WORLD SCIENCE FORUM
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Upholding human dignity through science

Keynote lecture explores role and relevance of science in global affairs

A thought-provoking panel discussion about the role of science in upholding human dignity took place at the World Science Forum on Wednesday, December 8.

By **Ace Moloi**

The second day of the World Science Forum (WSF) started with a keynote lecture by Dr Gabriela Ramos, UNESCO's Assistant Director-General for Social and Human Sciences. The topic of the lecture was "Science for human dignity – What role for science in fighting poverty, unemployment, inequality and exclusion?"

Dr Ramos inspired a thought-provoking conversation about the role and relevance of science in global affairs. According to Dr Ramos, science should not exist for the sake of science but must also influence policy, politics, inequality and technological innovation.

Dr Ramos listed artificial intelligence as another area that has to develop a social justice outlook. She asked if digital technologies are contributing to human rights, dignity, as well as sustainability, going on to call for more transparency and the rule of law in how tech companies conduct their business.

Furthermore, she implored the forum to work towards the empowerment of women.

"There is a bulk of evidence that if gender patterns of discrimination change economies will be stronger," she said, emphasising that there is no justice without confronting the realities of women.

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The keynote address was followed by a panel discussion that featured Prof Rémi Quirion, Chief Scientist of Quebec and President of the International Network for Governmental Science Advice (INGSA), Prof Roula Inglesi-Lotz, economist and former co-chair of Global Young Academy (GYA), Prof Olive Shisana, Special Advisor on Social Policy to the President of South Africa, Prof Michel Kazatchkine, Senior fellow, Graduate Institute, as well as Her Royal Highness Princess Sumaya bint El Hassan, President of the Royal Scientific Society of Jordan.

Her Royal Highness advocated for bold science diplomacy to reclaim its power from industry, which she argued has infiltrated the scientific autonomy.

"Perhaps it would be harsh to say science has a debt to pay, but in truth it does. Science was mastered by commerce and our world has suffered the consequences."

Her Royal Highness also acknowledged the past transgressions of science, saying science has been behind many social issues. "Science, though it holds so many of the answers that we all seek, has also enabled and continues to empower systems that separate our people and destroy hope for so many. Science has a sometimes dark heritage and a present footprint that enables systems of excess and exploitation," she told the plenary.

In her remarks, Prof Roula Inglesi-Lotz called for science that "not only talks but also listens" and is "prepared to co-create solutions" with communities. In practice, this means that research studies must be informed by communities. In so doing, research findings will reflect cultural dynamics and report accurately on phenomena. "It's not my way or the highway anymore," she declared. "If we as scientists don't sit and listen, we might spend time and precious resources into problems that we think from our perspective exist when actually they don't," she concluded.

WSF continues until December 9. It's a platform for scientists, academics, leaders of public institutions and other practitioners to deliberate the role and responsibilities of science in society. This year's conference is being held under the theme Science For Social Justice and it's taking place in Africa for the very first time.

Climate change is wreaking havoc around the world as seen in extreme weather patterns and disasters.

A spotlight on climate change

> Action is an awareness, but awareness is not action. This means that we need to start with the action immediately.

By **Ace Moloi**

Nearly 80% of SA's greenhouse gas emissions are caused by energy, 86% of the country's electricity comes from coal-fired power stations, while the carbon intensity of its exports is twice that of China and 75% more than India.

This was revealed in a keynote lecture delivered by Dhesigen Naidoo, former chief executive officer of the Water Research Commission and current Adaptation Lead, South African Presidential Climate Commission. The lecture on the second day of the World Science Forum in Cape Town was titled "Science for climate justice – How can science working with civil society lead the way in correcting the failure of climate policy?'

"Until 2035, the most important decline in emissions will arise from energy efficiency and new investments and policies in the power sector due to heavy reliance on coal and other fossil fuels. It is also expected that most refineries will curtail emissions by 2035. From 2035, emission reductions from transport and industrial sectors will increase significantly," Naidoo stated.

South Africa's Just Transition is premised on the principles of distributive justice, which seeks to ensure an equitable distribution of risks and responsibilities addressing direct impact of transition, restorative justice aimed at redressing historical injustices and procedural justice, which possesses itself with empowering workers, communities and small businesses so that they can define their own development.

Panellists who took the global conversation of climate change and policy deeper included Prof Felix Dapare Dakora, President of the African Academy of Sciences (AAS), Ramia Al Bakain, Prof of Analytical and Environmental Chemistry at the University of Jordan, Prof Roger Pielke Jr., Environmental Studies Programme at the University of Colorado Boulder, Magdalena Skipper, science communicator and editor-in-chief of Nature, as well as Azeeza Rangunwala, who is the senior campaign manager at groundwork.

The plenary session heard that there is a great need for the scientific community to move urgently when it comes to climate change.

Speakers agreed that "the science is there" and what's only lacking is the will to implement it. "Action is an awareness, but awareness is not action. This means that we need to start with the action immediately," contended Prof Ramia Al Bakain, adding that scientists must move from designing solutions to applying them on the ground.

For science to have impact on the ground, advised Rangunwala, it will have to collaborate with civil society and communities. "Communities are sceptical. We saw that with vaccine hesitancy," Rangunwala asserted, reminding fellow scientists that science is not only what happens in the lab but can also be found among communities.

"Civil society organisations also have indigenous knowledge and that is also science. And we need to respect that. We need to remember that. Evidence is also science. Lived experience is also science," she said. Prof Dakora concurred that science must work with communities to make an impact, cautioning against dismissing indigenous knowledge systems as being unscientific. "Everyone in their own right is a scientist.

They have certain experiences and when they share them with society, it can lead to benefit for all," he argued.

The WSF takes places against the backdrop of worsening climate change whose effects include global warming, which leads to loss of sea ice, accelerated rising of sea levels, heat waves, droughts and floods.

The many extreme weather events cause mass deaths and large economic and environmental problems.

Building of SKA telescopes takes off

By **Phakama Mbonambi**

One of the highlights of the World Science Forum (WSF) 2022 has been the announcement that construction of the world's largest radio telescope infrastructure at Square Kilometre Array Observatory (SKAO) sites in South Africa and Australia had started. The telescopes in both countries will seek to unlock the many mysteries of the Universe by allowing radio astronomy to take a peek into distant galaxies.

Astronomers, scientists and stakeholders gathered at the SKA site outside Carnarvon in the Northern Cape this past Monday, a day before the opening of the WSF, to officially mark the beginning of construction of the square kilometre array observatory telescopes.

Dr Blade Nzimande, Minister of Higher Education, Science and Innovation, was among the dignitaries at the event. "The development of the Square Kilometer Array (SKA) represents a major innovation that will provide scientists with unprecedented amounts of data on the basis of which to push the explanatory frontiers of modern cosmology," the Minister said in his address. "SKA is a pioneering, and in some ways unique international scientific project which demonstrates the power of multilateral collaboration in science to help us tackling the big challenges of humanity."

The significance of the SKA telescope was not lost to the Minister. "I cannot help but being intrigued by the idea that significant discoveries on cosmological origins may well be made on African soil through the work of the SKA, the very place where we know through science the origins of all humanity is to be found. Indeed, an intriguing thought."

The start of construction is an exciting milestone for the SKAO, the culmination of 30 years of work to conceive, design and plan for one of the world's largest science facilities. The SKAO is an inter-governmental organisation composed of member states from five continents. Its mission is to build and operate cutting-edge radio telescopes to transform our understanding of the Universe, and deliver benefits to society through global collaboration and innovation.

Headquartered in the UK, its two telescope arrays in South Africa and Australia will be the two most advanced radio telescope networks on Earth. Through the development of innovative technologies and its contribution to addressing societal challenges, the SKAO will play its part to address the United Nations' Sustainable Development Goals and deliver significant benefits across its membership and beyond.

The SKAO recognises and acknowledges the Indigenous peoples and cultures that have traditionally lived on the lands on which the SKAO facilities are located.

Some interesting facts about the project's

- The SKA-Mid is situated in the Karoo Central Astronomy Advantage Area in the Northern Cape.
- The closest main town is Carnarvon, with a population of 6 000, in the south of the Kareeberg Municipality, part of the wider Pixley ka Seme District Municipality.
- Carnarvon was established in 1853 as a mission station of the Rhenish Missionary on a route between Cape Town and Botswana that was followed by early explorers and traders.
- A visitors and community centre is planned for Carnarvon which will be a must-vist destination for local and tourists wishing to view the Karoo's magnificent skies.
- The SKAO builds on years of work by SARAO that has seen communities benefitting from the MeerKAT project via construction contracts, employment, training opportunities and other local initiatives.

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Dr Blade Nzimande, Minister of Higher Education, Science and Innovation.

The ground-breaking SKA telescopes in both South Africa and Australia will allow radio astronomy to take a peek into distant galaxies

The SKA telescopes will initially comprise 197 dishes and 131 072 antennas spread across two radio protected sites in South Africa and Australia respectively. Together, they will be one of the biggest science facilities in the world. Both sites have been specifically selected due to their remoteness, lack of radio interference and unparalleled view of the Universe from the southern hemisphere.

Construction of the telescopes will take 10 years, but thanks to the telescopes' design – where the signals of multiple telescopes are combined to act as one giant telescope – the first scientific results are expected before the telescopes are completed.

In South Africa, the SKAO will collaborate with the South African Radio Astronomy Observatory (SARAO), a national facility of the National Research Foundation, while in Australia it will work closely with CSIRO, Australia's national science agency, to build and operate the telescopes.

In addition to South Africa, eight other African countries are involved in a programme to develop radio astronomy skills and capabilities that will enable partner countries to fully participate in the SKA project. These countries are Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia.

Valuable investments

A total estimated value of contracts worth R1.2 billion have now been awarded to South African entities to help build the radio telescope infrastructure, with further contracts expected. These contracts are expected to deliver longer-term foreign investment to South Africa with about 11 200 construction job opportunities to be created over the next six years of construction.

The scale of the SKA represents a huge leap forward in both engineering and research and development towards building and delivering a unique instrument, with the detailed design and preparation now well under way. As one of the largest scientific endeavours in history, the SKA will bring together a wealth of the world's finest scientists, engineers and policy makers to bring the project to fruition.

Scientific benefits of SKA telescopes

The SKA telescopes will tackle some of the most fundamental scientific questions of our time, ranging from the birth of the Universe to the origin of life. The telescopes will make it possible for astronomers to look back at the history of the Universe as far as the Cosmic Dawn, when the very first stars and galaxies formed. The Observatory will be the first entity capable of exploring this time in the Universe at large scales. In other words, the SKA telescopes could answer the fundamental questions that humans have been asking themselves: Who are we? Where do we come from? Where are we going?

> "SKA is a pioneering, and in some ways unique international scientific project which demonstrates the power of multilateral collaboration in science to help us tackling the big challenges of humanity."

The data, which will be processed on supercomputers located in Cape Town and Perth, will also provide valuable insights into the nature of dark matter, dark energy and the evolution of the Universe, enabling humanity to interrogate and understand some of the most fundamental laws of physics. To support the SKAO's enormous data volumes, a global network of SKA regional centres will be distributed around the world in its member states.

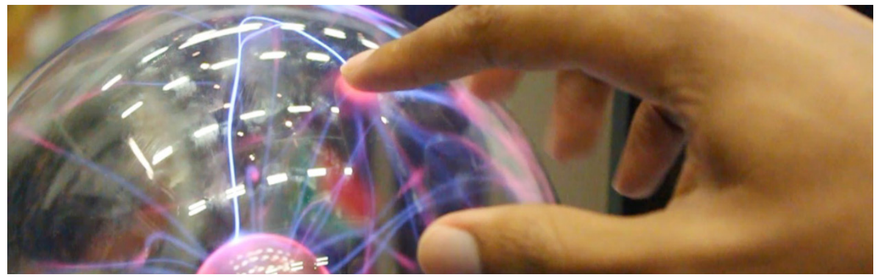
The impact of SKAO

SKAO is expected to deliver significant socio-economic benefit for member states' research landscape, economy, society, sustainability and culture. This impact spans industry return and innovation, human capital development, inspiration and education, geopolitics and diplomacy.

Sustainability is the heart of SKAO. In fact, the SKAO and its partners are helping to address global challenges by contributing to addressing a number of the United Nation's sustainable development goals to achieve a better and more sustainable future for all. When it comes to environmental sustainability, the SKAO has already halved the estimated power consumption of the SKA telescopes, thanks to the adoption of innovative design and more efficient technologies during the pre-construction phase of the SKA project. Looking ahead, the telescopes will draw electricity from solar and other renewable sources.

World Science Forum in pictures

The second day of the World Science Forum lived up to its billing as a place where leading lights in science would meet to explore ideas on how science could be used to achieve social justice. Delegates and visitors attended various sessions – keynote addresses, panel discussions and mingled in the exhibition hall.



Meet some of WSF trailblazers

The ground floor of the Cape Town International Convention Centre, where the World Science Forum (WSF) is held, swells with exhibitors who are showcasing their innovations, research and community campaigns aimed at making science relatable.
Visitors to the conference have a chance to move from stall to stall finding out about the remarkable work that each organisation does.
The entire hall pulsates with energy and one thing is clear – there are myriad remarkable scientific projects on the ground, here in South Africa and beyond our borders, that touch people's lives in a variety of delightful ways. Science is being used a tool for development.

Lungile Ikaneng —

Director,
Science Spaza and
Hip Hop U

One such science activist is Lungile Ikaneng from the Science Spaza and Hip Hop U movement, a joint outreach programme that clubs rural children together to share scientific information with them in interactive ways. Currently, there are just over 60 clubs nationwide, with provinces like the Eastern Cape, KwaZulu-Natal and Limpopo leading in participation numbers.
"Most of our clubs are in rural areas. And these are kids from Grade 6 to Grade 10. We cater for them especially in rural areas because we don't want them to be left out," says Ikaneng, explaining that the children she works with don't have internet connectivity and libraries in their villages.
To bridge this information gap, Science Spaza produces a quarterly interactive learning magazine with worksheets and puzzles. Again, it uses storytelling in the form of animated characters that carry narratives about important scientific information. The content, adds Ikaneng, is not instructional but allows the kids to learn on their own and with the help of their peers in the clubs. "An underlying factor is it's all in English and it improves their literacy," she continues.
In addition to literature, Ikaneng, through Hip Hop U, uses the popular genre of hip-hop "as a tool to communicate with the youth" and to encourage them to be "engaged in their communities." The youth identify problems in their community and compose songs which they perform in the presence of their parents, peers and community leaders.

http://www.sciencespaza.org

Jansie Niehaus —

Executive Director,
National Science and Technology
Forum (NSTF) of South Africa

Based in Tshwane, Gauteng, the National Science and Technology Forum (NSTF) of South Africa is a consultative forum and watchdog for influencing the formulation and delivery of science, engineering, technology (SET) and innovation public policy in South Africa.
The organisation runs NSTF Awards, which recognise outstanding scientists who have made an outstanding to SET and innovation through research and innovation.
The theme for next year's award is Ocean Science for Sustainable Development. This theme was chosen in response to the United Nations (UN) proclamation of the decadal theme of Ocean Science for Sustainable Development for 2021-2030. This Special Award is intended to focus on research and innovation in ocean science in support of attaining the sustainable development goals (SDGs) in South Africa.
Nomination registrations are open until 15 December 2022. Fully completed nomination documents have to be submitted by the second deadline on 3 March 2023.
"We run the awards to recognise the very top scientists in South Africa. We have been doing that for 25 years. We basically have a database of everyone who is anybody," Niehaus says.

https://nstf.org.za

Natasha Chinyemba —

Operations Manager,
Kids Innovate
Africa

Natasha's organisation is based in Cape Town. It's mission is to introduce children from disadvantaged communities to STEM careers through robotics, coding and animation.
"We believe that our field is important. Technology is all over the place. We believe that STEM careers are the future, particularly robotics. Machines have taken over many jobs. We believe that we must prepare youngsters for the future while they are still young. This is why our primary focus is on children between the ages of five and 18," Natasha says.
Kids Innovate Africa teaches children through "collaborating with schools or they come to us so we can teach them the basics of engineering, programming and digital literacy skills". So far, the organisation is on a winning track. "We have received many reports from parents telling us that their children have improved in their school performance and who they are as individuals. We host a lot of competitions, where we have a coder or programmer team leader and this teaches them leadership skills. We also provide mentorship programmes that help them develop as individuals."
Natasha believes in the power of science to transform society. "Science can help end poverty. We have had a lot of children who come from townships who came to us want to pursue regular careers. But now most of them wish to become scientists, doctors, astronauts. They have become ambitious enough to work harder so they can pursue these careers and, no doubt, they will succeed and have stable incomes and have an impact in their communities."
https://www.kidsinnovateafrica.com

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