SAASTA

Science Engagement Highlights Report

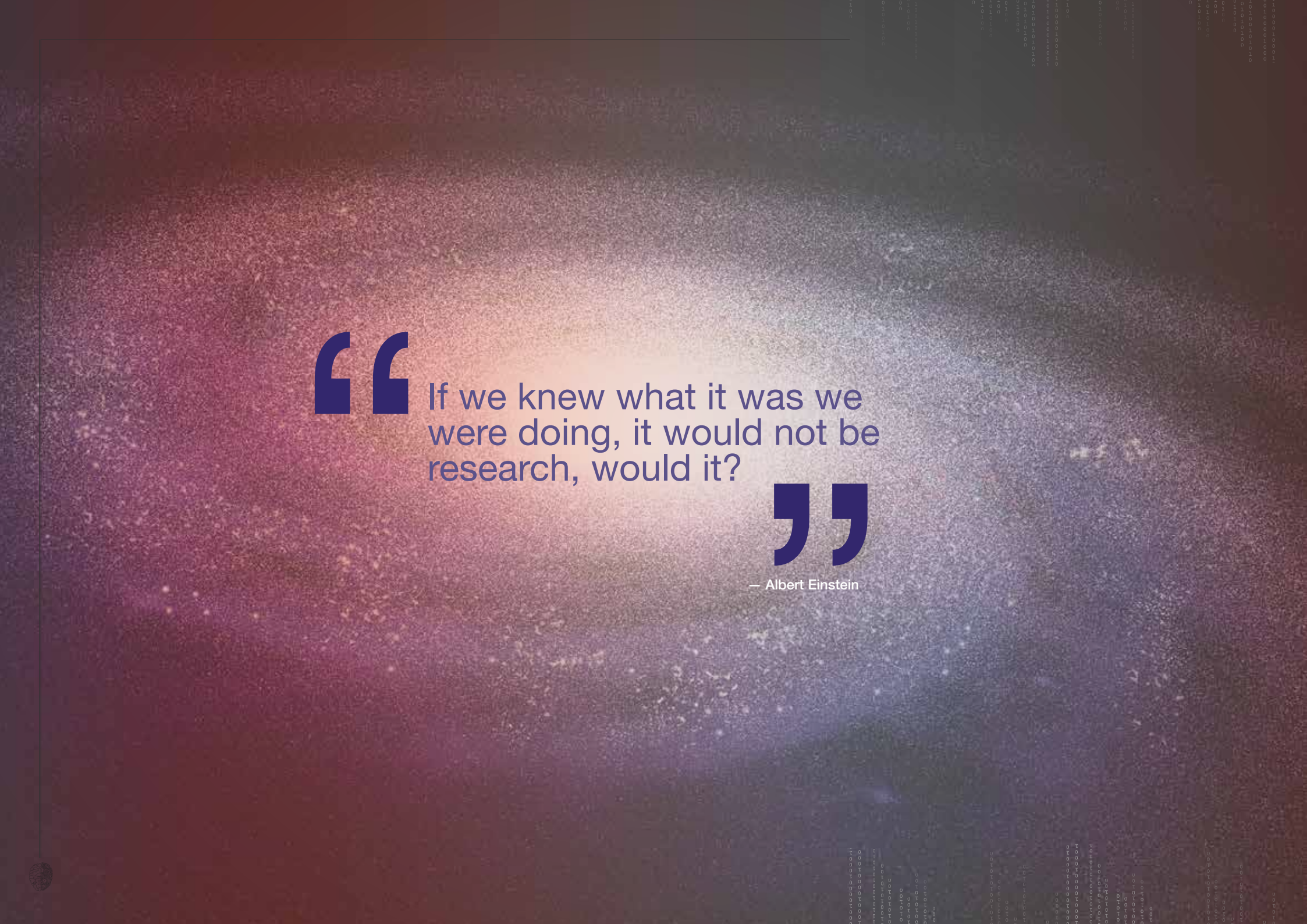
2015/2016

science & technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

SCIENCE ENGAGING WITH SOCIETY ...
TO BUILD A BETTER FUTURE FOR ALL

NRF National Research Foundation | SAASTA South African Agency for Science and Technology Advancement


If we knew what it was we were doing, it would not be research, would it?
— Albert Einstein

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The National Research Foundation and Science Engagement

The National Research Foundation (NRF) acknowledges the role of science engagement in the achievement of its strategic goals.

To fully realise the social, economic and environmental benefits of the significant investment in science, research and innovation, the NRF endeavours to engage the wider community more fully in science and in an understanding of the knowledge economy.

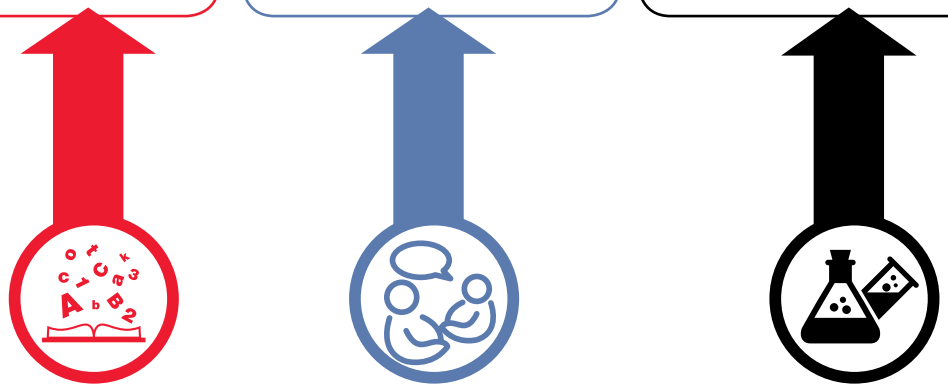
One of its business units, the South African Agency for Science and Technology Advancement (SAASTA) is tasked with facilitating the communication and advancement of science. SAASTA and the NRF's national research facilities interact closely with a network of science centres, higher education institutions, science councils, professional science associations and a host of other science-based entities at national and international levels to engage the public in science, engineering and technology.

All science promotion or awareness programmes within the NRF reside under three key strategic areas that combine to form an integrated and seamless approach. The three areas are interdependent, each enhancing the effectiveness of the other – often an educational event will also enhance science awareness or a science communication intervention in the media will add to readers' education:

Through education we build up the supply of tomorrow's scientists and innovators.

Through communication we celebrate South African achievements in science and technology and build the public's appreciation of the benefits of science.

By growing the awareness of science through exploration, exhibitions and actual experience, we instil in people an enthusiasm about the wonder and application of the subject, while encouraging greater public engagement.



The South Africa Agency for Science and Technology Advancement (SAASTA) is a business unit of the National Research Foundation (NRF) with the mandate to advance public awareness, appreciation and engagement of science, engineering, innovation and technology in South Africa. SAASTA's contribution to the NRF's vision is to grow the pool of quality learners today who will become the scientists and innovators of tomorrow.

By growing the awareness of science through exploration, exhibitions and actual experience, we instil in people an enthusiasm about the wonder and application of the subject, while encouraging greater public engagement in SET issues.

GROUP EXECUTIVE'S MESSAGE

Over two years ago, the National Research Foundation (NRF), through the South African Agency for Science and Technology Advancement (SAASTA) undertook the Department of Science and Technology's (DST) Science Engagement Strategy to improve the public's understanding of science, scientific literacy and science engagement. Since then, we have been working to integrate the natural sciences, engineering, and social sciences and humanities, aiming to foster better, more valuable science engagement for society's benefit.

We fully understand that investing in science is advantageous for all South Africans. It spurs innovation and promotes the curiosity and creativity that our best and brightest minds direct towards solving society's greatest challenges. It also enables us to ensure we are developing the best and brightest talent for the workforce of tomorrow to enable South Africa to be economically competitive in the critical areas of science, engineering, technology and innovation (SETI). We also realise it is important that the success of the South African science and innovation system be effectively communicated and profiled to demonstrate how it has advanced and contributed to the national development.

To date, we can confidently report that the NRF, through Programme 2 (Science Engagement) is making progress. We continuously strive to deliver on our mandate to profile South African science and science achievements domestically and internationally, demonstrating their contribution to national development and global science, thereby enhancing its public standing.

In 2016, the NRF implemented its Vision 2020 strategy, of which one cornerstone is "Entrenched Science Engagement". This will enable Programme 2 to intensify and strengthen African and global networks to position South Africa in the international arena in order to drive the knowledge economy. This significant fusion of the Science Engagement Strategy and the NRF Vision 2020 Strategy, as well as the appointment of SAASTA as a national coordinator by the Minister of Science and Technology (DST), Naledi Pandor, will help to improve public confidence, interest in, and attitude towards science.

Over the next five years, the NRF, through Programme 2 (Science Engagement), will work towards sustainable implementation and resourcing of the new Science Engagement Strategy with the focus on the number of programmes and/or opportunities for citizens' engagement with science. This will establish on-going science communication capacity-building programmes benefitting learners, local science communicators, journalists, scientists and researchers; and mainstream local scientific inventions and discoveries in awareness and engagement programmes.

The NRF continues to advance science engagement in South Africa in an integrated approached strategy through SAASTA, our research facilities that focus on nuclear science,

biodiversity, conservation and also astronomy. This will be achieved in partnership with our key stakeholders, DST entities, universities, other government departments and science councils, museums and partners outside the public sector.

We look forward to creating an exciting and enriching science enterprise that will improve the public's perception of the critical role of science and technology in ensuring national prosperity and sustainable development to enhance South Africa's scientific competitive advantage.

Dr Beverley Damonse
Group Executive: Science Engagement and Corporate Relations of the National Research Foundation

We fully understand that investing in science is advantageous for all South Africans. It spurs innovation and promotes the curiosity and creativity that our best and brightest minds direct towards solving society's greatest challenges.

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MANAGING DIRECTOR'S MESSAGE

> *"It is essential that we spread the message about the role that science has to play to boost our economy and create new jobs"*

In a country where the economy is struggling to grow sufficiently at times, it is essential that we spread the message about the role that science has to play to boost our economy and create new jobs. This has been one of SAASTA's core messages in the past year. With our mineral resources dwindling, it is essential that we develop our knowledge economy and strengthen the innovativeness of all our people so that we are in a position to compete in the international arena.

Strengthened by the Department of Science and Technology's (DST) Science Engagement Strategy, which has been in place for just over a year, SAASTA, as coordinator of science engagement across the National System of Innovation, has experienced challenges, but also huge growth and excitement.

Engaging with the public

With the backing of virtually the whole science community in South Africa we now have, through this Strategy, taken big steps in engaging ever larger groups of people, including the youth, with science. We grabbed every opportunity to show them that science is part of their everyday lives, and not only a discipline for the super intelligent. Engagement also involved that we attempted to find out how society experienced science and where science could assist to improve their lives.

Tools and events that SAASTA has been using effectively to engage the public since our inception in 2002, and in which we believe we have outstanding expertise, are science festivals of which the biggest and most well-known is National Science Week. Most of these festivals are funded by the DST and coordinated by SAASTA.

Science festivals now reach communities all over the country with their exciting displays and messages about the role of science in people's lives. In order to reach people in deep rural areas who could not attend these festivals, we travelled with exhibits to them with our message about the important role of science, also in their lives.

Science centres play a large role in fulfilling the task of engaging the public with science. These centres – from the biggest in cities to the smallest in rural villages – assist us in fulfilling our mandate. The 35 centres currently in operation in South Africa are owned by various private and public organisations, universities and the Department of Education. SAASTA, with funding from the DST, supports the centres financially to run activities. In the past year we arranged that over 300 interns – unemployed graduates in science, engineering and technology – assist at these centres where they are placed for a year. This has proved to provide excellent work experience for the interns and an invaluable resource for the centres.

We have set ourselves an aim to reach all municipalities with the science centre experience, therefore we have deployed a number of mobile labs, managed by the established centres, which can reach most areas. These mobile labs are also funded by the DST.

Engaging with scientists

We are turning the common belief that scientists are bad at communicating their subjects on its back. In the past year we created many opportunities for the science experts to learn how to better communicate their knowledge with non-scientists by challenging them to debate their sometimes extremely complex fields of interest with their peers, to engage with the media, and to attend our science communication courses/workshops.

The media as partner

SAASTA has always seen the media as a crucial strategic partner to assist us in disseminating science information to our publics. We know that they are imperative to assist us in many areas, also to spread the idea of science tourism – an exciting new field we are investigating. I am thinking of sites of scientific interest such as the Vredefort Dome in the Free State, the largest impact crater on Earth and the possibility to attract many more tourists to this UNESCO World Heritage Site of geological interest. The media is essential in not only informing people about places of scientific interest such as Vredefort and many others, but also in giving useful information about the "story" of the science behind these places.

Other partners

The DST is SAASTA's line government department, but we also work closely with the Department of Education. Without their assistance we will not have access to learners, who form a very important part of the public we aim to reach. They assist us to identify talent among the youth, and we partner with them to try to improve, through our schools projects, results in fields such as the sciences and mathematics.

The Department of Public Works is experiencing a shortage of talent that can assist them in their crucial task of building human capacity in the built environment. They have therefore partnered with SAASTA to identify young talent and recruit them as prospective engineers and technicians in the Department and the country. They have provided 40 bursaries for students who wish to further their studies in these fields and join the Department after completing their studies.

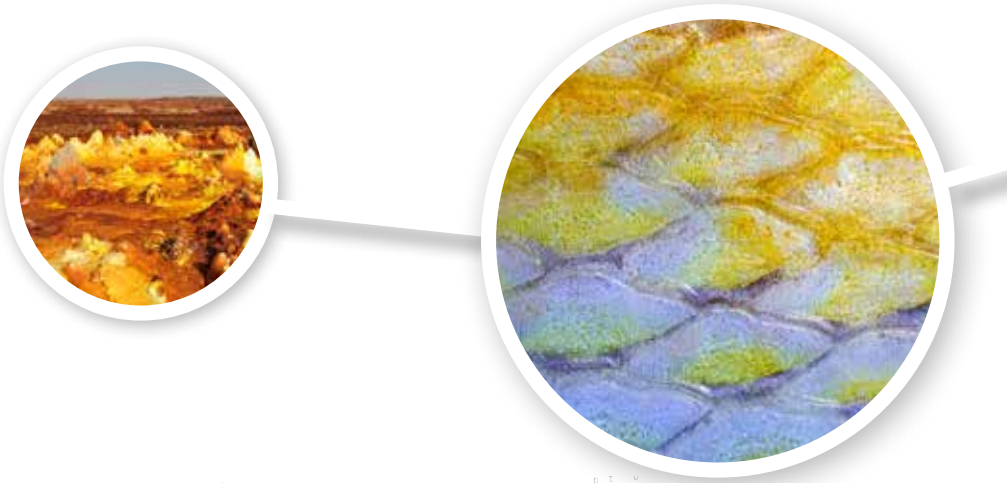
Cutting-edge science

We live in a global science and technology revolution and any country that would like to succeed in the 21st century needs to invest in science and technology. The DST is concentrating resources on certain key areas where South Africa has a strategic advantage, like astronomy, biotechnology, nanotechnology, fuel cell technology and our indigenous knowledge systems.

SAASTA'S aim is to engage the public with the importance of cutting-edge technologies like biotechnology and nanotechnology and their daily influence in society with applications such as cell phone technology and the latest advances in medicine.

Although SAASTA is not involved in the research process, it is our function to communicate this research in a way and language that young and old can understand the importance thereof.

SAASTA is actively engaging the public with the importance of South Africa's involvement in astronomy. We are leaders in many fields of astronomy research, as has been shown with the development of the Square Kilometre Array telescope. The public does not always understand why scarce resources should be used for this purpose and not for more immediate needs. In the long run we believe that, with our strategic advantage in this field because of our situation on the globe and our clear skies, we should be at the frontier of astronomy research, which could again lead to a better understanding of our Universe. The spin-offs will definitely benefit mankind tremendously, as has been shown by space exploration in the past.



International cooperation

SAASTA has long-standing formal agreements regarding science and technology exchange and cooperation with the Beijing Association for Science and Technology (BAST) and the NUCLEUS consortium. We realise that we are part of the global village and that we cannot work in isolation. These agreements expose us to the work that other countries are doing and, in return, they are able to learn from us. The agreements involve visits to and from both organisations and sending learners to Beijing to participate in science competitions.

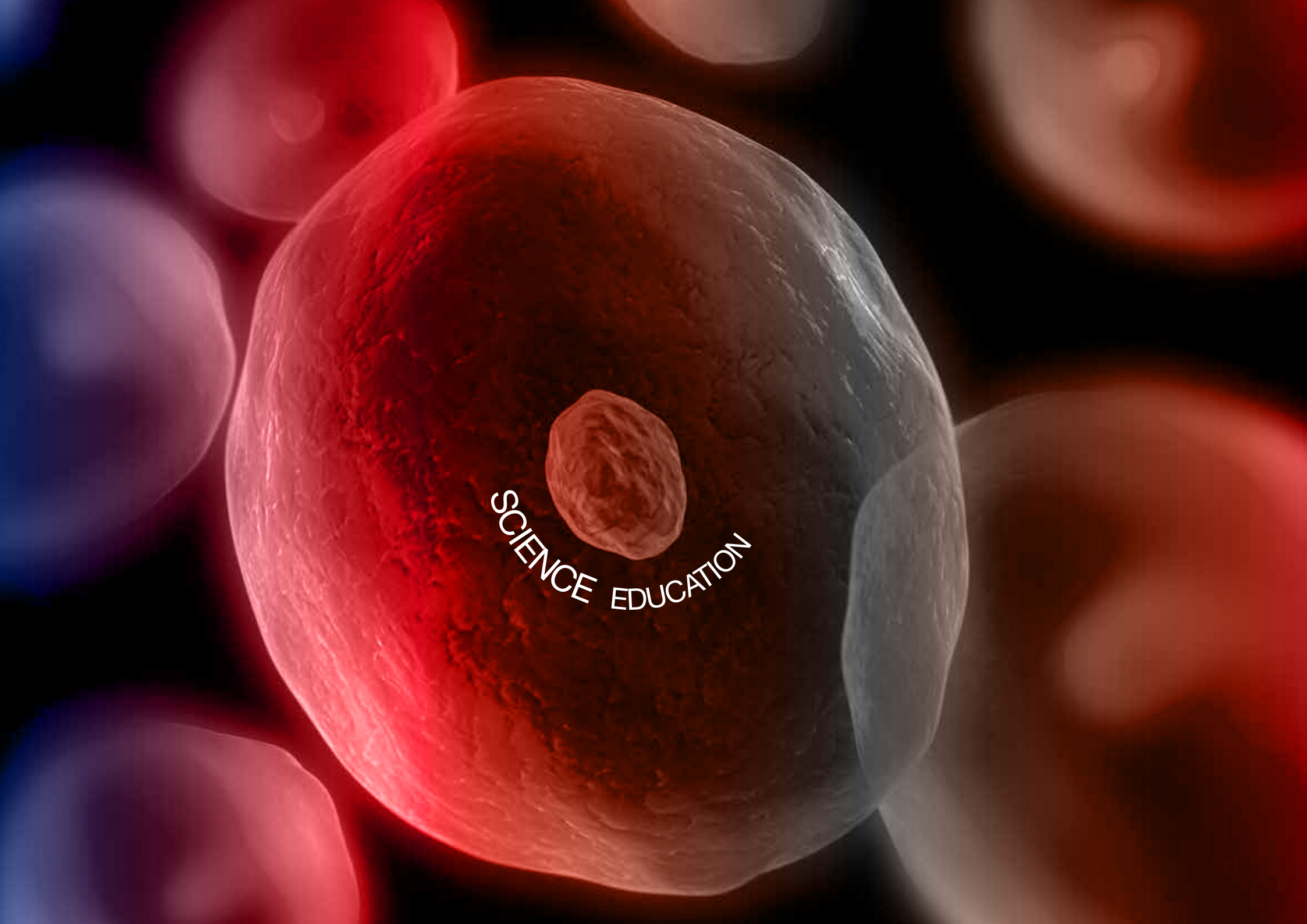
Aiming towards our goal

Looking back at the past year, a personal highlight for me is that SAASTA, as an organisation with a limited budget, was able to involve more than one million members of the public during the period under review. Through our various programmes like Olympiads and competitions such as the national science debating competition, we reached about 71 000 learners across the country.

If SAASTA can put the world of science in the hands of the people, we have succeeded in our goal.

Dr Jabu Nukeri

SAASTA: Managing Director


SCIENCE EDUCATION

Science education

National Science Olympiad competition

SAASTA celebrated excellence in science teaching and learning at the 52nd National Science Olympiad awards ceremony held at Gallagher Estate, Midrand on 30 June 2016.

The awards ceremony honoured South Africa's top young science learners in 2015 in various categories, such as the Top National Winners for Life Sciences and Physical Sciences, Top Girl Learners, Top Learners from Previously Disadvantaged Schools and Top Learners from Southern African Development Community (SADC) Schools. This was after they had participated in the annual competition wherein learners wrote examinations in Physical and Life Sciences during March 2015.

SAASTA, a business unit of the National Research Foundation (NRF), implements the National Science Olympiad. The Olympiad has grown in popularity over the years, starting with just 700 learners participating in 1967 to more than 19 200 in 2016.

NRF Group Executive: Science Engagement and Corporate Relations, Dr Beverley Damonse, lauded the learners and schools that took part in the competition, indicating that the Olympiads and competitions are particularly beneficial in supporting performance in science, and evidence to that effect abounds. "There appears to be a positive correlation between learners' participation in the Olympiads and competitions and learners' performance in Maths and Science in school," she said.

Damonse used as example, Hamdishe Mathivha, a former participant in the NSO and a learner from Mbilwi Secondary School in the rural village of Sibasa in Limpopo, who scored 100% in both Maths and Physical Science in the 2015 national matric exams, making him the number one learner in both subjects despite being from a school in a rural village.

Mathivha, who is now studying for a Bachelor's Degree in Computer Science at the University of Cape Town, had participated in three consecutive Olympiads, starting in 2013 when he was in Grade 10. In 2013 he was among the top learners and earned himself a trip to the London International Youth Science Forum.

The National Science Olympiad is one of SAASTA's flagship projects. Since 2005, the 52-year-old project has offered learners in grades 10 to 12 an opportunity to compete in science with fellow learners from SADC countries such as Lesotho, Zimbabwe and Namibia.

Learners and schools stand a chance of winning exciting prizes. The top national performers won an all-expenses-paid trip to the London International Youth Science Forum and the Australian National Youth Science Forum.

SAASTA MD Dr Jabu Nukeri, speaking at the awards ceremony, thanked Harmony Gold Mining Company for continuing to support the National Science Olympiad initiative despite the tough trading conditions in the mining sector. The gold mining company has sponsored the Olympiad for the past seven years.

> "The main aims of the competition are to identify talent, to encourage excellence in science education and to stimulate interest in the sciences. It seeks to inspire young people to consider careers in science and technology."

Photo: (From left) National Research Foundation CEO, Dr Molapo Qhobela; three of the top four learners, from Victoria Girls High, Eastern Cape, Jacqui James, from Bishops High School, Western Cape, Angus Thring and from Mbilwi Secondary, Limpopo, Risuna Rivombo; SAASTA MD, Dr Jabu Nukeri and Harmony Gold CEO Peter Steenkamp.

Natural Science Olympiad competition

Throngs of learners participated in the 2015 edition of the Natural Science Olympiad, which has grown from strength to strength since its inception in 2010. This Olympiad is part of the activities that SAASTA runs to promote maths and science among the youth.

“Participation in science Olympiads focuses on building learner confidence, stimulating interest in science, instilling the culture of learning beyond the four corners of a classroom, and identifying potential and talent among learners,” says Moloko Matlala, manager of the Science Education Division at SAASTA. More than 20 000 learners competed in the 2015 Natural Science Olympiad, a written examination comprising questions set by field experts.

“With the implementation of the Department of Science and Technology’s Science Engagement Strategy, SAASTA will work closely and collaborate with important stakeholders involved in science, technology, engineering, mathematics, and innovation (STEMI),” Matlala adds. “These stakeholders include Mathematics, Science and Technology provincial coordinators, industry, science councils, municipalities, government departments, and non-government organisations that engage learners and educators in STEMI.

“It is therefore appropriate that SAASTA recognises and acknowledges complementing efforts from all who contributed to the success of the 2015 Natural Science Olympiad.”

Matlala lauded the top three schools whose average performance was above 60%, but acknowledged that a lot of ground still needed to be covered to improve the state of mathematics and science education in South Africa. He cited a 2011 Human Science Research Council study titled “Highlights from Trends in International Mathematics and Science Study (TIMSS) 2011: the South African Perspective”. The study painted a grim picture of learner performance in Mathematics and Science. “The lack or shortage of the skills that require mathematics and science denies South Africa the competitive edge it deserves as the country moves towards a knowledge economy,” Matlala says.

“We look forward to the talent identified in our learners during the Natural Science Olympiad, being nurtured until it bears fruit.”

Even more encouraging were the pockets of excellence that emerged. The top three schools all attained performances above 60%.

The awards ceremony was held at the Johannesburg Observatory in October. The prizes included laptops, Kindle e-readers, trophies, certificates and laboratory equipment vouchers for schools.

The top national winners were A Abdullah from Star College (Western Cape) in the number one spot and the runner-up was LB Shabalala from Sifososethu Primary (KwaZulu-Natal). Both received tablet computers as prizes.

The top performing schools were Parklands College (Western Cape), Avonford Secondary (KwaZulu-Natal) and Star College (KwaZulu-Natal), in that order.

Photo: Adam Abdullah (front), the top national winner. Left to right (back row): SAASTA officials Gaongalelwe Tiro, Moloko Matlala and Shadrack Mkansi; and the programme director at the awards ceremony, Nicholas Rawhani.

Photo: FS Smuts (front) walked away with the prize for top national winner in grades 6 to 9.

Photo: K Pillay (front) was third in the competition for national winner in grades 6 to 9.

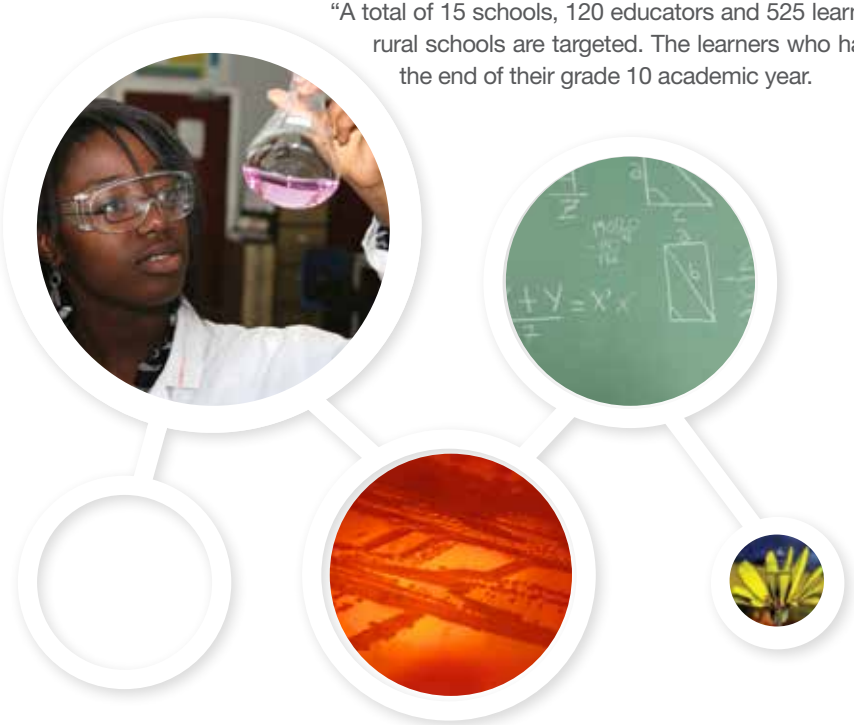
New partnership for science education takes off

SAASTA, backed by the Komatsu Development Trust (KDT), has rolled out a new programme to upgrade the level of Mathematics, Physical Science and Life Sciences education in the country.

The project targets learners from rural and disadvantaged communities in three district municipalities – Nkangala (Mpumalanga), Waterberg (Limpopo) and John Taolo Gaetsewe (Northern Cape). Five schools and 35 grade 10 learners per school (with a total of 175 learners per district) have been identified in each district.

"This is a three-year programme (2015 to 2017) targeting the same group of learners who are in grade 10 during 2015 and to grade 12 in 2017 and also their Mathematics, Physical Science, Life Science and Life Orientation educators," says Moloko Matlala, SAASTA Science Education Unit manager.

"A total of 15 schools, 120 educators and 525 learners from disadvantaged/ rural schools are targeted. The learners who have been identified are at the end of their grade 10 academic year.



"Processes will be put in place to ensure that the learners get the full benefit of the programme as from the 2016 academic year."

The interventions this project has introduced include learner support in the form of extra tuition or learner camps and career profiling in the form of role modelling campaigns, industry visits and participation in STEMI (Science, Technology, Engineering, Mathematics and Innovation) Olympiads and Competitions. In addition, there is engagement with Life Orientation educators in terms of science, engineering and technology career options, market analysis and entry requirements into higher education institutions.

During the 2015 September/October school holidays, learner camps were held in two of the districts, Nkangala and John Taolo Gaetsewe. "The aim of the camps is to improve learner performance in Mathematics, Physical Sciences and Life Sciences," Matlala says.

Construction and mining equipment company Komatsu Southern Africa established KDT, which is the main funder of this programme, in 2014 to provide human resource development programmes for the historically disadvantaged South Africans as defined in the Mining Charter. SAASTA and KDT signed a memorandum of agreement in July 2015.

> "SAASTA has rolled out a new programme to upgrade the level of Mathematics, Physical Science and Life Sciences education in the country."

Science centre staff exploit opportunity to gain new skills

SAASTA recently conducted a job shadowing programme, which it runs on behalf of the Department of Science and Technology, for science centre staff to build their capacity to run their institutions more effectively.

Twenty seven staff members were placed at science centres other than their own across the country. During the five-day job shadowing programme the participants learned best practices through observing their more experienced counterparts at their host centres doing practical work.

On the basis of the staff members' interests, SAASTA designed schedules and identified experienced science centres to host the programmes that allowed each staff member to spend time learning about different aspects of science centres in order to gain a realistic perspective of running science centre programmes, explaining exhibits and the actual planning and implementation of the programmes at the centres.

The programme involved scientists, both SAASTA employees and the host centre employees, sharing their work experiences as well as talking about their chosen career paths with the participants.

> "It was indeed an eye opener to come from a small science centre and absorb how the big science centres operate. I have learnt that no matter how small your science centre might be, you are somehow making an impact on someone's life through science."
>
> *- Chrisencia Moatshe, Manager of Mothibistad Science Centre*

Diloshni Tambaran, volunteer at the KwaZulu-Natal (KZN) Science Centre, thanked SAASTA for an informative programme. "It was a great opportunity for me as it gave me hands-on experience with science shows development, presentation and evaluation. I hope SAASTA runs the programme again as attending these programmes benefits one a great deal," she said.

For Akash Dusrath, Education Officer at Sci-Bono Discovery Centre, the experience to observe the effective functioning of science centres on limited resources and the hard working people behind the scenes giving their all to promote science awareness and engagement, left her motivated.

The job shadowing programme achieved its objective to give participants insight into the operations and projects of different science centres.

"Our job shadowing programme has allowed participants to freely explore the different approaches of science centres and offered participants exposure to areas such as Science Centre Philosophy, Educational Theories, Science Shows Development, Science Exhibits Development, Science Centre Research and Evaluation, Outreach Programmes, Curriculum Interventions and Productive Relationships with Industries," said Thandimanzi Mtsweni, project coordinator at SAASTA.

Science centres that assisted with the job shadowing programme included Sci-Bono Discovery Centre, KZN Science Centre, Giyani Science Centre, Forté School of Science and Technology (FSOST) Discovery Centre, Unizulu Science Centre, ArcelorMittal Science Centre Vanderbijlpark and Cape Town Science Centre.

> "The most important thing I have learnt from this experience is that in order to run a successful educational institution that is well visited, one needs to have an excellent programme offering with qualified and passionate employees."
>
> *- Akash Dusrath, Education Officer: Sci-Bono Discovery Centre*

Olympiad organisers launch community of practice

The value of Science, Technology, Engineering, Mathematics and Innovation (STEMI) Olympiads and competitions should not be underestimated and more learners and schools had to participate in them, Science and Technology Minister Naledi Pandor told delegates at the first Annual STEMI Olympiads and Competitions Conference.

She said the Olympiads and competitions had a potential of being game changers in advancing science education in South Africa.

Already as it were, Pandor said, South Africa, with its small economy, made a disproportionate contribution to global scientific and technological innovation. But the country could not afford to be complacent and it should pull out all stops to produce more scientists.

Organisers of STEMI Olympiads and competitions gathered at the Garden Court, OR Tambo International Airport from 15 to 17 March 2016 to launch a community of practice. This move follows a resolution made at a consultative conference on the community of practice and a formal body of organisers. SAASTA and the DST jointly organised this 2016 inaugural STEMI Olympiads and competitions Conference.

Science Education Manager at SAASTA, Moloko Matlala said the gathering achieved it goals. “The main purpose was to receive feedback on the progress made since the conference we held last year.

“We launched the community of practice and held the founding meeting of ASTEMI (Association of Science, Technology, Engineering, Mathematics and Innovation) whose main objective will be to promote STEMI Olympiads and competitions for schools. The founding meeting adopted a constitution and a business model for ASTEMI and elected a leadership.

“Further, the community of practice has created a platform where we will share experiences and best practice, and advise ASTEMI on what it needs to take into account as it endeavours to open up access to Olympiads and competitions to more learners in rural and remote areas. Olympiads and competitions are a recognised way of enticing learners to take up STEMI subjects.”

At present, there is concern about the number of schools taking part in Olympiads and competitions as they represent only a fraction of the total. Only 82 164 school learners from 1 039 high schools (out of 6 000 in total) took part in the South African Mathematics Olympiad in 2015.

There are 20 000 primary schools in South Africa, but only 378 participated in the South African Mathematics Challenge. The number of learners who took part was 9 000.

SAASTA, ASTEMI and the Department of Science and Technology (DST) will work together to develop mechanisms of tracking the impact of STEMI Olympiads and competitions. The conference showcased some of the successes that the Olympiads have produced in the past with previous participants giving testimonies.

The former Olympiad participants included the University of Johannesburg Deputy Vice-Chancellor, Tshilidzi Marwala, Science Awareness Manager at SAASTA, Shadrack Mkansi and Palesa Masuku, a pharmacy student at the University of Limpopo. They spoke about how participating in the Olympiads shaped their careers.

> “Our children have the potential to be counted among the best in the world (and) all they need is structured support from those who have a passion for Olympiads and competitions.”

Inventive entrepreneur scoops SAASTA award

DLO Energy Resources walked away with the South African Agency for Science and Technology Advancement (SAASTA)-sponsored Most Innovative Black Business Award that aims to reward companies that demonstrate a high level of inventiveness.

"The decision to support an award that rewards innovation furthers our mandate as SAASTA," says MD Dr Jabu Nukeri. "We have been charged with the responsibility of advancing public awareness, appreciation and engagement of science, engineering and technology and it is to this end that we agreed to support the award.

"In DLO Energy Resources we have a befitting winner that is involved in a project that leverages science and technology to address South Africa's challenge of energy supply constraints in an environmentally sustainable manner."

The SAASTA-sponsored prize is part of the annual Motlekar Holdings BBQ Awards, which are South Africa's most prestigious and longest-running black business awards. Their main purpose is to celebrate good corporate governance and leadership, and to serve as a platform to applaud world-class individuals, and black-owned and empowered companies and organisations.

DLO Energy Resources was part of the consortium that emerged successful in the South African government's Renewable Energy Independent Power Producer Procurement Programme. The consortium's two wind projects have a combined capacity of 244MW, making them among the largest wind farms to be developed in Africa.

Entrepreneur Linda Mabena-Olagunju is the founder and managing director of DLO Energy Resources, a wholly black female-owned energy investment and advisory company. In addition, she is the founder of the Renewables and Energy Forum South Africa.

Prior to forming her own company, Olagunju practised as an attorney with a specialisation in energy and project finance. She was part of the team that advised on key transactions in the African energy sector, including Eskom's $250 million World Bank loan for its renewable energy projects.

She has also acted as the lead advisor to Gestamp Solar South Africa, Mulilo Renewable Energy, Longyuan South Africa Renewables, Total Energie Developpement and Sonnedix BV in their bids under the (REIPPPP) process.

She is an admitted attorney of the High Court of South Africa and a World Economic Forum Global Shaper. In 2014 she was listed as one of the most powerful women in Africa by the Oprah Magazine and in 2013 she was selected by the Mail and Guardian as one of the Top 200 Young South Africans to take to lunch.

Science and Technology graduates acquire entrepreneurship skills

Unemployed Science, Engineering and Technology graduates from all over South Africa are benefitting from a programme that aims to equip them to create jobs for themselves and others. SAASTA has been presenting this series of entrepreneurship workshops since the beginning of January 2016.

As at end of March 2016, 252 Science and Technology graduates had attended the week-long skills training programme. In total, 11 workshops were conducted in Pretoria, Witbank, Cape Town, Durban, Polokwane and East London.

This is in keeping with the spirit of the National Development Plan (NDP) that places entrepreneurship at the heart of efforts to address the challenge of unemployment. The plan estimates that by 2030, about 90% of all new jobs created will be as a result of small and expanding companies.

The importance of entrepreneurship to the economic future of South Africa has warranted the establishment of the Ministry of Small Business Development to oversee and nurture the sector. SAASTA joined this initiative to cultivate science, engineering and technology entrepreneurs.

The unemployed graduates were trained in a wide variety of business skills for success as entrepreneurs. These included Innovation, Marketing, Basic Business Finance, Funding Options, Problem Solving, Negotiation and Intellectual Property.

The training investigated entrepreneurial opportunities in science, engineering and technology. Further, trainees were taught how to compile entrepreneurial and personal growth goals.

"We help them understand the nature of entrepreneurship and form an opinion of their own entrepreneurial abilities," said Dolf van Rooyen, Director of Megro Learning and one of the facilitators of the training. "Using this information, they are then able to compare their skills with those of well-known entrepreneurs.

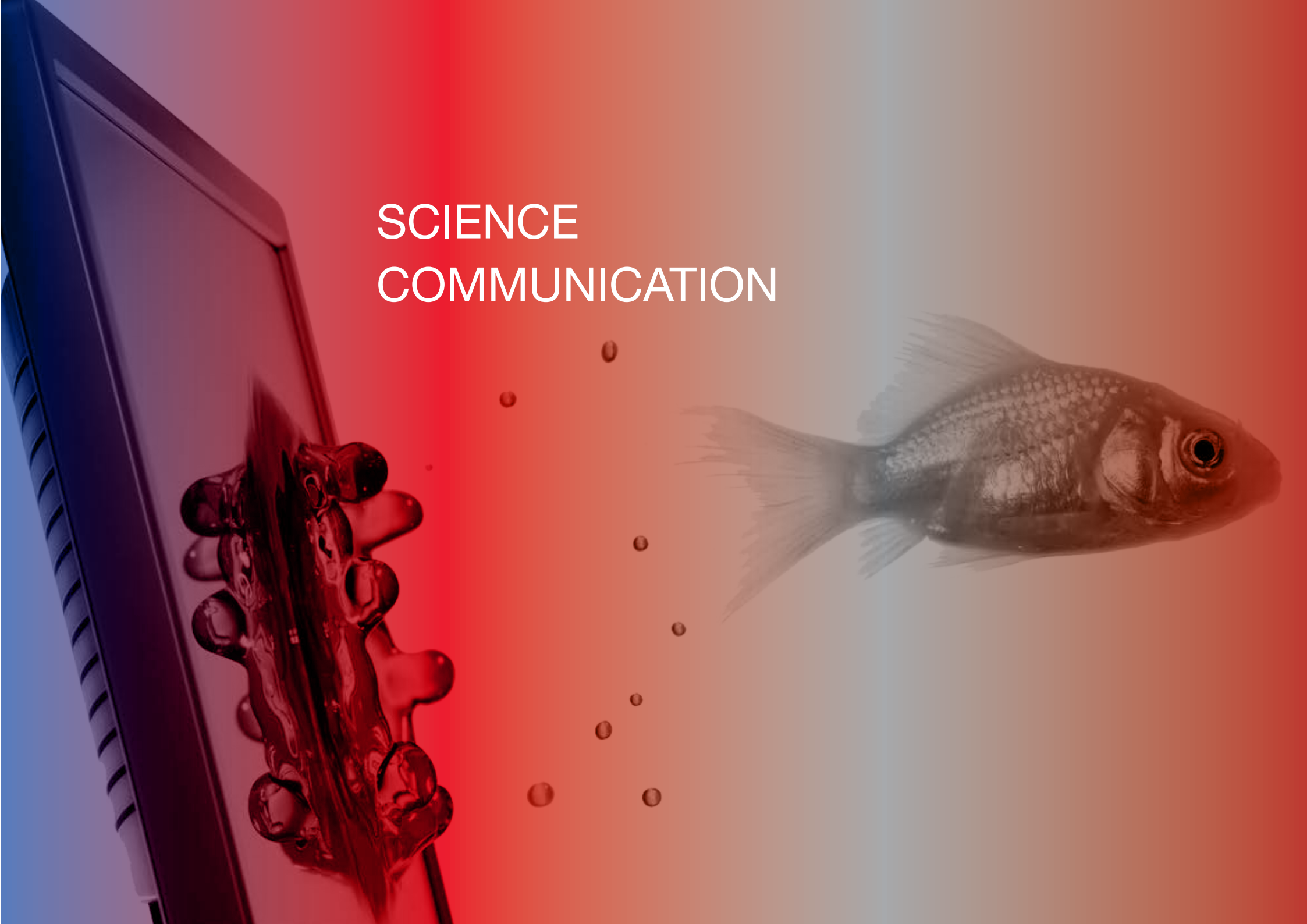
"Another key aspect of the training is that it highlights the difference between innovation and creativity. The trainees do exercises in innovation."

The training uses case studies in science, engineering and technology to drive home the importance of innovation. Real life cases that are studied include Apple, Google, mobile device apps, energy saving innovations, and a host of other technological applications.

"Overall, we guide the trainees on their way to becoming successful in their ventures," Van Rooyen said. "If you are going to spend the time and effort to start a business, you might as well do it properly and be successful at what you do."

The trainees (in preselected groups) were requested to construct a shortened business plan on an innovative idea, and to present it to a panel of external experts at the end of the programme. The experts then provided a critique on the feasibility of their business idea as well as on the practical application thereof.

SCIENCE COMMUNICATION



SA Science Lens Competition

The Southern African Science Lens competition aims to encourage the use of photography as a tool in science communication. It runs every two years and alternates biennially with the Young Science Communicators' Competition. The competition is open to all with an enthusiasm for science and photography, and also encourages engagement with science.

To increase engagement in 2015/2016, the competition opened an Instagram account, which provides an ideal platform for sharing images associated with the SA Science Lens competition. It also appeals to a younger demographic population.

Winning images of the 2015/2016 competition were published in Popular Mechanics and Science Spaza newspaper, and shared on social media via Facebook, Instagram and Twitter.

The competition closed on 11 December 2015. 151 entries were received in the four categories and winners were awarded as follows:

1

1.Science As Art
Winner – "Pearl Essence" by
Dr Camilla Floros

Close-up, the true beauty of the scales of the blue emperor fish, Lethrinus nebulosus, is revealed. You may be surprised to know that the beauty of fish scales has literally been under your nose for decades. Pearl essence, as it is called, is derived from fish scales and has been used in lipsticks and nail polish to give them that shimmery look. Crystals within the fish scales reflect light from many different angles and levels, giving lips and nails a pearly appearance.

CATEGORY 1
Science As Art

RUP

Runner up – "Endangered Seedlings"
by Morgan Trimble

Malawi's national tree, the Mulanje cedar, is critically endangered. It grows atop a single imposing granite massif, Mount Mulanje, where illegal loggers are harvesting them towards extinction. Wood of the Mulanje Cedar is prized for its resistance to fungus, rot and insects and its pleasant odor. Only about five square kilometres of the tree remains on the top of Mount Mulanje. Although threats to the tree have been known for a long time, since it was harvested commercially during the colonial era, the population has continued to decline, and scientists have struggled to understand the complex reasons, which besides physical harvesting, also include fire, environmental conditions and problems with natural recruitment. The Mulanje Mountain Conservation Trust (MMCT) aims to reverse the cedar's decline. With funding from international donors, it has provided forest guards, boosted tourism and organized an unprecedented tree planting campaign attempting to plant a million new seedlings over the next few years. Through several years of planting trials and associated scientific studies, they think they have hit upon a method for the greatest success at tree recruitment. Nurseries scattered across the mountains grow seedlings from seeds collected in the wild. The seedlings must reach a certain height before they have a good chance of surviving when they are planted. This photo shows an abstracted view of Mulanje cedar seedlings growing in one of the mountain's nurseries.

CATEGORY 2
SCIENCE CLOSE-UP

A late stage embryo of the species Chamaeleo calyptratus, the veiled chameleon. As the skeleton forms, cartilage is gradually replaced by bone. At this stage of development, most of the bones have formed, while the fronts of the ribs are still formed from cartilage. By comparing the rate of skeleton growth and other processes of embryonic development across different animals, scientists such as Dr Hockman, gain insight into how evolution acts on these processes to allow the diversity of form in the animal kingdom.

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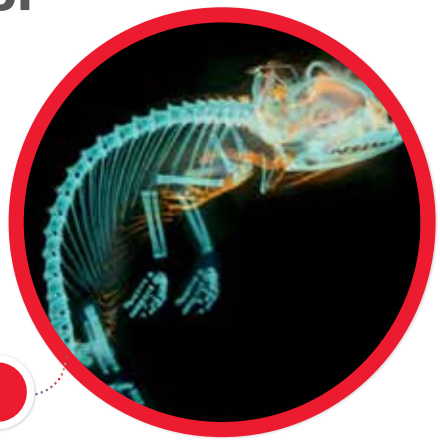

2.Science Close-up
Winner – "Inside Out" by
Dr Dorit Hockman

RUP

Runner up – "What's in a wing?" by
Mandy Mason

This image shows an embryonic bat at a stage of development where the hands form distinctive elongated digits and interdigital webbing of the wings. The open mouth of the embryo and flexed forelimbs that are tucked beneath its chin are characteristic of this stage, which is commonly known as 'Tongue Out'. The bat's hind limbs, which form short free digits, project outwards. This embryo has undergone an in situ hybridisation experiment, whereby a gene's activity is visualised through the staining (in purple) of the mRNA molecule that it transcribes. In this particular experiment, the gene Meis2 shows unique expressions in the developing tissues that will form the membranes. This points towards a role for this gene in the evolution and formation of these structures. The evolution and development of the bat wing remains enigmatic and provides a remarkable contrast to embryonic studies of the conventional model organisms.

CATEGORY 3
SCIENCE IN ACTION

Three extraordinary chemical engineering academics brainstorm ideas by writing on a window pane. Prof Diane Hildebrandt (left) and Prof David Glasser (middle) are directors of the MaPS (Material and Process Synthesis), a research unit at UNISA. Dr David Ming (right) is a lecturer at the University of the Witwatersrand. He is one of the 2014 Mail and Guardian Top 200 Young South Africans and is one of the directors of Engineers Without Borders South Africa. The image shows the collaboration necessary in scientific pursuit.

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3.Science In Action
Winner – "Research is Attainable" by
Michelle Low

RUP

Runner up – "Turtle release" by
Camilla Floros

Nine juvenile loggerhead turtles await release back into the ocean after several months of rehabilitation. Loggerhead turtles are one of two species that nest and lay eggs along the northeast coast of South Africa. Many juvenile turtles get swept down from the north coast by the strong Agulhas current and get washed ashore by stormy seas. These turtles need rehabilitation because of exposure to cold water and dehydration. The loggerhead turtle is one of many turtle species at risk from human activity and is listed as endangered on the IUCN red list. Thus rehabilitating juvenile turtles is seen as a conservation priority.

CATEGORY 4
International Year of Light and Light-based technologies

This photo uses both natural light, in the form of stars, and man-made light from the city lights of Cape Town to illustrate the dichotomy and harmony between astronomy and light-based technology. Astronomy has been the driver of much development in light-based technologies, from telescopes to sophisticated light collecting sensors and advanced engineering to study the faintest light signals from far-away galaxies. Man-made light in the image, consisting of a streak of vehicle headlights along Tafelberg Road; street, house, and building lights of the city; and a beacon atop Table Mountain, illustrate the progress in controlling light to visualize our world—for safety, security, and comfort. Different colours and intensities represent different light emitting technologies, from the traditional incandescent and fluorescent bulbs, to neon lights, to the latest light emitting diodes (LEDs). You can even see the light pollution over the city in the form of a faint red glow in the sky. Perhaps a few people in Cape Town are using their lights to read about astronomy on this particular evening.

4.International Year of Light and Light-based technologies
Winner – "Light at night – natural and man-made" by Morgan Trimble.

Supersonic car inspires debate

"This innovation is not just about a fast car, but about inspiring change." This was heard during the imbizos at the finals of the SAASTA National Schools Debates competition in October 2015, where some very smart young minds were brought together to talk about the Bloodhound Supersonic Car (SSC). But this was not only a conversation about science and technology, it was also a conversation about what a big science project like the Bloodhound SSC can do for South Africa and her people.

NATIONAL TOPIC: "Does a leading edge technology project such as Bloodhound benefit the development of society, and national and local economies, beyond, as well as through, its scientific and engineering achievements?"

The Bloodhound SSC aims to reach a speed of over 1 600 kilometres per hour. This equals travelling the length of four and a half football pitches in one second. Bloodhound is called a supersonic car since it is anticipated that it will reach a speed faster than that of sound.

A number of brilliant scientists and engineers are currently working together in the UK to design the car, using innovative designs and new technology. They are also inspiring young people in South Africa and abroad to follow careers in science, engineering and technology through the Bloodhound Education programme.

Breaking a land speed record requires a good surface on which to run the car, and the best place for this challenge was found in South Africa, in the Northern Cape, at Hakskeen Pan.

The young debaters made strong arguments about what this project can do for South Africa. They brought key points to the table from technological, economic, social, cultural and political perspectives.

They spoke about the infrastructure that will be built in the Northern Cape to support the land speed record attempt. They spoke about the tourists it could bring to the country and the jobs the project could create, benefitting the local communities. They also felt it would benefit science as a whole, as it brought together many scientific fields and was advancing technology. The SAASTA Schools Debates are different from other debating competitions in that, while other debates focus on arguing what is right and what is wrong, they place emphasis on creatively finding solutions.

The judges had a difficult time deciding on the best debating team on the day, but awarded the first place to Clarendon High School for Girls from the Eastern Cape. Also to be commended were the first runner up, Randfontein High School from Gauteng, and the second runner up, De Kuilen High School from the Western Cape.

Gumbi flies SA flag high at international competition

Nozipho Gumbi scooped the FameLab South Africa 2016 award against nine other finalists and went on to compete in the United Kingdom (UK) for the international title against 26 other contestants from different countries in June 2016.

The 26-year-old from Eshowe in KwaZulu-Natal won the South African leg of the science communication competition, which has been dubbed the Pop Idols of Science, in front of a large audience at the Going Global conference held in May 2016 at the Cape Town International Convention Centre.

FameLab is an international competition and training programme designed to inspire, motivate and develop young scientists to actively engage with the public. The format of the competition requires participants to present a scientific topic or concept to a panel of expert judges within three minutes. Talks are judged on content, clarity and charisma. The challenge is that talks should be accurate and informative but also entertaining and original, while making sure the public audience understands.

Science Communication Manager at SAASTA, Michael Ellis hailed the contribution of the competition. "At SAASTA our focus is not only on the ultimate national FameLab winner, we believe that all the participants benefit greatly from the competition. They gain valuable science communication skills which they will use throughout their science careers," he said.

The ten finalists were brought to Cape Town and presented to the high-profile audience and judges, who included, from the University of Cape Town School of Public Health, Dr Tollulah Oni, from the Universe Awareness Programme, Dr Caroline Odman, from the Department of Science and Technology, Koki Selepe and from the British High Commission, John Wade Smith. Quentin Cooper of the BBC and FameLab International host was the MC at this occasion.

Independent agency Jive Media Africa assisted with the competition implementation and facilitated science communication training for the participants with the support of SAASTA and the British Council in South Africa. The competition went through several rounds held across the country until only ten finalists remained in the race.

Gumbi, who is studying nanotechnology at the University of South Africa (Unisa), impressed the audience and the judges with her engaging talk on water filtration using carbon nanotubes. Her PhD research at Unisa is investigating ways of improving water purification using membrane filters. She commended the level of the competition she encountered from the other entrants. "Each and every one of you could have been the winner tonight," she said.

Runner-up of FameLab South Africa, from Limpopo, Claude Moshobane, currently working with the South African National Biodiversity Institute, discussed "Alien invasive plants and how they disrupt the ecosystem". Another runner-up from Uganda, Savannah Nuwagaba, from the University of Stellenbosch, spoke about "How mathematics is used to predict possible changes in animals' body size, depending on changes in their eating habits".

As winner of the local leg of the competition, Gumbi received R5 000 in prize money and a trip to the UK to represent South Africa at the FameLab International Finals, hosted by Cheltenham Festivals. She made it to the top three in her group and in so doing made it to the finals which took place on 9 June 2016. Though Gumbi did not bring the international title home, she did fly the South African flag high by being among the nine finalists of the international competition.

FameLab competition

FameLab is an international competition that promotes engagement with science, technology, engineering, mathematics and innovation by creating spaces for scientists to find their voices and develop their communication skills. It was established in 2005 by Cheltenham Festivals in the United Kingdom and has been run in South Africa since 2013.

FameLab has been referred to as a "Pop Idols of Science". Contestants (research scientists, mathematicians, engineers and technologists from the age of 21 to 35) have three minutes to present a science topic to a panel of expert judges. The presentation should be entertaining, original and scientifically accurate while being accessible to a public audience.

The aims of the project are to:

- identify new voices in science, technology, engineering and mathematics;
- develop science communication skills; and
- profile role-models to inspire the next generation of scientists.

Since its inception, the project has increased its global footprint to include 30 countries around the world under a licensing agreement through the British Council.

FameLab 2016 competition

A number of preliminary regional heats are run across the country. Training and development in science communication, in the form of a workshop, is offered prior to each heat, in order to develop confidence and skills. Science communication specialists from NRF|SAASTA and Jive Media Africa collaborate

to conduct training and build capacity for science communication in South Africa.

In early 2016, the following heats were held across the country: Mintek; CSIR; Unisa; Stellenbosch CIB; UWC; University of Limpopo; University of Fort Hare. 19 Semi-finalists were selected from these heats to attend a two-day Master class on 10 and 11 March 2016 with an international trainer from the UK, Malcolm Love. The semi-finals were held at Sci-Bono Discovery Centre on 12 March 2016, where ten finalists were selected to compete in the national final at the Going Global conference on 4 May 2016 at the Cape Town International Convention Centre.

The winner of FameLab South Africa, Nozipho Gumbi from Unisa, went on to compete in the international semi-finals in the UK on 8 June 2016. She gave a stellar talk and was selected as one of the international finalists to speak in front of a packed public audience as a highlight of the Cheltenham Science Festival on 9 June 2016.

Nozipho was the first South African representative to compete in the international finals. She said "Representing my country on such a huge and global platform is a win on its own. I am grateful to all the people that have helped in shaping my Famelab journey to get to the point where it is today; The University of South Africa, Robert, Sthabile and Hayley from Jive media, the team at NRF|SAASTA, Anisa and the guys at British Council and all my Famelab South Africa fellow contestants, thank you very much for making this an exciting and unforgettable experience of my life."

Through FameLab, a diverse range of young scientists have been provided with the opportunity to improve their skills or discover their talent for communicating science. Experienced scientists and science communicators have acted as judges and shared knowledge with a new generation of young science communicators, and public audiences have been engaged on diverse science topics through the media and live events.

Photo: FameLab SA 2016 Finalists (l-r): Marli Louw; Tashnica Sylvester; Margaret Siyawamwaya; Nozipho Gumbi; Savannah Nuwagaba; Tendai Samkange; Claude Moshobane; Charles O'Donoghue; Wandisile Sixhoto; Robert Schlegel.

The ten finalists of FameLab SA 2016 were:

- Tashnica Sylvester (Molecular Biology and Human Genetics – Stellenbosch University);
- Margaret Siyawamwaya (Pharmaceutical Sciences – University of the Witwatersrand);
- Nozipho Gumbi (Nanotechnology and Water Sustainability (NanoWS) – Unisa);
- Savannah Nuwagaba (Biomathematics – Stellenbosch University);
- Tendai Samkange (Pharmaceutical Sciences – University of the Western Cape);
- Claude Moshobane (South African National Biodiversity Institute (SANBI) and the Centre for Invasion Biology – Stellenbosch University);
- Charles O'Donoghue (Department of Chemistry – Rhodes University);
- Wandisile Sixhoto (Agricultural Extension – University of Fort Hare);
- Robert Schlegel (Department of Marine Sciences – University of the Western Cape); and
- Marli Louw (Institute for Wine Biotechnology – Stellenbosch University).

Science and Technology Youth Journalism Programme

SAASTA selected 17 interns from the following district municipalities for a Science and Technology Youth Journalism Programme; four from Limpopo (Polokwane and Sekhukhune); four from the Eastern Cape (Alfred Nzo, Chris Hani, Amathole, OR Tambo); three from North West (Bonajala and Dr Ruth Segomotsi); one from Mpumalanga (Ehlanzeni) and five from KwaZulu-Natal (uThungulu, uMzinyathi, uThukela, uMgungundlovu). These candidates were subjected to a rigorous selection process and interviews.

The programme was launched in February 2016 through the facilitation of a two-day science journalism workshop for the selected interns and community media hosts. Ms Mandi Smallhorne, President of the South African Science Journalists Association, facilitated the workshop on behalf of SAASTA.

The focus of the workshop was on science journalism and to provide interns with a practical experience. In addition, the aim and format of the internship programme was explained to interns and discussions were held around the logistics and contracting of the interns. There was a total of 33 participants at this workshop, including both community media representatives and interns.

In July 2016 SAASTA worked with the community media houses to increase the number of interns. The aim is to ensure that science journalism is sustainable in the future and that science journalism skills are developed in community media staff members/volunteers/unemployed graduates in the municipalities. SAASTA used the same advert to recruit interns from the community media.

SAASTA received 15 prospective candidates from the community media, who were then screened. Six candidates did not meet the minimum criteria for selection and they were not accepted by SAASTA. Nine candidates met the criteria, one could not take up the offer because he was working as an intern and was disqualified. A total of eight interns then joined the first group of interns. There would then be a total of 25 interns in the programme. The successful candidates started on the programme in July 2016.

Many of the candidates had experience as journalists in the community media and recruiting such individuals would ensure that the science and technology journalism skills remained in the community media beyond the end of programme. This was therefore a sustainable approach for the implementation of the programme and would ensure the continuation of project impact in the long term.

> SAASTA believes that the interns are contributing towards introducing science related articles in the community media and increasing capacity in various community media outlets in the country and that they are gaining valuable experience in return.

Map of South Africa showing the current distribution of interns at community media partners across South Africa.

Science and Technology Journalists website

SAASTA has designed and developed a webpage for the Science and Technology Journalism Programme in order to profile the great work that the interns are doing in the community media. The interns are required to submit their published stories via Dropbox to SAASTA every month. This enables SAASTA to monitor their progress and most importantly to profile their work online. This in turn enables the interns to learn from each other in terms of science stories. One of the main objectives of the website is to profile best the science stories produced by the interns. SAASTA is responsible for selecting stories and populating the website.

BACKGROUND INFORMATION ABOUT THE PROJECT
http://www.saasta.ac.za/programmes/nurturing-talent/youth-journalism-programme/

PUBLISHED WORK
http://www.saasta.ac.za/programmes/nurturing-talent/youth-journalism-programme/projects

SAASTA has also created a SoundCloud and Dropbox account for the project.

Photo: Participants in Science and Technology Youth Journalist Programme together with SAASTA MD Dr Jabu Nukeri, acting MDDA CEO Thembelihle Sibeko and science journalism trainer Mandy Smallhorne

General science coverage by the interns

The Science and Technology interns have contributed immensely to the community media in terms of science that is happening and is relevant within their own communities.

Success stories of the programme

The interns have indicated that they achieved the following:

- Introduced a 10-minute science slot during a breakfast show on Thursdays;
- Read news;
- Been involved in a Law Focus Show that takes place every Wednesday;
- Science Tech Network Promo;
- Vox-pop for women cancer awareness;
- Youth vs Science (special show for Youth Month);
- Hosted current affairs show called “Uthukela Nezalo”;
- Learnt to use audiocity software to record and FL studio software to edit audio clips; and
- Produceed content for Current Affairs.

Science and Technology Youth Journalism Programme

SAASTA and MDDA join forces to promote science journalism.

MDDA partnership

The Media Development and Diversity Agency (MDDA) and SAASTA have signed a memorandum of understanding (MOU) to promote science journalism.

The MOU, signed in February 2016, will find expression in the Science and Technology Youth Journalist Programme that the two organisations have launched, with the first batch of trainees and community media journalists attending a two-day workshop at SAASTA's offices in Pretoria.

The MOU aims to seek opportunities to cooperate so that each party may achieve their respective goals/mandates more successfully and that together they may make a meaningful contribution to science engagement in South Africa for society's benefit.

"We believe that our partnership with the MDDA will help us achieve the objectives of the Science Engagement Strategy that the Minister of Science and Technology approved in 2015," said SAASTA MD, Dr Jabu Nukeri.

"SAASTA is the designated national coordinator of the strategy. The objectives of the strategy include popularising science, engineering and innovation as attractive, relevant and accessible in order to enhance scientific literacy and awaken interest in relevant careers; and developing a critical public that actively engages and participates in the national discourse of science and technology for the benefit of society.

SAASTA MD Dr Jabu Nukeri with MDDA acting CEO Thembelihle Sibeko.

"The strategy further aims to promote science communication that will enhance science engagement in South Africa and to profile South African science and science achievements domestically and internationally. It seeks to demonstrate their contribution to the national development and global science, thereby enhancing its public standing."

Nukeri added that the media was an important conduit of disseminating information to the general public. Therefore, the Science and Technology Youth Journalist training programme would enable SAASTA to entrench dialogue between scientists and society in line with its mandate.

"In the delivery of our mandate to develop and diversify community media, the MDDA values the very important role that journalists, including our local media, play as knowledge interpreters and communicators on behalf of our country's scientific and technological community," said MDDA acting CEO, Thembelihle Sibeko.

"Science, technology and innovation are critical to the sustainability of all aspects of development in South Africa, including poverty alleviation and economic growth. But equally important is the ability of South African communities to exploit scientific and technological solutions for their specific needs.

"Initiatives such as the SAASTA partnership therefore go a long way in ensuring that we capacitate our journalists in an environment that encourages such knowledge to be communicated and applied to our nation and its communities' needs."

SAASTA recognises the MDDA and the community media as an important stakeholder and channel for dissemination of critical information to the South African public, and the MDDA as a strategic partner in order to facilitate access to the community media.

SAASTA will support the MDDA in the following areas: training community media in science communication/journalism; launching awards in science journalism in the community media to promote excellence and creativity in science coverage. The MDDA is to recommend to SAASTA hosts for the Science and Technology Youth Journalist Programme in various community media houses in the targeted municipalities in KwaZulu-Natal, Mpumalanga, the Eastern Cape, North West and Limpopo.

SAASTA believes that interns will contribute towards introducing science related articles in the community media and increasing capacity in various community media outlets in the country, and gain valuable experience in return.

SAASTA hosted a number of science communication development interventions in 2015/2016:

For scientists:

- The Public Understanding of Biotechnology Programme (PUB) hosted a one-day writing workshop for researchers at the Agricultural Research Council in Potchefstroom on 12 October. The workshop was facilitated by Daryl Ilbury
- A science communication workshop was conducted at the Indaba Conference in August 2015 in order to build capacity in science communication while contributing to the advancement of Crystallography
- The Nanotechnology Public Engagement Programme facilitated a science communication workshop at the 7th International Symposium on Nanotechnology from 18 to 22 October 2015.
- SAASTA co-presented the SARIMA science communication workshop on 12 November 2015, incorporating Caroline Southey from The Conversation and Sarah Wild as expert science journalist.
- Three science communication workshops were held prior to each FameLab heat (University of Limpopo on 10 February; University of Western Cape on 3 February; University of Fort Hare on 29 February) for young scientists.
- A science communication presentation was made at the ASSAf Young Scientist's conference on 18 September 2015.

For media:

- Three workshops for community media on science communication were hosted in Limpopo, in Polokwane, Phalaborwa and Giyani.
- In collaboration with the Agricultural Research Council, PUB held a science journalism session on 29 January 2016 at a WEMA (Water Efficient Maize for Africa) field trip and information session for science journalists. The session was facilitated by Adele Baleta.

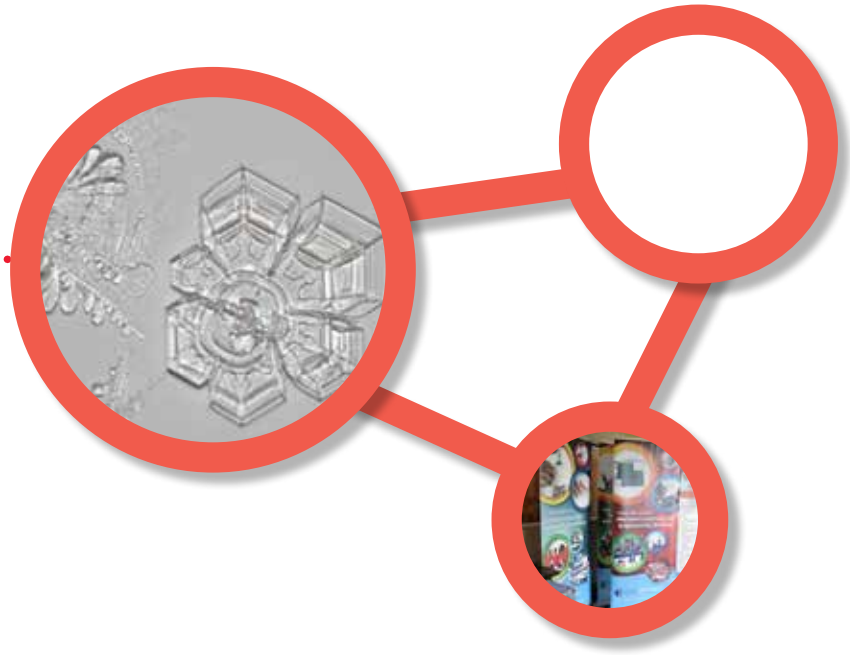
Science centre network:

- An advanced biotechnology course focusing on genetic engineering was offered to science centre staff on 21 and 22 September at SAASTA's Observatory site and was facilitated by Professor Valerie Corfield.

Science Communication Workshops

One of the key focus areas of the Science Communication Division of SAASTA is capacity building in science communication. SAASTA, largely on ad hoc request, hosts numerous science with communication workshops, providing scientists with opportunities to develop their skills in science communication. These workshops encourage scientists to 'package' and share their science using more accessible language. SAASTA has also hosted workshops to the journalism community with the objective to improve science journalism and the quality and quantity of science reporting in the media, with a particular focus on community media in 2015/2016.

The Department of Science and Technology's Science Engagement Strategy, with four key strategic objectives, highlights the importance government is placing on public engagement and science communication, with scientists and journalists playing key roles in engaging with various publics. With this, the demand for skills development in the area of the science communication is increasing.



SAASTA Schools Debates competition

The SAASTA National Schools Debates Competition is an initiative of the Science Communication Division at SAASTA, which continues to provide learners with a platform to make scientific information relevant, through the understanding of social, cultural and economic implications. The aim of the competition is to encourage young people to address key issues around science and technology that are faced by their communities, through the medium of debate. The programme also seeks to foster confidence in high school learners from Grades 9 to 11 to speak about science.

The provincial finals for the 2015 SAASTA Schools Debates competition were held on 8 October where all nine provinces were represented.

Provincial finalists competing in the National Finals:

Eastern Cape	– Clarendon High School for Girls
Gauteng	– Randfontein High School
Western Cape	– De Kuilen High School
Limpopo	– Taxila Secondary School
Mpumalanga	– Mashishing Secondary School
Northern Cape	– Kimberley Girls' High School
Free State	– St. Michael's School for Girls
KwaZulu-Natal	– Wingen Heights Secondary School
North West	– Lebone High School

The teams competed fiercely to be crowned the SAASTA National Schools Debates Champions. The winners were later announced at the gala award function that was hosted at SAASTA Observatory in Johannesburg. The Clarendon High School for Girls from the Eastern Cape took the honours of being crowned the champions and was awarded the ultimate prize of a trip to New York to visit the American Museum of Natural History. In 2nd place was Randfontein High School from Gauteng and in 3rd place was De Kuilen High School from the Western Cape.

The all-girls' team jetted off to New York early in 2016 to experience the amazing wonders of science in the Big Apple. The trip was packed with an exciting programme of scientific exploration to various sites such as the visit to the New York Wall of Science and the World Trade Centre. The learners expressed their appreciation to SAASTA and American Museum of Natural History for a well-organised trip, with one of the learners, Laureen du Preez, stating that "the whole SAASTA competition and the New York experience were pure magic" that made her realise her mental capability.

The Clarendon High School all-girls team won a trip to visit the American Museum of Natural History in New York City, USA, where they experienced some amazing science shows and exhibitions, found out what it is like to attend school in the USA and spoke to inspiring people.

Photo: 2015 SAASTA Schools Debates Champions - in New York City. From left to right: Mame-Diara Mbyae, Cwayita Kweya,Rebbecca Mqamelo,Luaren du Preez and Moya Eyber.

Photo: The winning school, Clarendon High School for Girls, from the Eastern Cape. From left to right: Dr Jabu Nukeri (SAASTA MD); learner Lauren du Preez, Nicholas Rawhani (MC for the awards function); learners Moya Eybers, Cwayita Kweyi and Mame-Diara Mbaye; Katie Joubert (Educator) and learner Rebecca Mqamelo.

Symposium equips researchers with communication skills

Communicating science to the public is almost as important as generating scientific knowledge itself, researchers attending the Deutscher Akademischer Austausch Dienst (DAAD)/SAASTA science communication symposium heard.

Ten postgraduate science students under the DAAD, also known as the German Academic Exchange Service, scholarship programme from South African universities, including KwaZulu-Natal, Witwatersrand and Cape Town, attended the symposium. The symposium explored why communicating science is important, especially in South Africa.

The benefits of science communication include influencing change in behaviours and attitudes in society, informing discussions and debates on research findings, and correcting misinformation or misconceptions. Further, the symposium aimed to improve science communication skills of the delegates. “The importance of science communication in South Africa cannot be overstated,” said one of the participants Nelusha Shunmoogam-Gounden, an NRF Postdoctoral Fellow in Pharmacology.

“The importance of science is well known but there is little understanding of the various research and development projects that take place in the institutions of South Africa.”

According to Maryam Bibi, a PhD student in Medical Biochemistry at the University of Cape Town, science communication can be thought of as the ability to convey scientific information to those often referred to as the “layman”.

“The German Academic Exchange Service believes that the Science Communication symposium is important for developing future science communicators and teaching the next generation of scientists the necessary communication tools to make it easier for them to communicate their research work,” said DAAD South Africa Communication Officer Meghan Beukes.

Mthuthuzeli Zamxaka, Science Communicator at SAASTA, believes that the symposium benefitted the participants. “As the next generation of scientists and researchers, it is very important for postgraduate students to develop science communication skills in order to communicate their scientific research to various audiences using different platforms,” he says.

The two-day symposium, which took place at SAASTA's offices in Pretoria during October 2015 explored opportunities for postgraduate students to collaborate with SAASTA in science engagement initiatives.

The benefits of science communication include influencing change in behaviours and attitudes in society

Nanomedicine holds promise in fight against HIV/Aids

SAASTA in partnership with Nanotech and Biotech (Nabio) Consulting brought together a wide array of experts to explore the role nanomedicine can play in the fight against HIV/Aids.

The "Nanomedicine: The new approach towards HIV/AIDS Eradication" symposium took place shortly after World Aids Day, which is commemorated on 1 December annually. The UNAIDS World AIDS Day theme for 2011 to 2015 was: "Getting to Zero". In 2015, South Africa focussed on Zero Discrimination, without losing sight of the other "zeroes", such as zero new HIV infections and zero AIDS-related deaths.

The expert speakers at the symposium underscored the great promise that nanomedicine, which is the application of nanotechnology to the prevention and treatment of disease in the human body, holds. Nanomedicine could overcome some of the challenges of the current HIV/Aids treatments, University of the North West academic Lebogang Katata-Seru said.

The limitations of the current treatments include that some ARV drugs cause gastrointestinal degradation leading to low bioavailability and lengthy treatment. There is low adherence to HIV treatment due to adverse side effects, and ARVs cannot cross biological barriers for delivery to cellular and anatomical sites, and suffer from short residence time at the cellular and anatomical sites.

Another limitation is that discontinuation or shortage of treatment could lead to drug resistance.

Nanotechnology-based delivery of antiretroviral therapy could help overcome these limitations. "(It) improves solubility and allows sustained release of the antiretroviral drug," Katata-Seru said.

"(Nanotechnology-based delivery of antiretroviral therapy) reduces- toxicity and improves bioavailability. (Further, it) allows efficient crossing of the drug across cellular barriers or the ability to traverse the epithelial/endothelial barriers."

She said the advantages of HIV/Aids nanomedicine were immense, but there were challenges as well. These included that nanoparticles were not easily degraded or metabolised and might accumulate over a period of time, and that high toxicity issues resulted in DNA damage and cellular apoptosis.

Further, while several preclinical trials showed promise, scaling up was challenging and expensive. Most of the research had not proceeded beyond the pre-clinical stage.

Nabio director Steven Mufamadi agreed that nanomedicine could help South Africa to eradicate HIV/AIDS. Scientists were working on a nanogel-microbicide to prevent HIV.

Over and above the next-generation of "therapeutic" delivery vehicles, nanotechnology could help with early detection and rapid testing for HIV/AIDS among other things. "Nanomedicine helps to facilitate the quick detection (of HIV), instead of waiting for three months for HIV test results. "With nanomedicine you can have results immediately," Mufumadi said.

Fhumulani Maanda, representing the Department of Science and Technology (DST), said the government believed that nanotechnology held great promise. To this end, the DST had adopted a nanotechnology strategy that focussed on several strategic research areas.

The research areas include the applications of nanotechnology in health, energy and water in the social cluster. In the industrial cluster the focus was on mining and minerals, chemical and bioprocessing, and advanced materials and manufacturing.

Community Media Pilot Programme

The Community Media Pilot was a successful programme that had a number of positive spin offs both for SAASTA and the community media partners. The broader National System of Innovation also benefited, through its stakeholders and science being profiled. The community media partners indicated that they will continue communicating science after the pilot programme has ended. The challenges that have been faced during the pilot phase of the programme were addressed, and the overall feedback from all partners involved was that the programme was successful and it should be continued.

Some highlights of this report are:

1. 102 media placements were made with a return on investment of 44%.
2. The total Advertising Value Equivalent (AVE) was R612 000.00.
3. Science was communicated in nine languages over an area of more than 400 square kilometres.
4. 72 community media staff members were trained, from management to journalists.
5. The return on investment is 42% if all costs are included and the AVE of the 102 placements is taken in to account.
6. Collaboration and an MOU with the MDDA resulted from the pilot programme.

Champion young science communicator expands skills in Italy

I had the privilege of attending the 2016 Masterclass in Science Communication hosted by the Journal of Science Communication (JCOM). The location for this Masterclass was Trieste, a city perched against beautiful sandstone cliffs that drop into the crystal waters of the Adriatic Sea, northeast of Italy.

The National Research Foundation (NRF), along with SAASTA, sponsored my trip to Italy to attend this world-renowned course, where I gained valuable skills in communicating my own scientific research to diverse audiences in new and exciting ways.

The course runs over five days and hosted 12 participants from eight different countries around the world. It was a privilege to gain insight into the ways science is communicated internationally, across a wide range of fields including Astrophysics, Neurotechnology, Mathematics and Ecology. I found myself engaging with an ecologist, astrophysicist and nuclear physicist over the controversial issue of nuclear energy as a sustainable alternative to solar, wind and hydro energy.

With input from a range of experts in the field of science communication, including Paola Rodari, Simona Cerrato and Andrea Bandelli, the course left the participants inspired in different ways. Workshops on popular article writing, radio interviews and oral presentations gave us the opportunity to practice the theory behind effective communication.

One of the highlights of the course for me was an exercise where we had to write a popular online article summary based on a peer reviewed scientific paper. My group was given a complicated scientific paper that was published in *Science* on new insight into the genetic mechanism behind Alzheimer's disease. The challenge of translating scientific language into an easy-to-read and interesting article was immense, especially given the fact that researchers used lab rats in their experiments. However, we persevered and constructed a well thought out and balanced article.

Another highlight was an interactive session on citizen science and public engagement over policy making. Scientific research often informs policy makers on complicated challenges such as climate change, disaster risk management and food security. The public is often neglected in this relationship and is uninformed when it comes to the latest scientific developments. During this workshop we played a board game developed to assist citizens in familiarising themselves with scientific topics and ultimately making policy decisions based on this information. Our group's board game was focussed on nanotechnology and whether or not research into the unknowns of this science should be justified over more basic research on Third World problems such as food insecurity or climate change. The exercise helped us understand how science can be misunderstood by the public and gave us tools to better communicate it in the future.

Overall the trip was a great experience for me as a young scientist; it equipped me to better communicate my science to diverse audiences in various ways. Furthermore, it inspired me to implement these skills in my home country, South Africa, where science has an important and exciting role to play going forward.

By: Young Science Communicator's competition winner, Zander Venter

SAASTA exposes learners to real-world science

Close to 100 top achievers in this year's National Science Olympiad were treated to a week of excursions to science facilities, talks by scientists and hands-on science activities. The 2016 Focus Week, organised by SAASTA, was attended by learners from South Africa, Lesotho, Namibia and Zimbabwe.

The youngsters were exposed to career opportunities and interacted with mining engineers at Cullinan Diamond Mine, mechanical engineers at BMW and Nissan South Africa; and rubbed shoulders with physicists at the Council for Scientific and Industrial Research (CSIR) laser centre. They learnt more about astronomy at the Johannesburg Observatory and had the opportunity to explore South Africa's past from the unique perspective of indigenous cultural knowledge at the Wits Origins Centre.

Science talks and hands-on activities were also held at several venues across Gauteng. Among the hosts were the global supplier of world-class defence products and solutions, Denel, the National Zoological Gardens of South Africa (NZG) and the South African Nuclear Energy Corporation (Necsa).

At the NZG, the learners had an opportunity to interact closely with some of the animals under the guidance of a zoologist.

The Necsa excursion gave learners the opportunity to learn more about nuclear science, including reactors, radiation and radioactivity.

"We really loved and appreciated the science information that was shared throughout the focus week; the information has helped us explore the various possible careers in the science and technology fields," said Mr J Rossouw from Privaat Skool Moria in Namibia.

Rossouw further thanked SAASTA for the opportunity and confirmed that there is no doubt in his mind that most of the learners participating in the focus week will pursue science-related careers.

The Focus Week ended with lectures that showcased the creative and exciting career paths available to those who pursue Science, Technology, Engineering and Mathematics (STEM) studies. The lecture hosted by civil engineer and founder of Outlook Foundation, Segomotso Kelefetswe, introduced the achievers to several science fields.

In another activity, learners were exposed to ways in which creativity powers science. Professionals within the STEM fields shared their experiences of working creatively as scientists. They suggested ways in which the achievers could bring more creativity to science by coming up with their own solutions to open-ended science questions.

All the science activities for this year's Focus Week have triggered an interest in the important role of science and innovation and their relevance to everyday life. The achievers were given a first-hand experience of the various science, engineering and technology (SET) fields. SAASTA would like to thank the organisations involved in this year's Focus Week activities for giving the achievers the opportunity to learn more about the various SET careers.


SCIENCE
AWARENESS

National Science Week

The National Science Week (NSW) is an annual country-wide celebration of science and is funded by the Department of Science and Technology (DST). 2015 marked the 17th anniversary of National Science Week.

The NSW2015 was celebrated with the theme "The International Year of Light and Light-based Technologies."

The International Year of Light and Light-based Technologies (IYL 2015) is a global initiative adopted by the United Nations to raise awareness of how optical technologies promote sustainable development and provide solutions to worldwide challenges in energy, education, agriculture, communications and health.

The goal of IYL 2015 was to highlight to the citizens of the world the importance of light and use of optical technology in their lives, for their futures and for the development of society.

The theme encapsulated the following objectives that are embedded in the intent of the NSW:

- That science will enable us to improve our country and our world;
- That science is relevant today and that scientific endeavour, interest and literacy are for everyone;
- That the youth should choose science as it is the key to the future;
- That there are many new frontiers of science today that are worth celebrating and which will enable us to build our future.

A total of 74 exhibitors exhibited at the NSW launch at the University of North West, Mafikeng Campus.

NSW was covered 309 times in the media; this coverage can be broken down into the following categories:

- Broadcast - 184 times.
- Print Media - 66 times
- Online Media - 95 times

The number of participants has steadily increased during the past five years, from 338 625 in 2011 to 2 366 409 in 2015. In total, 4 477 949 participants were reached over the past five years.

Speed Dating for the Brain: The law of reflection

Participants were given the task of manipulating three small mirrors in order to hit the given target with the laser beam

Minister Pandor viewing a variety of exhibits, amongst others, a solar cooker.

Minister Pandor, together with other dignitaries, viewing the SA Inventions Exhibition at the launch, which took place at the North West University on the Mafikeng Campus.

Centenary celebrations for Proxima Centauri

"October 5, 2015 is a red letter day for South African astronomers," Ian Glass said at the event SAASTA hosted at the Johannesburg Observatory on 8 October 2015. "It was on this date 100 years ago that Robert Innes of the Union Observatory in Johannesburg announced the discovery of the nearest star to our solar system – the one we know today as Proxima Centauri.

SAASTA rolled out a string of activities across the country to mark this milestone in South African astronomy. These culminated in a national event where Glass, who specialises in astronomical history and who is an expert in the infrared radiation from celestial objects, was one of the key speakers.

Discovery of Proxima Centauri

The exact date of the discovery by Robert Innes is not known, but the evidence suggests that it was just before 5 October 1915. It was established that Innes sent the paper to announce his discovery to the printers on that date. The paper is entitled "A faint star of large proper motion" and dated 12 October 1915.

"Surprisingly, in spite of all the advances in astronomy over the last century, no closer star has ever been found," said Glass. Innes made this important discovery using the Franklin-Adams telescope. The Franklin-Adams telescope was built in England in 1902 and brought to South Africa to photograph the southern sky. The discovery of Proxima Centauri was revolutionary because for many years it was believed that Alpha was the closest star to the Sun. In 1917 Innes proposed that the new star be called Proxima Centauri. Proxima is the Latin word for the "nearest".

The centenary celebration at the Johannesburg Observatory showcased the importance of preserving astronomy knowledge, and transferring and creating it. Most importantly, it highlighted how astronomy helps mankind understand how it fits into the vast Universe.

"This national event did not only celebrate the discovery 100 years ago of Proxima Centauri, but to also brings astronomy to the people," said SAASTA's Science Awareness Platform manager, Shadrack Mkansi. "Our aim is to continuously advance public awareness, appreciation and engagement of science, engineering and technology in South Africa, and we live by this motto in all we do."

SAASTA sponsored all the activities with the assistance of the Department of Science and Technology and support from the Italian embassy. Attendees had an opportunity to stargaze with equipment housed at the Johannesburg Observatory.

Learners from Ruabohlale Secondary in Soshanguve, Pretoria were treated to a day trip to Hartebeesthoek where they experienced the original Franklin-Adams telescope. The purpose of the trip was to inspire them to consider careers in space science.

"We achieved our purpose of demonstrating that science can change lives. All the activities leading up to the main event brought together scientists, engineers and visionaries from astronomy and the space industry to share their experiences and inspire our learners to learn about the astronomical discoveries and the newest technologies," Mkansi said.

The year 2015 marked the centenary of the discovery in Johannesburg of the star closest to the sun, Proxima Centauri, and South African Agency for Science and Technology Advancement (SAASTA) leveraged the occasion to advance science awareness.

NUCLEUS partners seek insights into South Africa's science landscape

New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions (NUCLEUS) consortium partners undertook a field trip to South Africa during February 2016 to gain an insight into local conditions as they roll out their mandate.

South Africa, through SAASTA, is involved in the cells that deal with civil society, public engagement and the economy.

SAASTA is the first and only African institution to be accepted as a partner in the NUCLEUS consortium. The organisations will send representatives on field trips to Dublin, Ireland and Beijing, China from 20 to 21 June and 15 to 18 September 2016 respectively.

The 12 delegates who visited South Africa are from several European countries involved in the consortium. NUCLEUS is part of the European Union's HORIZON2020 project, with the aim to lead the industry with scientific and technological innovation that addresses the needs of society.

NUCLEUS also aims to develop, support and implement inclusive and sustainable approaches to Responsible Research and Innovation (RRI) within the governance and culture of research organisations. Its founding document posits that it will focus primarily on stimulating research and innovation that reflect and respond to societal needs.

“NUCLEUS aims not only to understand barriers to RRI and develop solutions, but to apply these solutions over two years to see how they perform in practice,” said Prof Alexander Gerber, the NUCLEUS project leader who is also Chair of Science Communication at Rhine-Waal University, in Germany.

“We have the rare opportunity to actually experiment with new governance strategies at thirty international test sites, including partners in Europe, China and South Africa, and evaluate which approaches can bring about real change,” he said.

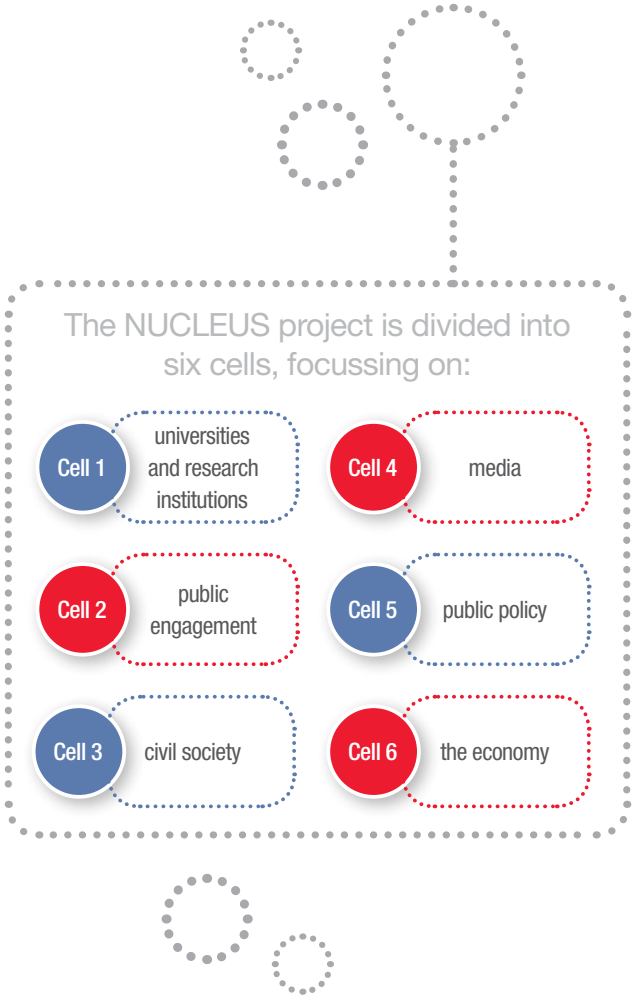
Consortium partners hailed the visit to South Africa as instructive. They visited and interacted with institutions including SAASTA, Osizweni Science Centre, Sci-Enza Science Centre, the National Zoological Gardens, the Natural History Museum and Ditsong Museums.

“For the majority of the consortium it was our first time in South Africa and we didn't know much about its specific problems and context,” said Nino Dvalidze from Ilia University in Georgia. “I think it was brilliant to select it as one of the field trips for the project because we could really learn a lot.

"I was happy to notice the problems that we are sharing. It was a really valuable experience and I take away a lot of ideas to try to implement in my country.

“I think the experience of South Africa is more relevant in context to Georgia than some of the European partners. For me, it was very interesting to see where South Africa stands, and that our countries share problems in engaging civil society and research.”

Institutions that were represented during the South Africa field trip include the Rhein-Waal University, the University of Edinburgh, Science City Hannover, Nottingham City Council, University of Aberdeen, Wissenschaft im Dialog and the University of Lyon.



SAASTA showcases scientific wonders at Scifest Africa

SAASTA took part in the 20th edition of the national science festival, Scifest Africa, which took place in Grahamstown from 2 to 8 March 2016, under the theme "A matter of time". The creation, measurement, depiction, experience and the end of time were explored extensively at the festival in line with the theme.

The 20th edition of Scifest Africa took place from 2-8 March 2016 at the 1820 Settlers Monument, in Grahamstown. The Minister of Science and Technology, Ms Naledi Pandor officially launched the festival, and stressed appreciation of Scifest Africa and its contribution to SET sector, applauding the festival for its ability to create excitement around science, technology, and innovation. "The main purpose of Scifest is to introduce young people to the exciting world of science and technology and to encourage them to choose to be part of this community of science and innovation".

SAASTA participated in several exhibitions and these include a mobile planetarium and the Great South African Inventions exhibition. The planetarium offered a unique opportunity for visitors to experience the galaxies in the universe, the planets in the solar system and all the other night sky wonders.

The Great South African Inventions (GSAI) exhibition and its educational programmes showcased several inventions and innovations by South Africans from prehistoric times to the modern era. Visitors were encouraged to practically experience some of the inventions on display.

In addition, Professor Mike Bruton, presented an illustrated talk entitled 'Who is South Africa's Greatest Inventor?' as part of the main programme. Approximately 180 people attended the talk, which was hosted by NASA Deputy Chief Technologist, Jim Adams. Resultantly, the audience voted Professor Tebello Nyokong as South Africa's greatest inventor, ahead of Elon Musk and Mulalo Doyoyo during a quiz.

SAASTA was awarded the "Best Exhibition: Special Mention" for the GSAI exhibition.

Further, SAASTA ran several interactive workshops. These were on the Bloodhound Supersonic Car (SCC), hydrogen, nanotechnology and biotechnology.

The Bloodhound Supersonic Car Project will attempt to break the world land speed record using the Bloodhound SSC, designed to travel at a speed of 1690 km/h, or 1.4 times the speed of sound. The car will run at Hakskeen Pan in the Northern Cape in 2017.

Hakskeen Pan was chosen from 20 000 other locations around the world.

The workshops on hydrogen, biotechnology and nanotechnology sought to foster an understanding of and showcase the advances in the disciplines. SAASTA hosts the Department of Science and Technology funded Hydrogen South Africa Public Awareness, Demonstration and Education Platform (HySA PADEP) and the Public Understanding of Biotechnology (PUB) programmes.

HySA PADEP was created to market hydrogen technology locally and internationally. Further, it aims to create awareness, visibility and acceptance among the public, industries, entrepreneurs and key decision makers in South Africa about the challenges, benefits and safety of using hydrogen fuel cell technology in the alternative energy industry.

The mandate of the PUB programme is to promote a clear, balanced understanding of the potential of biotechnology and to ensure broad public awareness, dialogue and debate about biotechnology and its current and potential applications. Several resources have been developed to provide the South African public with relevant information on biotechnology.

Scifest Africa was established in 1996 to promote the public awareness, understanding and appreciation of Science, Technology and Innovation (STI). The Department of Science and Technology (DST) and various other sponsors support the project.

Street Science at the Science Forum South Africa

As part of the Science Forum South Africa hosted by the Department of Science and Technology (DST) at the Council for Scientific and Industrial Research (CSIR), SAASTA took science to the streets with exhibitions, explosive science performances and exciting hands-on activities at Sammy Marks Square in the Pretoria CBD.

The theme for this Science Forum was: Igniting Conversations about Science. Science and Technology Minister Naledi Pandor said Africa's agenda for science, technology and innovation would be a priority. "Other themes, which I have no doubt the Forum will spark vibrant conversations on, include how to best use scientific advice for policy and decision-making; improving science's response to societal challenges; and the challenges associated with human capital development for the knowledge economy."

The aim of the Forum was to create a platform for a vibrant debate on the role of science, technology and innovation in South African society; to strengthen South Africa's strategic international partnerships in the science, technology and innovation sector; and to create a platform for senior government leaders, academics, scientists, industry, civil society, and students to interact.

SAASTA's science offering during the Forum was designed to "Take Science to the Public", thereby ensuring that the visitors engaged in the pursuit of interesting, exciting and informative science and technology experiences.

The visitors and school groups that joined the SAASTA street science activities were able to discover, explore and understand science phenomena like they never had before.

"For the first time I understood how a rocket was launched. It was exciting to watch the Rocket Science Show that was demonstrated by Tony Dlamini from HartRAO," said a young learner from Ivory Park Primary School.

"I saw the sparkle in the learners' eyes during the science shows and it was really rewarding and reminded me that through science we can educate, inspire and transform individuals of all ages," said Project Officer and one of the Science Shows' demonstrators from SAASTA, Happy Vilakazi.

By taking science from the lab to the street SAASTA was able to reach more than 1000 individuals and, together with partner stakeholders Hartebeesthoek Radio Astronomy Observatory (HartRAO), CSIR, ArcelorMittal Science Centre, the Water Research Commission, Department of Higher Education and Training (DHET), the National Zoological Gardens (NZG) and Weather SA, the conversation about science was ignited.

Role of science in Africa comes under spotlight at SFSA

Trailblazing research, development and innovation that take place in Africa but hardly hog the headlines, came under the spotlight at the inaugural Science Forum South Africa (SFSA), held under the theme “Igniting conversations about science” in December 2015.

More than 1 500 delegates participated in debates that focused attention on the interface between science, development and society. The several parallel sessions looked at how research and innovation could be harnessed for economic growth and development on the African continent.

Science and Technology Minister Naledi Pandor opened the conference with a speech that underscored the centrality of science in the future development of Africa. “Our primary rationale for this conference resides in our conviction that Science, Technology and Innovation can and must play a central role in achieving sustainable development,” she said.

“Africa cannot advance without investing in science. At present, there are efforts to enhance the status of science and to increase investment in research development and innovation.

“Unfortunately, science is still at the margins of government attention – seen as less significant than water scarcity, food security and disease burdens. Yet, all of these can be addressed through science.”

African Union (AU) Commission chairwoman Nkosazana Dlamini-Zuma, delivering the keynote address, said the goals and objectives of Africa’s Agenda 2063 depended to a large extent on scientific advancement. Agenda 2063 is a fifty-year programme aimed at bringing to fruition the AU’s vision of “An integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena”.

To achieve the all-important goal of economic prosperity, Africa needed to leverage science more, she added. The dependency on mineral resources was not sustainable and knowledge increasingly had to take the centre stage.

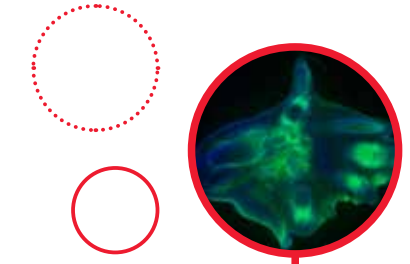
In view of the shifting economic landscape, human capacity development had to be given special attention. "To ensure that our economies are knowledge-based, we must ensure that we have very good science teachers," Dlamini-Zuma said.

With the SFSA in its first year, the Department of Science and Technology drew on international best practice in similar initiatives, according to Pandor. It was modelled on the Science and Technology in Society Forum of Japan and the Euroscience Open Forum.

“Our key motivation is to foster public engagement in science and technology, to showcase science in South Africa and to provide a platform for building strong African and global partnerships,” Pandor said. “We are very pleased at the participation and presence of several international organisations and thank them for their support for the forum.”

The delegates comprised scientists, industry leaders, students and civil society from South Africa, the rest of Africa and other parts of the world. More than 45 countries were represented at the two-day event that took place at the Council for Scientific and Industrial Research Campus in Pretoria on 8 and 9 December 2015.

Among the high-profile attendees were Senegalese Minister of Higher Education and Research Mary Niane and Angolan Minister of Higher Education, Science and Technology Maria Teixeira. Chief Science Advisor to the Prime Minister of New Zealand and founding co-chair of the International Network for Science Advice, Peter Gluckman, was also in attendance.



“Africa is a young continent in an aging world. Science is critical in Africa's growth.”

Inspiring a new generation of women scientists

More than 2 000 grade 12 girls from 87 schools have been exposed to the world of science, technology, engineering and mathematics (STEM) through an empowerment programme run in the rural regions of Sekgosese and Gakgapane in Limpopo.

SAASTA collaborated with the Rural Education Festival (RedFest) to host the event, dubbed the Greater Letaba Learners Empowerment Programme, aimed at girl learners. The event included a science festival component. The other partners in organising the event were the Greater Letaba Municipality and Cornet Mamabolo Foundation.

The event, among other things, afforded the learners an opportunity to interact with role models in the STEM terrain. Many learners said that this was the highlight of the festival as it gave them an opportunity to interact with real-world scientists.

A variety of hands-on and minds-on activities were undertaken to ignite the learners' enthusiasm for STEM. The learners were assessed on their engagement and participation in the activities.

Cornet Mamabolo, Tbose in the SABC drama series Skeem Saam, was among the people who addressed the learners at the festival. Mamabolo shared his academic journey with the learners and encouraged them to explore the world and to make a difference in their communities.

Learners had the opportunity to participate in a South African Police Service Forensic Science Department lab experience. There were also exhibits from the University of Limpopo Women in Physics and Science Centre.

The organisers of the empowerment programme gave the girl learners sanitary towels for which they expressed immense gratitude. Menstruation is the main cause of poor school attendance by girls in rural areas and the gesture will assist these learners.

Programmes

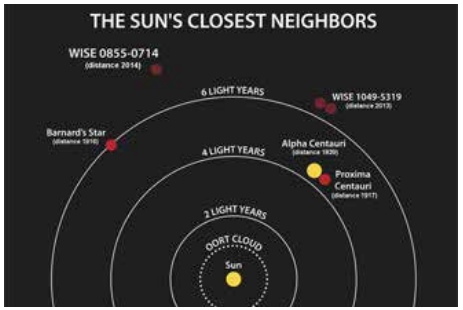
AstroQuiz™

The AstroQuiz™ Competition focuses on Astronomy and learners participate in groups of four in a number of knockout rounds that lead to a final round. Knockout rounds take place at a provincial level and the winning teams per province then compete at a national level.

- The 2015 AstroQuiz National Final was held at the Johannesburg Observatory on 8 October 2015. The winning team from Maranatha Primary School in Mpumalanga received awards from SAASTA and the Italian Embassy. In second place was Ncotshane Primary School from KwaZulu-Natal and in third position was Rethusitswe Primary School from Limpopo.
- Dr Thomas Auf der Heyde of the Department of Science and Technology was the keynote speaker at the National Finals. Representatives from the Italian Embassy in Pretoria, neighbouring science centres and the Department of Basic Education also attended the event.

Johannesburg Observatory

The Observatory tour exposes the general public and learner visitors to different concepts of science and technology under the main themes of astronomy, astrophysics and optics through exhibits and displays. It also aims to expose younger children to activities such as identifying shapes, puppet shows and building blocks in order to stimulate their interest in science.



Proxima Centauri was discovered in 1915 by the Scottish-born astronomer Robert Innes, then Director of the Union Observatory in Johannesburg (Image: Wikipedia)

The Sun's closest neighbours (Image: NASA)

- On 16 March 2016 the Observatory hosted an interesting talk on mole rats & burrows & burrowing by a National Science and Technology Forum 2016 Award Winner, Professor Bennett from the University of Pretoria.

Techno Youth™

The Techno Youth™ is a holiday programme that runs for three successive days. It is aimed at underprivileged learners in grades 8 and 9 from areas in and around Gauteng. Due to the success of this project, SAASTA decided to expand it to other provinces which include KwaZulu-Natal, Mpumalanga, North West and the Northern Cape. Learners are introduced to technology in an informal, fun and friendly manner, where they design and build different models. At the end of every three-day session, a task is given to four learners who showed talent and interest. They have to complete this within a specified time and are then invited to compete with learners from other schools for prizes. The other provinces were tasked to design and build models whilst Gauteng was tasked to build and programme robots.

- SAASTA in collaboration with Unisa has introduced I-SET Robotics to Techno Youth™. The first Robotics pilot programme was implemented in Gauteng.
- Two sets of challenges were presented to learners at the Techno Youth awards in March 2016. In the first, eight teams of four learners from schools in Gauteng battled it out in a Robotics Challenge with the topic Build Riley Rover Robot who can pick up, drop, collect, grab and throw an object. The winning team in this challenge was from Lesiba High School. In the second challenge, ten teams of four learners each had to design and build a model that can generate electricity without the aid of a battery, solar power or by plugging it into an electric socket. The teams were from Mpumalanga, North West and the Northern Cape provinces and the winning team was Gasebonwe Secondary School in the Northern Cape.

Science Club

The Programmatic Support Grant Intervention (PSGI), funded by the Department of Science and Technology, supports and develops science centres. The support for science clubs for learners is one form of this support. Science clubs create opportunities for learners to learn in a team, share information and develop skills which cannot be acquired in a formal setting. These clubs become platforms for learners to socialise with the peers and attain skills without constant adult interference.

- Learners attended a workshop from 19 to 20 February 2016, learning from each other and getting information on how to run effective clubs.

GLOBE

The Global Learning and Observations to Benefit the Environment (GLOBE) Programme is an international science and education programme that provides students and the public with the opportunity to participate in data collection, following a research scientific process, to contribute towards understanding the Earth system and global environment. Most of the activities are focused on data collection, data analysis and research methods.

- SAASTA trained over 200 people, including educators, learners and science centre personnel on the Atmosphere GLOBE Protocol.
- A delegate from SAASTA, Thembi Mdlalose and Mokgadi Magikga from the Department of Science and Technology attended the 20th GLOBE Annual Partner Meeting in Los Angeles, USA, where training was offered on GLOBE protocols on an international scale and new research was highlighted.
- From 19 to 20 February 2016, learners attended a training session done by Globe Master Trainers Mark and Rogeline Brettenney. The following was covered in the training:
  - Data Collection – they learnt about the different ways to collect data
  - Data Uploading – they were shown how to upload data collected onto the internet
  - Mapping – site identification – where they learnt about identifying a suitable site and getting more information on the site itself.

Festivals

The Rand Show

The Rand Easter Show 2015 took place from 3 to 12 April 2015 at Nasrec Expo Centre. One of the categories of this year's show was to highlight South African Science and Technology.

Visitors at the Science and Technology site were provided with the opportunity to browse through the different exhibits and view science shows such as the Naked Scientist.

A total of 220 000 people were recorded in attendance.

Attendees touring the SAASTA exhibition

A family engaging a SAASTA exhibit

The Naked Scientist performing Science shows at the RES

Large groups of people, mostly families enjoying the SAASTA exhibitions at the RES.

International Participation – Beijing Science Festival

SAASTA led a South African delegation that participated in the 2015 Beijing Science Festival from 17 to 25 September 2015 in Beijing, China. The following organisations were part of the South African delegation that exhibited:

a. SAASTA: Two delegates, Dr Jabu Nukeri and Happy Vilakazi represented SAASTA. SAASTA exhibited the Great South African Inventions Exhibition, which included the Vuvuzela, African guitar, and the Snuza Baby Monitor, amongst others.

b. Sci-Bono: Sci-Bono was represented by Michael Ellis, who exhibited five replica fossil skulls including desktop labels for each specimen of the following species:

- Australopithecus africanus
- Australopithecus robustus
- Plio-pleistocene hominid
- Homo Naledi (replica skull) – recently discovered in SA

c. Arcelor-Mittal Science Centre: Siphosethu Dudumashe represented the science centre and conducted science shows for a variety of audiences.

d. Square Kilometre Array: Sam Rametse conducted a satellite-building workshop and gave presentations about the latest developments in the SKA project.

e. Bloodhound SSC: Wendy Maxwell represented the Bloodhound SuperSonic Car project and conducted workshops on building a rocket-propelled replica of the Bloodhound car.

A member of the public interacts with the SAASTA exhibit in China

The South African delegation attending the round table

3. Capacity Development In Science Centers

Great South African Inventions (GSAI) Training for Science Centres

Due to the apparent need for skilled individuals to explain exhibitions at events and science centres, a training intervention was formulated for science centre staff members to facilitate more efficient science communication. Through cost-saving measures, the programme was able to appoint Professor Mike Bruton, who has extensive knowledge of GSAI, as well as being the creator of an exhibition, to facilitate two training sessions for coastal science centres from 2 to 4 March 2016 in Grahamstown and inland science centres from 16 to 18 March 2016 in Pretoria.

The aim of the intervention was to equip the science communicators in science centres with skills to handle the technical aspects of the exhibition as it is ready to travel to various science centres across the country, as well as ensuring that several individuals could present the exhibition, should the need arise.

Coastal science centres participants In Grahamstown

Learners being guided through part of the exhibition

Science communicators displaying the exhibition before taken through the various themed exhibits in Gauteng

Professor Mike Bruton guiding the science communicators through the exhibition

Japanese Oversees Corporation Volunteer (JOVC) Workshop

DST and SAASTA embarked on the JOCV short programme roadshow in partnership with the Japan International Cooperation Agency (JICA) from 2 to 13 August 2015. The programme dispatches trained and qualified professionals in a variety of disciplines to support and provide technical assistance to organisations around the world. Volunteers serve in various positions aiding in skills development, which includes, but is not limited to working as exhibits engineers, science workshop facilitators/educators and even as actors in science puppet shows. Based on feedback received, this unique and interactive approach to informal science teaching proved enjoyable to members of the communities in the areas served by these science centres.

The following South African science centres have thus far participated in the programme:

- University of Limpopo Science Centre, Limpopo;
- Vuwani Science Centre, Limpopo;
- Osizweni Education and Development Centre, Mpumalanga;
- FSOST Discovery Centre, Eastern Cape; and
- Unizulu Science Centre, Kwazulu-Natal Province.

In 2015 Mr Yokosuka, a representative of JICA, came to South Africa to participate in a JOCV short programme by conducting two sets of training interventions in August 2015. The two sets of workshops focused on using readily available, inexpensive teaching and learning materials to provide everyone with the opportunity to enjoy science anywhere and anytime.

Learner engagement training

Three half-day learner workshops were presented at science centres in Mpumalanga, Limpopo and North West Provinces. The curriculum aligned workshops were presented in an entertaining way through interactive experiments, amongst others. Since the groups were smaller, all learners had an opportunity to be involved and engaged. 50 learners and 25 educators attended the workshops.

Learner workshop at Penreach Science Centre

Learner workshop at the University of Limpopo Science Centre

The Japanese Oversees Cooperation Workshop for Science Centres

One three-day workshop was presented to science centre staff at the National Zoological Gardens in Gauteng from 11 to 13 August 2015. The focus was on how these science centres can acquire skills for developing similar science related activities as presented by using locally available materials. The inexpensive teaching and learning materials used during the workshop enabled science centre staff to conduct interesting science lessons through group or individual activities. A total of 37 science centre staff attended the workshop. The three themes covered during the workshop were:

- Sound and Light
- Magnets and Combustion
- Balance and Symmetry

Science centre staff conducting experiments during the JOVC workshop

Science centre staff performing group experiments

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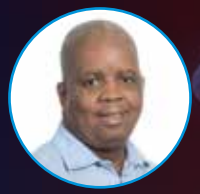
Managing Director

Chrisna van Staden
Personal Assistant

Daphney Molewa
Corporate Communicator

Finance & Administration

Nonhlanhla Gumede
Financial Manager



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