment. By using a mobile Rotowinner® plant, low

life-of-mine reserves can be beneficiated until depletion. The electrowinning plant can then be moved to the next site for use on a new resource.

Free Radical Process Design plans to directly integrate the Rotowinner® plant with solar PV to further enhance its remote operational possibilities and drive down the cost of production. Future developments for the Rotowinner® include using it for continuous water-softening and metals-removal, thus removing metals and hardness from mine tailings or acid mine drainage, powered by solar and producing hydrogen and oxygen as by-products.

Once industrial trials are completed, steps will be taken to commercially expand and implement the use of Rotowinner®.



# TIA

## SEEN AND ABOUT



Mentors and mentees at the launch of the TIA Mentorship Programme



Ms Anati Canca at the Bio Africa Convention 2022



TIA at the BIO Africa Convention



Agri Team with innovators at the Agri5 Commodities Expo



Ms Tshembani Khupane with Minister of Small Business Development, Ms Stella Ndabeni-Abrahams with Social Innovation Awards Winner at SAB Foundation



TIA Board Chairperson Ms Matsi Modise at the SAIS 2022



Signing of an MoA: Prof Peter Mbatia of Sefako Makgatho University with TIA ACEO, Mr Patrick Krappie





## Our Vision

To be a leading technology innovation agency that stimulates and supports technological innovation to improve the quality of life for all South Africans



## Our Mission

To facilitate the translation of South Africa's knowledge resource into sustainable socio-economic opportunities.

# Our Values



## Teamwork

Together we can do more. Fostering teamwork creates a TIA work culture that values collaboration and co-operation.



## Integrity

We strive to do what we said we would, when we said we would do it.



## Professionalism

We apply the most appropriate skills, competencies, experience and knowledge of best practices cohesively in conducting our work.



## Transparency

We engage in inclusive open communication, and hold each other accountable for our performance and conduct.



## Excellence

We will be accountable to all stakeholders to deliver exceptionally high standards of work and performance.



## Innovation

We foster a culture where we continually nurture and implement new ideas from our staff and stakeholders that enhance how we do things and deliver services.