

# SAASTA Science Engagement Highlights Report

2013-2014



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

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



SAASTA

South African Agency for Science  
and Technology Advancement



## SAASTA celebrates the International Year of Crystallography 2014

Crystallography underpins many scientific fields, yet scientists say it rarely garners the attention it deserves in its own right. "It has had an enormous impact, yet there's so little known about it in the public domain," says Peter Strickland of the International Union of Crystallography.

Major objectives of the IYCr2014 that correspond with SAASTA's own mandate are to:

- increase public awareness of the science of crystallography and how it underpins most technological developments in our modern society;
- inspire young people through public exhibitions, conferences and hands-on demonstrations in schools; and
- promote education and research in crystallography and its links to other sciences.

### Did you know?

- 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.
- Between April 2013 and March 2014, SAASTA activities reached 506 411 learners and 18 295 educators. Six learner resources, six educator resources, 12 science promotion publications and 11 technical manuals and fact sheets were developed.

*A total of over 846 999 members of the South African community was reached between April 2013 and March 2014*

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Catalysts for change – the people of SAASTA



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The Department of Science and Technology is the main sponsor of SAASTA and its projects.



National  
Research  
Foundation

SAASTA is a business unit of the National Research Foundation.





**Dr Beverley  
Damonse**

*Group Executive:  
Science Engagement and  
Corporate Relations of  
the National Research  
Foundation (NRF)*

*Image courtesy Destiny*

## Group Executive's message

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### Science engagement is crystallising throughout the National System of Innovation

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In the very recent past, engagement of the South African public with science has advanced with huge strides. The National System of Innovation (NSI) has taken cognisance of the fact that our country needs the appropriate skills to compete internationally, and grow economically to improve the lives of its citizens in general. The NSI recognises that in order to do this, we need to consistently encourage an interest in and engagement with the sciences among our people. We recognise a number of positive moves that give effect to this end goal of a scientifically and technologically literate society.

Role players within the NSI have supported various proposals to increase their involvement in science engagement. The Department of Science and Technology (DST) has developed a Science Engagement Framework for the NSI and the first draft of an implementation plan for this framework has been proposed. But the hard work to polish and refine, and then to start implementing the system-wide plan lies ahead. SAASTA is expected to play a strong coordinating role in the implementation of the framework.

With SAASTA as its implementing unit, the NRF has been able to increase the national momentum in science engagement. The NRF's Research and Innovation Support and Advancement (RISA) division is now building science engagement into all its programmes. The NRF is encouraging researchers to become involved by increasing science engagement opportunities across RISA-funded projects and SAASTA is providing science communication training and support.

The NRF appointed the first DST/NRF Research Chair in Science Communication at Stellenbosch University in October 2014. A second Chair in Science Communication has also been appointed at Rhodes University. These two research chairs will make significant contributions to strengthening this scientific discipline in South Africa and we look forward to working closely with them into the future.



*“With many large science projects such as the building of the SKA radio telescope, findings of human fossil remains by palaeontologists and new developments in the search for a vaccine for the prevention of HIV/AIDS, we need innovative ideas to engage the public with the achievements of our scientists, engineers and technologists and the impact thereof on their lives.”*

- Dr Beverley Damonse



**Dr Jabu Nukeri**  
Managing Director  
of SAASTA

## Managing Director's message

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*"We have stretched our limited resources to ensure the greatest possible impact. SAASTA programmes and activities reached 847 000 participants during the year. This is the highest ever, and close to a million people. We are reaching a significant percentage of the population of the country. This is good considering our limited resources, but we are determined to keep increasing that percentage every year."*

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As a business unit of the National Research Foundation (NRF) – whose mandate is to advance public awareness, appreciation and engagement of science, engineering, innovation and technology in South Africa – SAASTA has to ensure that it aligns all its activities with the NRF's key strategic objectives. In addition we have to align our work with the priorities and mandate of our parent body – the Department of Science and Technology (DST). SAASTA is therefore responding to organisational as well as national imperatives.

Through science education we build the supply of tomorrow's scientists and innovators. Through science communication we celebrate South Africa's achievements in science and technology, expand the public's awareness and appreciation of the benefits of science, and encourage engagement with science issues that impact on people's daily lives. Finally, through exploration, exhibitions, science festivals and actual experience our science awareness activities instil in people an enthusiasm about the subject, while encouraging greater public engagement in science, engineering and technology (SET) issues.

Our intervention programmes targeting learners, educators, undergraduate and postgraduate

students and the public are rolled out at approximately 80% of the municipalities across the country, in a number of SADC countries and in other countries across the world.

### **Some of our sparkling achievements**

During the past year – to help the NRF and DST grow a representative science and technology workforce in the country – SAASTA has run a number of maths and science educator development programmes and a number of learner development programmes, including maths and science camps for learners with potential, olympiads and competitions.

Through our learner development programmes, which we also use to identify talent, we managed to reach over 70 000 young people across primary and secondary schools and at university level.

National Science Week remains at the forefront of SAASTA's efforts. We reached almost 600 000 participants during one week – young and old. We've always done well working with learners, but this time we reached 300 000 members of the public as well. It is important to get the balance between working with the learners, to identify talent, and creating platforms where we can engage with the public about SET.



Another flagship is our three-year Nurturing SET talent (NSET) intervention to identify budding scientists and encourage them to pursue careers in SET. We tracked participating students to map their progress and conducted an impact analysis to ensure the programme is achieving its goals. This was a highlight for me, because we were targeting learners from deep rural areas and assisting them to enter SET careers and because it is a fine example of collaboration with other government departments.

As part of the programme, the Department of Public Works joined forces with SAASTA to roll out a camp focusing on performance in mathematics and science and career profiling in SET, especially in the built environment. A spin-off of the camp was securing bursaries for 20 students to pursue their careers in the built environment at higher education institutions.

Core to the business of science communication, is close cooperation with national and community media outlets, across the print and broadcast sectors, to take science to the public. Some of the key programmes we profile through the media focus on biotechnology, hydrogen fuel cell technology and nanotechnology. During the past year, SAASTA has introduced advisory committees of experts drawn from relevant scientific fields to give gravitas to each of these programmes.

These activities, I believe, play a significant role in the NRF and DST strategic objective of contributing to a vibrant national innovation system.

We are casting our global net wider each year and managed to send two learners to participate in the Beijing Youth Science Creation Competition. We also managed to send a group of our top learners in the olympiads to the international youth science forum in London. Three learners, who performed exceptionally well in the National Science Olympiad attended the

Australian National Youth Science Forum. The five team members who won the 2013 SAASTA National Schools Debates competition and their educator paid a jam-packed visit to New York's landmark natural science museum and planetarium as their prize. So, it's all about giving opportunities to learners.

We also develop useful resources. Significant among these this year was a booklet titled *Careers and opportunities in physics* and a booklet on *Careers in Agriculture*.

We continue to stretch our limited resources to ensure the greatest possible impact. SAASTA programmes and activities managed to reach 847 000 participants during the year. This is the highest ever, and close to a million people. We are reaching a significant percentage of the population of the country. This is good considering our limited resources, but we are determined to keep increasing that percentage every year.

SAASTA has always worked closely with the NRF's national facilities, but we have now also joined forces with the NRF's Research and Innovation Support and Advancement (RISA) division to draw NRF grantees and researchers into our efforts, enabling them to communicate their work to the public. RISA is including science engagement in all its programmes, in return SAASTA provides science communication training and support through workshops, roundtables and media training.

#### Inside the engine room of SAASTA

Operational highlights include the creation of a new monitoring and evaluation (M&E) unit, so that we can do impact analyses of some of our programmes. We also want to refine our work and define best practice through proper M&E.

DST has assigned us the responsibility of ensuring that the country's existing, and emerging, science centres are accredited and where necessary further developed. The M&E unit will play a critical role in this process. Five science centres asked to be accredited during the past year. They've done the self-assessment and we are busy finalising their accreditation level through our expert advisory committees.

Funding remains a challenge. Looking ahead, we would like to expand our work. For example, we'd like to get involved with all 54 municipalities and metros across South Africa. Based in Pretoria, we have to rely on our partners at science centres and the national facilities to assist us to engage people in some of the regions with science, engineering, technology and innovation. So we would like to mobilise more funding from all sources – core funding from government, contract funding and funding from the private sector, so that we can expand and maybe even establish regional offices.



*SAASTA reached almost 600 000 participants during National Science Week*

## Did you know?

Crystals are divided into seven main systems of symmetry. The DIAMOND falls into the most symmetrical of them all.

Diamonds have been known to mankind since ancient times; some of the earliest references can be traced to India.

Diamonds have been treasured as gemstones since their use as religious icons and decorative items in ancient India.

Their usage in engraving tools also dates to early human history.

The 3 106 carat Cullinan diamond is the largest gem-quality diamond ever found.

It was found on 26 January 1905, in the Premier No. 2 mine, near Pretoria, South Africa.

The value of these gems has increased throughout the ages and they will continue to play a valuable role in the future economy.

Diamonds are such a highly traded commodity that multiple organisations have been created for grading and certifying them based on the four Cs – colour, cut, clarity, and carat.

Other characteristics, such as presence or lack of fluorescence, also affect the desirability and thus the value of a diamond used for jewellery.

*Sources: Wikipedia and  
<http://www.iycr2014.org/>*





## CHAPTER 1

### **Towards a knowledge economy ... for a brilliant future**

*The objective of the NRF is to contribute to the improvement of the quality of life of all the people of the country. This objective is directly linked to the promotion of a knowledge economy that is based on the generation, transfer and use of knowledge in innovative ways.*

**SAASTA promotes internationally competitive research as the basis for a knowledge economy.**

## Advancing science and technology across the globe

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*“SAASTA’s programmes and projects covered vast and varied terrain in the period under review. Locally, our activities reached the most remote corners of our country. Internationally, our staff did us proud by flying the SAASTA flag in a range of other African countries and as far afield as Europe, the United States and China.”*



### PUSHING THE FRONTIERS

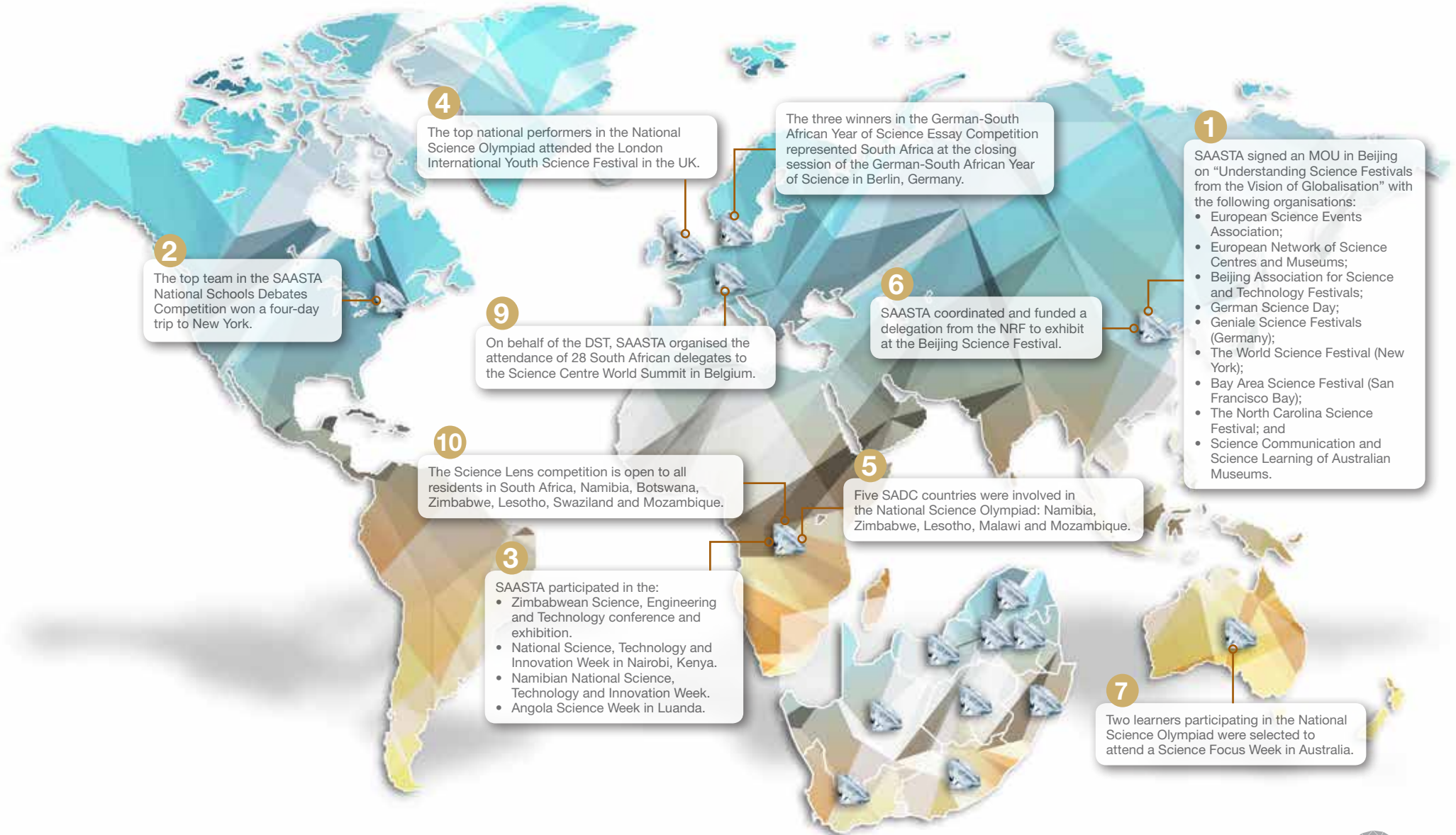
#### Collaboration to accelerate transformative science

The concept of a community is no longer restricted to a group of people living in a common geographic location. Today communities can extend across the globe. To remain relevant and at the forefront of developments in science communication, awareness and education, SAASTA is increasingly pushing the frontiers and becoming an active member of the global community. Intervention programmes targeting learners, educators, undergraduate and postgraduate students, and the public are rolled out at approximately 80% of the municipalities across the country, in a number of SADC countries and in other countries across the world.

In the past year the organisation visited rural communities in remote areas like Matatiele in the Eastern Cape, but it also participated in exhibitions and workshops in places as far afield as bustling Brussels in Belgium and Beijing in China. It has sent worthy winners of science competitions to New York in the US and London in the UK. And in between all that activity, SAASTA found time to participate in science fairs and festivals in South Africa, Namibia, Zimbabwe, Kenya, Lesotho, Malawi and Mozambique.



# SAASTA ventures into the global arena

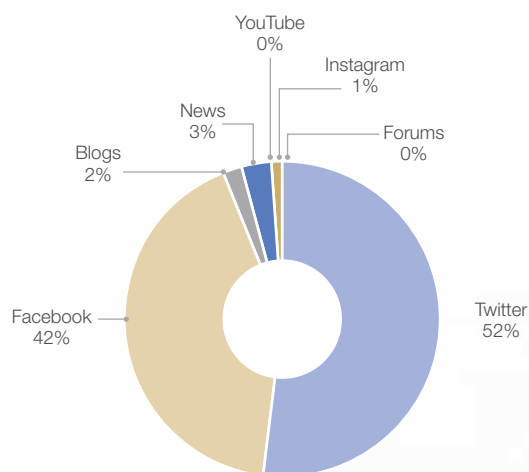




# Social media as a tool to engage people with science

SAASTA is putting effort into maintaining an engaging presence in this arena to increase awareness of its activities, and also to keep followers up to date with interesting developments on the research front – using the Internet, YouTube, Facebook and Twitter. SAASTA projects like Science Lens, FameLab and the National Schools Debates have their own Facebook pages. The Public Understanding of Biotechnology (PUB) programme and Nanotechnology Public Awareness Programme (NPEP) are active through their own social media accounts. Platforms are constantly updated with information related to the programmes and useful bio- and nanotechnology content.

## Social media usage NRF\*



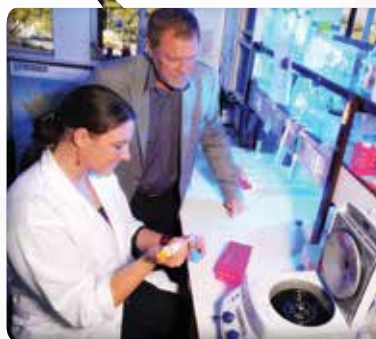
\* This information is for the first quarter of 2014/15

## Tweeting for science

SAASTA's twitter feed and monitoring forms an important part of its social media outreach programme. Each morning, local and international news sites are scanned for science and technology-related stories. Choosing the stories is important - there has to be a balance across the myriad fields of science and technology, as well as in terms of the technical intensity of the stories. A number of research news feeds such as AlphaGalileo and EurekAlert! are also scanned for stories that have a 'wow' factor. The stories are then traced back to the original research papers and scrutinised.

The next part of the science of tweeting comes in the composing of the tweets. There is a limit to what can be said in 140 characters or less, so the story provides context. The final part of the process is the scheduling. SAASTA uses Hootsuite, a social media management system to schedule the tweets to be posted at key times in South Africa - around teatimes, lunch breaks and just before home time during weekdays - when there's a general spike in social media usage. If a story profiles South African research that would interest an international audience, it is scheduled to be posted later in the day or early in the morning South African time.

*By 31 March 2014 SAASTA was well on its way towards a social media milestone – its 1000th tweet!*



# Exploring synergies between art and science advancement

## Science Lens competition

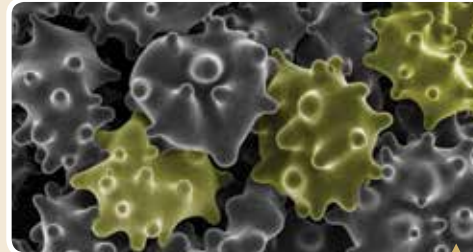
The popular Southern African Science Lens science photography competition – the only of its kind in the world – is open to scientists, science communicators and science enthusiasts, as well as professional photographers and amateurs with an enthusiasm for science and technology. Entrants are encouraged to capture spectacular and dramatic images that may explain something about science in our everyday lives, show something the human eye never sees, or simply be an attention-grabbing image of the beauty of science.

In the 2013/2014 round of the competition, the number of entries more than doubled from the previous round in 2011. The categories drawing the most entries were *Science as Art*, *Science Close-up* and *Science in Action*. This round's special categories of *Science in Society* and *International Year of Water Cooperation* drew different styles of photographs and opened up possibilities for a broader variety of photographs and the communication of the stories behind those photographs. The competition saw new talent in science communication emerging, with the youngest winner being Nicholas Cullinan, a grade 12 learner from Cape Town, for a photograph he took while job shadowing a research group at the University of Cape Town.

While the competition aims to encourage scientists to communicate their work and to see the opportunity for communicating their work through photographs, it also encourages photography enthusiasts to look for, and connect with the science in their environment.

### SCIENCE LENS WINNERS

*Science as Art*: "Distortion" by Kim Van Zyl, which made use of the phenomenon of surface tension to create a visual artwork. Judges' comments included: "An excellent use of creative lighting and angles to take an everyday object and turn it into a work of art."



*Science Close-Up*: "Starry, Starry Night" by Albe Carina Swanepoel, which showed an unusual sight of red blood cells appearing as starry objects, and explained the biology behind it.



*Science in Action*: "Kelvin-Helmholtz" by Thomas Otto Whitehead, who captured the very rare phenomenon of Kelvin-Helmholtz instability in cloud structures.



*Science in Society*: "Society's Resources" by Morgan Trimble who, in capturing a moment in a scientific study of the structure of fisheries in the Bangweulu Wetlands of northern Zambia, showed how researchers and communities can work together. Judges said: "A very well shot image with creative angles and lighting that tells a fascinating story – the viewer will always want to know more."



*International Year of Water Cooperation*: "Solving the Problem of Polluted Mine Water" by Nicholas Cullinan, which showed a postgraduate student engrossed in his experiment, observing Eutectic Freeze Crystallisation, a technique that can be used to recover salt from industrial brine solutions, simultaneously producing pure water.

# NSTF-BHP Billiton SAASTA award

SAASTA is the proud sponsor of the category *Communication for Public Awareness* of the annual National Science and Technology Forum (NSTF) awards competition. The award is presented each year to South African journalists, researchers, writers, educators, academics, specialist science communicators or science centre staff who excel in creating awareness of science, engineering, technology and innovation issues among the public.

## SAASTA salutes David Block

Professor David Block has the uncanny ability to bring the moon and stars within our grasp. This acclaimed astronomer has been intimately involved in the communication of science, particularly astronomy, to the public for over 30 years. His outreach activities span the complete spectrum from the writing of books, TV interviews (including the BBC), radio interviews, newspaper interviews, public lectures and outreach efforts to school learners and to their teachers.

Block is a Professor of Applied Mathematics and Astronomy at the University of the Witwatersrand. His pioneering discoveries are reshaping astronomical paradigms, and his imprint on human culture is a legacy to all South Africans. For his “outstanding contribution to science, engineering, technology and innovation (SETI) through communication for outreach and creating awareness over the last five years”, he received a prestigious NSTF-BHP Billiton award at a ceremony held in Gauteng in June 2013.

The other finalists in this category were:

- *The Aqualibrium Civil Engineering Team*  
Their *Aqualibrium* water competition is a fun, educational activity that has reached thousands of learners with messages of water quality, conservation, environmental protection, and how civil engineers provide communities with safe drinking water.

- *Professor Michael Pepper, Director: Institute for Cellular and Molecular Medicine, University of Pretoria, and Associate Professor, Department of Human Genetics and Development, Faculty of Medicine, University of Geneva*  
Through his extensive involvement in lecturing, radio, television and print media, and his background in medicine, science, bio-entrepreneurship and law, Michael Pepper has raised public awareness of many SETI issues and their impact on almost every facet of our existence.
- *Professor Peet van Schalkwyk, Associate Professor, Department of Mechanical Engineering, North-West University*  
Peet van Schalkwyk has developed a series of unique computer animations in mathematics and physical science for school learners and tertiary students, which offers valuable techniques to make mathematical and scientific concepts easier to comprehend.



◀ *Acclaimed astronomer David Block's pioneering discoveries are reshaping astronomical paradigms, and his imprint on human culture is a legacy to all South Africans*

## GetSETgo scoops SA Publication Forum Award



SAASTA's science advancement e-newsletter, *GetSETgo*, was selected as runner-up in the Best Electronic Publication category of the 2014 South African Publication Forum Awards. The publication also received a Certificate of Merit for scoring more than 75% in the categories of writing, communication, design and photography.

The judges commented:

*“The newsletter is a very good marketing tool and presents a positive image of the organisation. The publication is easily accessible and the reader can follow the articles and features with ease.”*

Close on 150 print and electronic publications were entered into the competition this year.



# Using EVENTS to spread the science message

## Space scientists invade Kimberley

In October 2013, representatives from nine organisations involved in space science and related disciplines landed in Kimberley in the Northern Cape armed with exhibition material and an inflatable mobile planetarium for exhibitions, demonstrations and talks. They also launched some rockets to good effect!

The Space Science Open Day aimed to inform 534 learners in Grades 9 to 12, 15 educators and 20 members of the public about the peaceful uses of space science and the role South Africa has to fulfil in global space science.

The Open Day activities were crafted to create awareness among learners of the concept of space, the history of space exploration, the scientific principles behind rocketry, the uses of rockets and satellites, the importance of Earth observations, various applications of space sciences and the huge range of career possibilities. The campaign also created an opportunity for strengthening relations between role players in space science in South Africa.

The highlight of the Open Day was a presentation by Dr Woodrow Whitlow Junior, a former National Aeronautics and Space Administration (NASA) Glen Research Center Director, who gave an inspiring talk. In his youth, Whitlow aspired to be a chemist until space missions in the 1960s captured his imagination, changing his career goal to astronaut.

*SAASTA's involvement in space science education, outreach and awareness stems from its involvement in World Space Week when it was first celebrated in South Africa in 2003.*



*Learners enjoyed the wide variety of hands-on activities at the exhibition*



*The theme of World Space Week 2013 was "Exploring Mars, Discovering Earth"*



*Learners had ample opportunity to find out more about the huge range of careers available in space science*

## Bloemfontein skies alive with space activities

Water rockets blasted off into the sky, telescopes were devised from affordable material, and stars were studied in an inflatable planetarium at the Space Science Open Day organised by SAASTA in Bloemfontein on 1 March 2014. The activities targeted learners from Grade 9 to 12 from urban, rural, private and public schools, their educators and members of the public.

The activities created considerable excitement among the attendees around the concept of space; the history of space exploration; the scientific principles behind rocketry; the uses of rockets and satellites; the importance of Earth observations; the various applications of space sciences; and the different careers available in this emerging field. The highlight of the day was inspiring presentations by the former Deputy Minister of Science and Technology, Michael Masutha and Mandla Maseko who, in 2015, will be the first black African to go into space.

The programme also included lectures by prominent South African space scientists and exhibitions showcasing space science and technology. These ranged from a project to build the world's largest radio telescope, the Square Kilometre Array, to the construction of South Africa's first micro-satellite, built by students at the Cape Peninsula University of Technology/French South Africa Institute of Technology. Participants were also treated to a "magic show" presented by the Chemistry Department of the University of the Free State, which proved to be one of the most exciting parts of the day's events for learners.

Exhibitors at the event included SAASTA; Hartebeesthoek Radio Astronomy Observatory; the South African National Space Agency; the Agricultural Research Council; Marcom Aeronautics; Denel Dynamics and the South African Weather Service. The wide range of resource materials distributed by exhibitors demonstrated a healthy balance between scientific information, career opportunities and information on the involvement of South African companies in space science and technology.

*Space Science open days form part of the Department of Science and Technology's Space Science Awareness Campaign. The events, which are held twice a year in different provinces of South Africa, are aimed at raising awareness of South Africa's advances in space science and promoting the benefits to society.*

*The former Deputy Minister of Science and Technology, Michael Masutha (left) and Mandla Maseko - the first black African expected to go into space in 2015 - participated in the Space Science Outreach Programme at the University of the Free State*



*Africa's next space traveller, Mandla Maseko, and admirers at the Space Science Open Day*



## Writing workshops for a new generation of nanotechnologists

The personalised interaction with facilitators stood out for students who participated in three *Nanotechnology Public Engagement Programme (NPEP) NanoNews* workshops held in 2013. Following on from models evolved in Grahamstown and Pretoria, the third in the series of nanotechnology writing workshops in Cape Town in December 2013 stayed true to the model of small workshops with high impact. Ten students from higher education institutions in Cape Town received one-on-one training from four facilitators representing the journalism, higher education and science communication sectors.

According to the coordinator of the Cape Town workshop, Professor Janice Limson of *Science in Africa/Rhodes University*, who serves as Editor of the *NPEP NanoNews*, the biggest challenge students appear to face is breaking out of the academic style of writing and focusing instead on a different kind of audience. Veteran science journalist and former Media Coordinator at SAASTA, Daryl Illbury put it to students to, “leave the researcher behind. Think like a writer”.

### What makes a good science story?

According to NPEP Manager Mthuthuzeli Zamxaka, the workshops were aimed at guiding students through the key principles of science writing and of science communication. Run by Science in Africa and Jive Media Africa on behalf of NPEP, the workshops have been modelled to allow students to workshop articles after each of the presentations,

focusing on different aspects as (incrementally) they turn their pre-prepared articles into a good science story.

In Cape Town, Zamxaka outlined some of the enduring reasons for science writing, followed by Professor George Claassen of Stellenbosch University succinctly outlining the key elements of writing science news. Daryl Illbury in his presentations sought to encourage students to develop their own style as he helped them reflect on what a good science story should convey.

Janske Nel, MSc student at the University of the Western Cape whose article from the workshop was published in the December 2013 issue of *NanoNews* said, “The workshop was presented, and attended, by dynamic and enthusiastic people who wish to communicate to everyone in SA how amazing science is.”

Social media means that a wide number of platforms are available for science communication. Ghouwaa Philander of iThemba LABS/University of the Western Cape (UWC) and Firdous Khan of UWC came with prepared articles they worked on to adapt for blogging or feature writing. For them the value of the workshops was that they could see their work ultimately published through *NanoNews*.

Readers can follow these science writers at [www.npep.co.za](http://www.npep.co.za)



*Students at the nanotechnology writing workshop in Cape Town. SAASTA's Mthuthuzeli Zamxaka, Manager of the Nanotechnology Public Engagement Programme (NPEP) and Prof. Janice Limson, Editor of the NPEP NanoNews stand ready to lend a helping hand*



*The personalised interaction with facilitators stood out for students who participated in the NPEP NanoNews workshops*



# Harnessing TECHNOLOGY to make science accessible to all

## Touchscreen computers and Braille plates bring nanotechnology to disabled learners

Three touchscreen computers featuring nanotechnology information were unveiled at the National Museum in Bloemfontein in February 2014. The aim of the nano touchscreen computers is to show a range of elements which have various uses as nanoparticles and their applications in different fields.

The project was initiated by Tebogo Mohlakane-Mafereka, Managing Director of Untouchable-But-Approachable (UBA) General Trading (Pty) Ltd. To implement the project, the company received a grant from the Nanotechnology Public Engagement Programme (NPEP), which is managed by SAASTA on behalf of the Department of Science and Technology (DST).

Among the special guests in the audience were 22 visitors from the Bartimea School for the Blind and Deaf in Thaba 'Nchu, ten visitors from Tswelang School for Learners with Physical Disabilities and another ten from the Association for Persons with Disabilities. There was a special surprise for the guests from the Bartimea School – Braille plates with information on the basics of nanotechnology, which were installed in the Geology Hall of the National Museum.

Other guests who attended the hand-over of the touchscreen computers and Braille plates included Fhumulani Manda, Deputy Director: Emerging Research Areas, DST; Rick Nuttall, Director of the National Museum; and Mthuthuzeli Zamxaka, Coordinator of NPEP.

Luyanda Noto, a PhD student from the University of the Free State gave a presentation on the general applications of nanotechnology and told the audience how nanotechnology can benefit our country. Mthuthuzeli Zamxaka from SAASTA explained the role of NPEP in making the cutting-edge science of nanotechnology accessible to people, as well as the general role of SAASTA in science and technology advancement. Fhumulani Manda addressed the audience on the role of the DST and thanked the National Museum for advancing the vision of the Department.

An educator from Bartimea School for the Deaf and Blind used sign language to interpret the talks for the disabled learners. Pinky Matshaseng, Principal of Bartimea spoke passionately about the school and appealed to people to be patient with her learners and sensitive to their needs. She thanked the National Museum for involving her school in this prestigious event.

Then it was time for Rick Nuttall, Fhumulani Manda and Mthuthuzeli Zamxaka to cut the ribbon to the Geology Hall and unveil the museum's first touchscreen computer. The educators of Bartimea and Tswelang unveiled the second touchscreen computer and the Braille plates, and the third touchscreen was unveiled by four learners – two from Bartimea and two from Tswelang.

DST and SAASTA representatives were privileged to be able to witness the excitement of two blind learners reading the nanotechnology information from the braille plates for the very first time.



*The learners gather around the touchscreen computer to view the nanotechnology information*



*An educator from Bartimea School for the Deaf and Blind uses sign language to interpret the talks to the disabled learners*



*Luyanda Noto, a PhD student from the University of the Free State tells the learners how nanotechnology can benefit our country*

# Building a network of science centres to nurture youth talent

## Accreditation programme to promote excellence at science centres

The Department of Science & Technology (DST) regards a national network of science centres as ideal infrastructure for the delivery of science, engineering and technology (SET) public awareness and SET youth development.

The recently established Network of Science Centres is to be enhanced by means of accreditation against a clear set of criteria. This lends credibility to a science centre, and indicates to potential sponsors that a centre is worth supporting. Benchmarking also supports the development of existing science centres and provides guidelines for the establishment of new science centres.

DST, through SAASTA, embarked on a process to build on this achievement, by implementing a Framework for Promotion of Excellence in the National Network of Science Centres. The framework utilises an accreditation approach to admit science centres to the national network.

SAASTA issued a call for participation to science centres in November 2013. Thirteen science centres responded to the call and five were selected initially to undergo evaluation. The five science centres have already completed the peer

assessment phase and their accreditation level is being finalised through expert accreditation committees.

The five science centres that have completed the peer evaluation process are: Sci-Bono Discovery Centre, North-West University (Potchefstroom Campus), Nelson Mandela Bay Science Centre, Cape Town Science Centre and Osizweni Science Centre.

The eight remaining science centres are scheduled to undergo evaluation in the 2014/2015 round of accreditation.

The accreditation and quality assurance processes have an underpinning aim of supporting continuous improvement rather than compliance with minimum requirements.

## Science Centre capacity building

DST, through the SAASTA, provides support to science centre staff. This support relates to capacity building to better manage the centres and thereby enable science centres to administer the funds allocated by DST and other funders. The aim of this project is to empower these individuals to employ events, exhibitions, lectures and other interventions efficiently. <http://scn.saasta.ac.za>



◀ Candice Potgieter, CEO of the KwaZulu-Natal Science Centre, engages learners in one of the centre's highly successful school programmes aimed at creating awareness of science, technology, engineering and mathematics



◀ The Sci-Enza Science Centre is a hub of activity during Youth Science Focus Week

## Capacity building: Science Centre World Summit 2014 heralds the start of a new era

On behalf of the DST, SAASTA organised the attendance of 28 South African delegates to the Science Centre World Summit (SCWS2014) that took place in Belgium in March 2014. The Summit was hosted by the Technopolis Science Centre in Mechelen near Brussels, under the leadership of Mr Eric Jacquemyn.

The Summit programme was revolved around three main themes: 'Research and communication of research', 'Engaging learners in all settings' and 'New technologies for learning and engagement'. Twenty of the South African delegates presented papers and 13 were provided with personal experiential learning to develop their skills in science centre management. Eight South African delegates, including Shadrack Mkansi, Manager of SAASTA's Science Awareness Platform, attended the CEO's forum.

"In order for the SCWS2014 host centre to keep delegates adequately informed about conference activities at all times, the organisers developed a useful Summit App," says Thandamanzi Mtsweni of SAASTA. "This enabled us to find the latest information, view the list of World Summit attendees, speakers and exhibitors, create our own schedule and notes, share thoughts and pictures, and participate in polls," she says.

One of the outcomes of the Summit is the Mechelen Declaration ([http://www.scws2014.org/wp-content/uploads/2014/03/Mechelen-Declaration\\_def.pdf](http://www.scws2014.org/wp-content/uploads/2014/03/Mechelen-Declaration_def.pdf)). The document was signed by delegates from within the science centre field and their networks. The next summit will take place in Japan in November 2017.

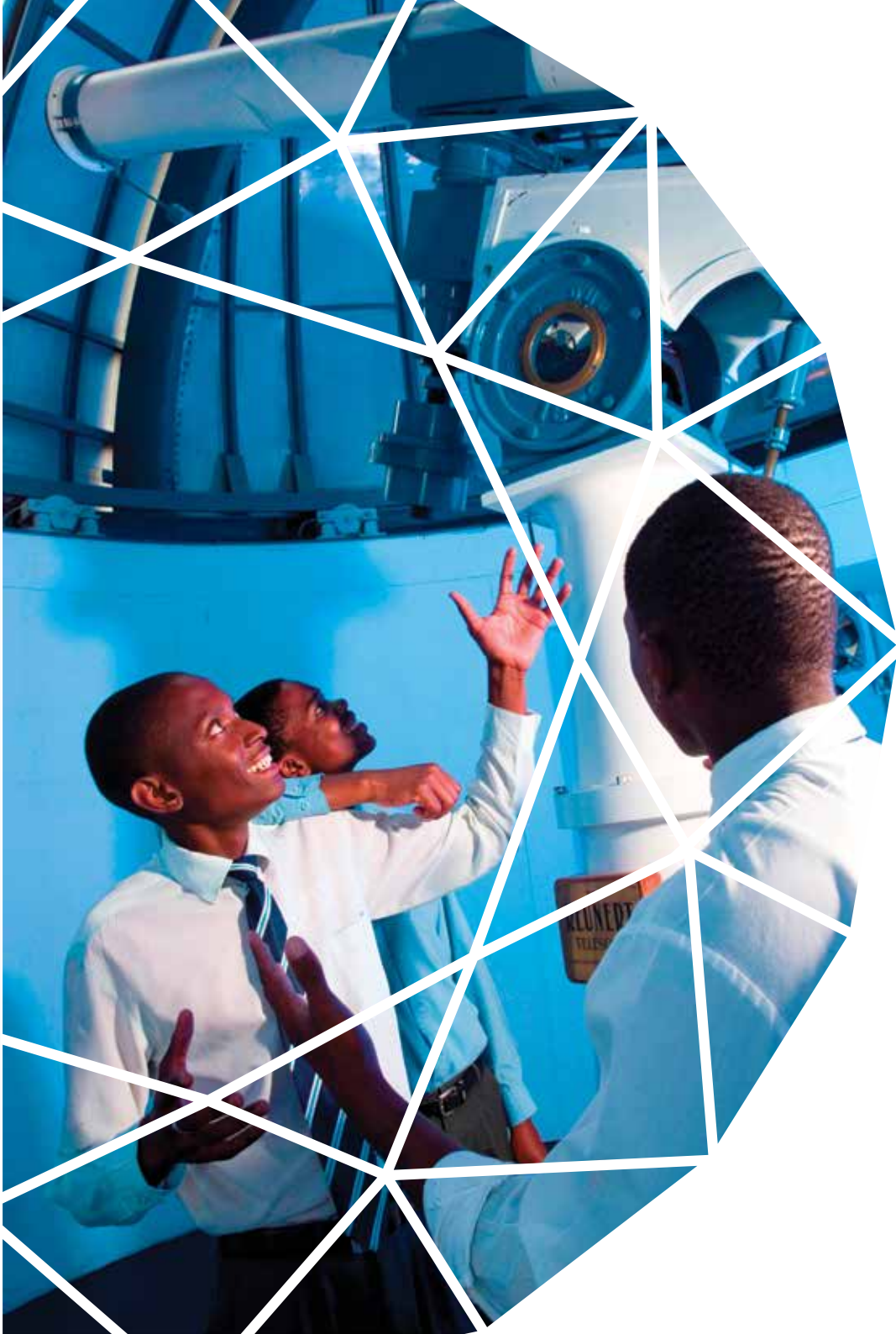


*Science centres across the country are extending their reach through the use of mobile laboratories that are able to travel to learners at their schools, even if they are located in remote areas*



◀ *South African delegates who participated in the summit included, from the left: Koki Selepe (DST), Chricencia Moatshe (Mothibistad Science Centre), Gilbert Lekwe (NECSA) and Lerato Molebatsi (Mafikeng Science Centre)*





## Johannesburg Observatory becomes a hub for astronomy activities

The number of visitors to Johannesburg Observatory has increased substantially, largely due to the sky-viewing events which proved to be particularly popular with the public. A number of science and technology programmes targeting learners, educators and the public are being implemented on-site at the observatory, and as outreach activities. These range from curriculum-based activities with learners and educators to interactive exhibits and sky viewing with the public.

During the 2013/2014 financial year, 10 764 visitors and other participants were reached through on-site and outreach activities at the observatory.

Visitors received at the Johannesburg Observatory in 2013/2014:

Visitors to the Johannesburg Observatory		
Learners	8 665	10 764
Educators	402	
Public	1 697	

The marketing of the Observatory as a learning platform as well as collaborations with the Department of Basic Education in Gauteng and Track Lab contributed to higher visitor numbers, as did various other activities.

SAASTA utilises the observatory for the TechnoYouth workshops for underprivileged learners in grades eight and nine from areas in and around Gauteng, introducing them to technology in an informal, fun and friendly manner. The programme takes place four times a year during the school holidays.

The observatory is also used for exhibits, astronomy presentations and laboratory experiments for learners and educators.

◀ *The Reunert Telescope at the Johannesburg Observatory is currently used for sky viewing by school groups and the general public*





## CHAPTER 2

# Growing a representative science and technology workforce in South Africa

### Did you know?

- Diamonds do not show all of their beauty as rough stones; instead, they must be cut and polished to exhibit the characteristic fire and brilliance for which gemstone quality diamonds are known.
- Diamonds are cut into a variety of shapes that are generally designed to accentuate these features.
- Craftsmanship — i.e. the care that goes into the crafting of a polished diamond, as seen in its finish — plays an important role in the overall cut grade.
- The art of turning a rough diamond into a glittering brilliant is a long process requiring a superlative degree of skill.

Source: <http://www.newworldencyclopedia.org/entry/Diamond>





# Opening up a future glittering with possibilities

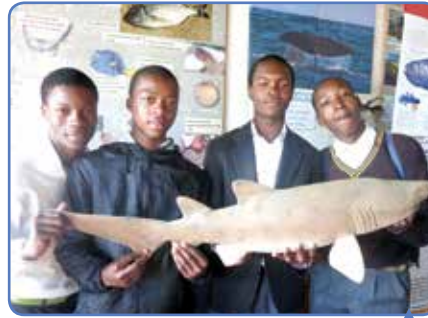
## National Science Week

National Science Week (NSW) is one of the many ways in which the DST seeks to reach out to the South African public to raise awareness of science and technology. NSW is run in all nine provinces simultaneously, at multiple sites in each province. SAASTA has been appointed by DST as the implementing agency and has the role of national project manager for NSW.

The theme of NSW 2013 was “Celebrating scientific areas in which South Africa has a competitive edge”, with “International year of water cooperation” as sub-theme. The objective of this year’s programme was to raise awareness of both the potential for increased cooperation in the water sector and the challenges facing water management in the context of greater demand for water access, allocation and services. The launch took place on 27 July 2013 at the University of Limpopo’s Science Education Centre.



*Settlers High School learners Don Maisels and Stephanie Less participate in the 2013 HIP2B<sup>2</sup> iTHINK Challenge. More than 7 000 learners participated in a variety of science and maths related tasks, riddles and problems in this challenge during National Science Week*



*Two classes from Thamsanqa High School in Port Elizabeth visited the South African Marine Rehabilitation Education Centre to learn more about fish, sharks and coelacanths. Here some of the learners inspect a model of a shark*



*Participating in Radio Teemaneng's Talk Show during National Science Week were, from left: Ocean van Rooi (Grade 9), Bonolo Phillips (Grade 11), Pamela Basjan (Grade 10), Obakeng Kock (Grade 11) and Masego Maarman (Grade 11)*



*Grade 7 learners from Vosburg in the Northern Cape enjoyed the SKA's planetarium shows during National Science Week*



*Having fun with the Human Battery exhibit at the SANSA stand in Somerset Mall*



*Sci-Enza and BASF took chemistry to the Kolonnade Mall in Pretoria. Learners from Bajabulile Primary School kicked off their week's "water" experiments with enthusiasm*



*Sci-Enza introduced 50 young learners from the science club at the Entokozweni Resource Centre in Mamelodi to Electronics. The learners enjoyed every moment of making electronic devices on the ELENCO circuit boards. The highlight was putting all the components together to make a radio that really worked!*



*Dentist Dr Phillip Johnson from Kimberley Hospital gave Grade 6 learners a new perspective on science, engineering and technology and its role in everyday life*

## Science Spazas – improving science literacy in schools

South African learners rank very low in recent studies on mathematics and science competency\*. The lack of resources and the lack of opportunity for experiential learning are, in part, responsible for this state of affairs.

The Hydrogen South Africa Public Awareness and Demonstration Platform (HySA PADP) and the Nanotechnology Public Engagement Programme (NPEP) – in partnership with Jive Media Africa – started the Science Spaza\*\*, an exciting, fun and interactive science learning experience bringing curriculum-linked science resources to schools around South Africa through science clubs.

The objective of Science Spaza is to improve science literacy in schools and to support educators to teach science in a fun and effective manner. For this purpose, a network of science clubs has been established in disadvantaged schools across the country, supported with appropriate resources and tools. Science Spaza also provides resources and tools to support science clubs or to set up a new science club in schools or communities. Science clubs can register on the Science Spaza website ([www.sciencespaza.org](http://www.sciencespaza.org)) to receive updates and additional resources – and the chance to participate in competitions and other initiatives.

In addition, Science Spaza arranges events that include talks, shows and other engaging activities such as

meeting science role models. Science Spaza creates opportunities for learners and educators, taking science in South Africa to new heights.



*Science Spaza creates new opportunities for learners and educators, taking science in South Africa to new heights*



*Science Spaza provides a space where learners can engage with science in a fun and interactive manner*

\* In the 2011 Trends in International Mathematics and Science Study (TIMSS), a cross-national assessment of the mathematics and science knowledge of fourth and eighth Grade learners, South Africa performed at the lowest end in both mathematics and science, together with Botswana and Honduras. For the first time since 1995 however, the national average mathematics score of Grade 9 learners has improved in SA public schools. The Human Sciences Research Council (HSRC) conducted the SA study in 285 schools among 11 969 learners. TIMSS 2011 was conducted in 45 countries.

\*\* The Science Spaza is sponsored by HySA PADP and NPEP in partnership with Jive Media Africa. The two awareness programmes are managed by SAASTA on behalf of the Department of Science and Technology.



*"I appreciate and commend the excellent work that SAASTA (in partnership with Tshwane University of Technology) is doing in our circuit. You have assisted and motivated our learners through your Role Modelling Campaign. Our learners have (for the first time) experienced live discussions with qualified science, engineering and technology practitioners. I would like to recommend that the programme continue and be expanded as the need is ever growing. The campaign has a huge social, economic and academic impact on learners as they are learning from SET practitioners who, despite the odds, have made it in the academic and corporate world."*

– Ms Ndifelani Nnduvheni, Nzhelele West Circuit Manager, Department of Education, Vhembe District, Limpopo Province

## Guiding our strong minds toward careers in the sciences

SAASTA has stepped up its Role Modelling Campaign. The objective of the programme is to expose learners and educators to career opportunities in science, technology, engineering, mathematics and innovation (STEM), through interaction with appropriate role models and provision of educational resources.

This year the focus was on the following careers: engineering, chemistry, biotechnology, and space science and in the agricultural sector. Participants are given an opportunity to interact with appropriate role models in these fields for about four hours and educational resource materials on careers as well as bursary information are handed out to all participants.

The project was implemented in 14 municipalities in nine provinces and included a healthy cross section of urban and rural towns. These ranged from Lady Frere in the Eastern Cape to Ficksburg in the Free State and Hammanskraal in Gauteng and many others.

The programme is run in collaboration with youth empowerment organisations, municipalities, higher education institutions and the Department of Basic Education, which released learners and educators to attend organised events.

Reach by 31 March 2014	
Learners	10 996
Educators	139
Young Women	200
Provinces	9



SAASTA also profiles role models in the youth media to inspire learners about career opportunities in science, technology, engineering and innovation



## SET Awareness: a sharper focus on HEIs

While science, engineering, technology and innovation (SETI) awareness at higher education institutions (HEIs) has always been in the cross-hairs of SAASTA's sights, the organisation embarked upon a sharpened focus on universities in the past five years to help realise the National Research Foundation's vision of increasing the number of physics PhDs.

Producing the representative science and technology workforce in South Africa, as per the NRF's key strategic areas, relies upon supporting SET awareness during the entire "pipeline" of producing our much-needed future scientists. SETI awareness and engagement should start at primary school level, and continue through the secondary school and higher education phases. At some point there will be a transition as the scientist's career progresses and the baton is handed from SAASTA to the NRF's Research and Innovation Support and Advancement (RISA) division. This occurs some time during the emerging researchers' early career when they are doing their postgraduate studies.

In order to ensure this continuous attention to SET awareness, all the way to higher education level, during 2013/2014, SAASTA undertook an intervention that gives undergraduate and postgraduate students the opportunity to interact with appropriate

role models in their fields in the work environment by visiting industries and research facilities. The focus is specifically on those students taking physics as a subject. The exposure to role models and site visits are aimed at encouraging them to continue to pursue physics as a subject all the way to PhD level, as there are many exciting work opportunities in the field.

Number of undergraduate students reached	
Students	804
Lecturers	25
HEI	11

An initial total of four service providers were appointed by November 2013 to start the ball rolling. Upon approval a further three institutions were approached and appointed. The participating service providers were:

- University of Venda
- iThemba Labs (University Western Cape, Cape Town University of Technology, University of Zululand)
- University of Fort Hare (FOSST)
- North-West University (Potchefstroom Campus)
- University of Free State (Boyden Observatory)
- University of Limpopo
- Hulisani (MEDUNSA, Tshwane University of Technology and University of Pretoria)

## Educators, our most treasured gems, need as much support as the precious learners

South Africa has the potential to become a rich source of scientific expertise - but only if the system is fed with a healthy supply of learners whose interest in science, engineering and technology (SET) is guided by equally passionate educators.

SAASTA's Science Education unit therefore implements, develops and manages projects that promote science, engineering and technology to educators. This school science support, SET careers campaigns, and science resources such as curriculum-based support resources, enrichment materials, web-based materials and online learning.

During the year SAASTA ran a successful Laboratory Training and Maintenance Workshop in June 2013 at the University of Johannesburg (Soweto Campus) for Grade 10 to 12 Physical Sciences educators. Ten educators from Limpopo, North West, Gauteng, Mpumalanga and the Eastern Cape attended.

### Going global

The Global Learning and Observations to Benefit the Environment (Globe) programme is a worldwide hands-on, primary and secondary school-based science and education programme. Globe promotes and supports students, teachers and scientists to collaborate on inquiry-based investigations of the environment and the Earth system working in close partnership with NASA, NOAA and NSF Earth System Science Projects in study and research about the dynamics of Earth's environment.

Globe Educator Training Workshops were conducted in Vryheid, KwaZulu-Natal (44 educators attended), in Piet Retief, Mpumalanga (19 educators attended) and in Cofimvaba, Eastern Cape (40 educators attended).

Reach by 31 March 2014	
Educators	113
Schools	71
Provinces	9



## National Youth Volunteers – a breath of fresh air in the science community

Each year a group of fresh young faces breathes new life into the South African science community, eager to learn and participate in the activities of the 43 organisations where they work as volunteers for a period of 12 months. A number of these volunteers join the science awareness and engagement community, such as science centres and science awareness units in science councils among others, where they deliver an invaluable service.

In support of the government's National Youth Service (NYS), which seeks to contribute to the enhancement of the youth as the current and future social capital of the country, the Department of Science and Technology initiated its National Youth Service (DST-NYS) programme in September 2007. SAASTA, as business unit of the National Research Foundation, was appointed as project manager by the DST in April 2011.

The DST-NYS programme aims to identify and reach unemployed science, engineering and technology (SET) graduates and place them at host institutions in SET fields to ensure that they are given an opportunity to gain work experience and life skills, which will make them more marketable and employable. During

the year they get specialised training in areas such as Business English, Project Management and Life Skills.

A total of 127 volunteers – all with at least diplomas or degrees and a few with honours and master's degrees - were appointed from 1 April 2013 for a year's service. They joined a group of 210 volunteers who had already been working in the science community since the previous year.

Quite a large number these enthusiastic young people find positions in the organisations where they spent time as volunteers, such as Zinzi Madiupe, a volunteer at SAASTA, who was appointed in a contract position as administrative assistant on this very project. A number of the volunteers also received offers for full-time positions elsewhere before the end of their contract, and we celebrated these opportunities with them.

*Zinzi Madiupe, a former volunteer at SAASTA, was appointed in a contract position as administrative assistant on the National Youth Service programme* ▶



Many of the organisations get wonderful testimonials from volunteers about the skills and experience they gained. The following are a few examples (in the volunteers' own words):

## Jive Media Africa



### Ayanda Nxumalo

"The directors and staff have been very supportive towards us. I have learned a lot in just one month, particularly with regards to managing a project. The project that I have been assigned

is called Science Spaza, which is a science outreach programme aimed at disadvantaged schools. The biggest lesson that I have learned so far in managing this project, is to have a production schedule. Another valuable lesson that we have been taught at Jive Media Africa is drawing up budgets for our projects. I have also learned to work more effectively with other people, since we assist one another with our projects."



### Nomasonto Ntuli

"Working as an intern at Jive Media Africa has given me a foundation of how things operate in the workplace. I have been given the opportunity to spearhead and manage one of

the big projects of the company — FameLab 2013. This project has taught me how to look at, and think of things in a very critical manner. I have developed important leadership skills, i.e. to delegate and meet deadlines. I have also learnt the skill of working with and handling clients. I have been taught to draw up a budget for the project. Hence, my self-confidence

as well as my self-belief has risen. This indicates that the internship is fulfilling its purpose and desire to develop the skills of graduates fresh from university."



### Bongwiwe Mbatha

"I started at Jive Media Africa as an NYS volunteer and now I'm employed as a project manager. Working at Jive Media Africa has opened up a whole world of opportunity for me.

The experience has been both exciting and nerve-racking! I have learnt a tremendous amount about science communication and science education in South Africa through projects I've been involved in. I have improved my writing skills, my leadership skills and time management skills; to name but a few. I have also learnt the importance of teamwork, being able to rely on and trust your colleagues to assist you and do a decent job of that task. This has been a great learning experience and I'm really grateful for this opportunity that SAASTA has given us."

## KwaZulu-Natal Science Centre

### Celiwe Chauca on her attendance of the SAASTEC 2012 Conference

"Thank you for the opportunity to participate in the ice breaker at the SAASTEC 2012 Conference. The event was a wonderful learning experience. It was fantastic to meet and get to know individuals from other science centres and I learnt many new, exciting things from them.

"A special 'thank you' goes to SAASTA for creating the opportunity for me and many other young graduates

to gain employment experience in such an exciting and dynamic environment. I do feel a part of a greater science community."

## Feedback from the Sci-Enza Science Centre

"During 2013 Sci-Enza hosted 13 amazing young graduates as NYS volunteers. These remarkable young scientists inspired, excited and taught our visitors that Science is Fun! May you still achieve great things old interns; your Sci-Enza family misses you! Thank you DST and SAASTA for making the NYS programme possible!"



*A group of Sci-Enza volunteers and staff members inspired visitors during the University of Pretoria's Open Day. Back row: Ashlan Mohlaphuli, Malcom Sande (Student Assistant); Evans Malatula; Irene Schoeman (Sci-Enza Science Communicator); Colette de Villiers. Second row: Courtney Barrett (Student Assistant); Yvette Barrett (Sci-Enza Administrator); Helettia Danster; Letaro Mokoka; Kagiso Ledwaba; Febé Wilken; Thami Mgwenya. Front: Justice Kgarume and Rudi Horak (Sci-Enza Manager)*





## From caterpillar to sanguine butterfly

It all started in July 2012 when my journey as a National Youth Service (NYS) volunteer at the Cape Town Science Centre (CTSC) began. As a graduate in the field of Medical Biosciences, I was excited to learn about the variety of other sciences the CTSC focused on. As a result, I've been exposed to scientific knowledge and technologies I've never thought imaginable. I now have an appreciation for how all sciences link together and understand why it is so important for us to continue to educate and empower ourselves in science and technology.

Coming from a quiet laboratory background, I felt the need to work with people. The CTSC was the perfect place to do just that – I had the privilege of working with people of all ages. It allowed me to constantly improve upon my public speaking, presentation, science communication, management, leadership, research and interpersonal skills, which is necessary for any workplace. Therefore, it was a great 'prep' period for my future career. With all these above-mentioned skills, it has now become second nature. I've gained all the necessary confidence in those areas, which I'm grateful for.

Among the many highlights of being an NYS volunteer, I not only travelled often, but also had the opportunity to make a difference in the lives of children who needed it most. I had the

privilege of educating, inspiring and motivating children and adults from all backgrounds about the wonderful world of science and how it benefits us. Witnessing their faces light up in excitement brings joy to my soul, knowing that there's hope for our future generation who now has the exposure and potential to work towards a brighter tomorrow.

What I also appreciated was the fact that the staff members of the CTSC were open to my ideas and therefore I was able to develop exciting workshops and demonstrations which always seemed to fascinate visitors who attended. I often had opportunities to take part in radio interviews, television debuts, international science communication competitions and seminars.

If I look back, I feel like I've started out as a little NYS caterpillar, which has grown into a sanguine butterfly ready to take on the world. For my growth and development, this great opportunity was an absolute necessity. I can visualise my future children growing up in a fun, educational and mentally stimulating environment such as the CTSC.

There's a saying: "when you're young work for experience, when you're older work for money". The NYS opportunity is a great way to get equipped for the 'real world', it is full of exposure, untapped potential, discovery and growth that I feel every science graduate should experience and most importantly enjoy, just like I did.

◀ *Yusrah Salie-Bassier in action during one of the exciting demonstrations she developed*

## SAASTA science olympiads and competitions

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*Through the implementation of the National Science Olympiad, National Schools Debates and the Astronomy Quiz, among others, SAASTA has gained extensive experience in the successful implementation and management of science awareness competitions.*

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### National Science Olympiad – walking in the footsteps of giants

2014 marked the 50th anniversary of the National Science Olympiad. “By looking back over the past 50 years, we realised that the winners of the 2014 olympiad will be walking in the footsteps of giants who participated in the past and have reached the top of their profession,” says Dr Jabu Nukeri, MD of SAASTA, the host of the olympiad.

Southern Africa’s top young science performers for 2014 were honoured at an awards ceremony in Gauteng, where they were inspired by some of the past winners to excel one day in their chosen professions. SAASTA presented awards to top achievers and schools in the areas of Physical and Life Sciences at the ceremony, and launched a special publication to celebrate the 50 years of this project.

This book takes a look at SAASTA’s role in identifying and nurturing talent through programmes such as the National Science Olympiad and profiles exceptional people who participated in the olympiad, such as Professor Nithaya Chetty, the National Research Foundation (NRF) Group Executive for Astronomy, Mteto Nyati, MD of Microsoft South Africa, award winning poet Imraan Coovadia, many other inspiring people as well as the next generation of innovators.

It also focuses on the endless possibilities that a solid school-level foundation in Science and Mathematics can offer a person in terms of career choices. It does this using the words of people who have followed a variety of paths, but all of whom

share a passion for science, and all of whom have participated in the National Science Olympiad over the years.

“Uncovering the names of past winners for the book provided SAASTA with a proud heritage of science leaders and innovators,” said Dr Albert van Jaarsveld, former NRF CEO.

### The jewel in the crown of South Africa’s Youth into Science strategy

“It’s remarkable to note that this is the 50th year of the olympiad. It’s remarkable enough on its own, but the olympiad is much more than a science and biology exam competition. It’s the jewel in the crown of our Youth into Science strategy, which is all about identifying and nurturing talent. The olympiad also identifies talent. It identifies talent that teachers have nurtured in schools across the length and breadth of the country,” said the Minister of Science and Technology, Ms Naledi Pandor, in her keynote speech at the event.

The olympiad aims to contribute towards excellence in science among learners and to encourage them to take up careers in science, engineering and technology. Just under 30 000 learners in grades 10 to 12 from around South Africa and four neighbouring countries wrote either the Physical Sciences or Life Science paper on 3 March 2014. The 100 learners who performed best in this examination were invited to attend the Science Focus Week, where they will be exposed to careers in science and technology.

## Sponsors

SAASTA has been receiving sponsorship from the Harmony Gold Mining Company for the National Science Olympiad for the past five years. This has allowed the organisation to expand the competition significantly. Three organisations sponsored achievement awards: Skynet (two laptops), Maltronic (two laptops) and Xahumba Consultants (cash prize). The DST also provides SAASTA with funding to increase the participation of selected Dinaledi Schools by settling the entry fees on their behalf.

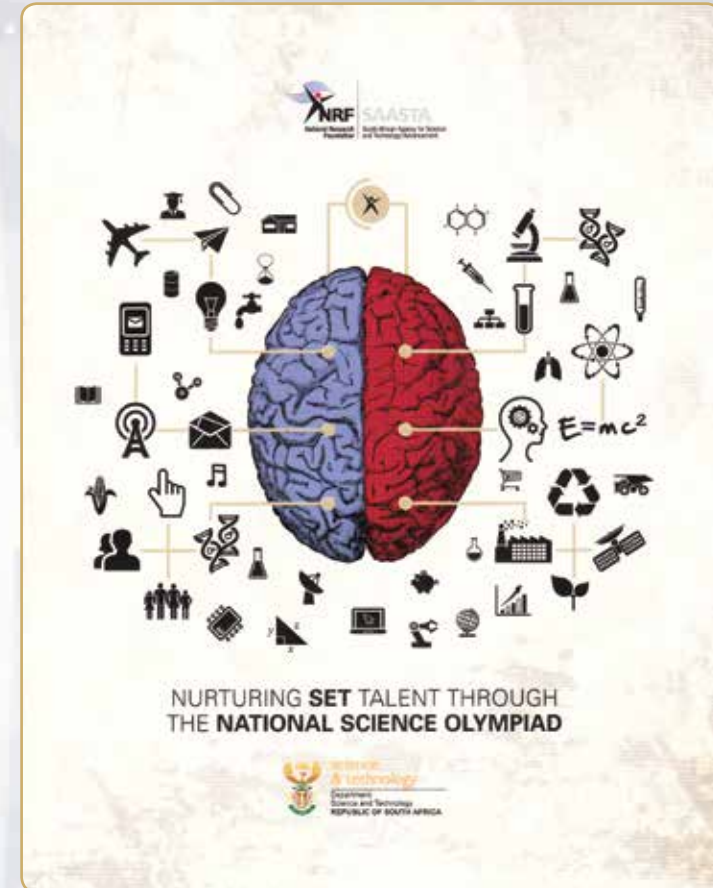
## Learner participation in the National Science Olympiad

Reach by 31 March 2014	
Learners	30 542
Educators	436
Provinces	9
SADC Countries	5
Learner Manuals	1

The top achievers in the 2013 National Science Olympiad were Thomas Orton of Bishops High School in Cape Town, Ishaq Lakhi of Raisethorpe Secondary School in KwaZulu-Natal and Rebecca Rogers of Reddam House Atlantic Seaboard in Cape Town. These bright sparks will attend the London International Youth Science Forum as part of their prize



The Grade 11s who excelled in the 2013 National Science Olympiad were Hamandishe Mathivha of Mbilwi Secondary School in Limpopo (left) and Danielle Vellema of Outeniqua High School in George, Western Cape. These learners will be attending the Science Focus Week in Australia in January 2015



SAASTA launched a special publication to celebrate the 50th anniversary of the National Science Olympiad



## Limpopo learners take top honours in National Schools Debates competition

Five learners from Northern Academy in Polokwane, Limpopo did their province proud when they demonstrated their ability to deliberate on high-level scientific topics such as biotechnology and space-related technologies in convincing style. Team members Eric Seabela, Lehlogonolo Letsoalo, Lesetja Masoga, Khomotso Sebake, and Ntshepe Matlou bowled over the audience with their brilliant arguments. They out-debated teams from the other eight provinces to win the grand prize, an all-expenses-paid trip to New York, including a visit to the Museum of Natural History to expose the learners to international science.

The main objective of the SAASTA National Schools Debates Competition is to stimulate interest among learners (Grades 9 to 11) to study towards careers in science, engineering and technology (SET) through researching and debating high-level topics. In addition, the competition aims to advance the public awareness, appreciation and engagement of SET in South Africa. But not only does the SAASTA National Schools Debates Competition stimulate an interest in SET careers, it also introduces learners to broader scientific topics and encourages them to consider how science relates to everyday life.

The topics in the finals were “Can biotechnology’s application in wastewater treatment and water purification provide a sustainable contribution to addressing water cooperation?” and “Can the use of space-related technologies, such as Earth observation, provide an effective tool for water management, leading to a meaningful contribution to water cooperation?”

### Excellence insured by advisory committee

An advisory committee was formed, consisting of the following content specialists: Dr Mlawule Mashego (Biotechnology) – CSIR; Dr Ndeke Musee (Space Science) – CSIR; Mr Daniel Matsapola (Hydrogen Fuel Cell Technology) – SANSA; and Dr Mkhulu Mathe – CSIR. The advisory committee structures the topics of each of the debates for the provincial and national tournaments. The committee also develops a database of content specialists to assist with the adjudication and mentoring at the provincial tournaments across all nine provinces.

The formidable team of adjudicators included space scientist Dan Matsapola; Mkhulu Mathe, a materials scientist at the CSIR; Dr Mlawule Mashego, engineer and energy boffin; Lisa Brown, an economist at Wesgro; Motebele Moshodi, a civil engineer at the Department of Water Affairs; and Dr Ndeke Musee, a principal scientist at the CSIR.

In 2013 it was decided to integrate the SKA (Square Kilometre Array) awareness competition for learners in Grades 9 to 11 in the selection process of the SAASTA National School Debates.

### Learner participation in the SAASTA National School Debates

Reach by 31 March 2014		SAASTA activities
Learners	415	<ol style="list-style-type: none"> <li>1. Distribution of resources.</li> <li>2. Running of essay competition out of which provincial winners were selected.</li> <li>3. Rolling out of debates regional workshops and provincial competitions.</li> </ol>
Educators	81	
Content Specialists	16	



*Northern Academy's winning team with their educator and the Managing Director of SAASTA, Dr Jabu Nukeri. From the left are Ngwanathaba Molepo (Northern Academy educator), Ntshepe Matlou, Khomotso Sebake, Lesetja Masoga, Lehlogonolo Letsoalo, Dr Jabu Nukeri and Eric Seabela*

## New York, New York

The winning team from Northern Academy and their educator jetted off to the Big Apple where they explored the American Museum of Natural History, one of the largest and most celebrated museums in the world. The tour of the museum included viewing the “Dark Universe” show at the Hayden Planetarium and the “Power of Poison” exhibit that took two years to complete.

The group also visited Teacher College at Columbia University, where Professor Chris Emdin, Associate Professor of Science Education, explained his Science Genius project to the group. The project uses hip hop as an art form to educate learners in New York City’s public schools about science topics.



*Ms Ngwanathaba Molepo (educator) and the five learners outside the American Museum of Natural History*

## Bright young learners gain insight into new technologies and sciences

Three learners who perform exceptionally well in SAASTA’s National Science Olympiad are selected each year to attend the Australian National Youth Science Forum (NYSF) with assistance provided by SAASTA. In 2014 Luthundo Mdadane, Thomas Orton and Keitumetse Mokoena attended this prestigious event.

One of the most important elements of the forum is the half-day visits to research and industry facilities. Learners embark on a range of visits depending on their stated areas of scientific interest. The range covers physics, maths and computing, chemistry, biomedicine, animal and plant biology, earth and environmental sciences, and engineering. The aim is to inform, inspire and challenge learners to consider what working in different fields is really like. They have a unique opportunity to talk to practicing scientists and engineers at and about their work.

This year’s bright young learners were in awe as they gained insight into new technologies and sciences. Luthundo Mdadane felt the forum opened his eyes to the wide range of opportunities available in biology. “Over the course of the forum the group and I undertook various lab visits, covering a large range of biological sciences. This was my first experience using a micropipette,” said Luthundo.

Keitumetse Mokoena thoroughly enjoyed the interaction with scientists at ACTEW Water, a facility which daily provides over 100 million litres of treated water to

Canberra and Queanbeyan residents in Australia. Another highlight for the learners was a visit to Canberra Hospital where they explored an autopsy room and a museum dedicated to preserved organs. Throughout these lab visits the learners discovered many different professions that they did not previously know existed.

At the Australian National University they spent time visiting key research facilities, attending debates and forums on major scientific topics such as climate change and meeting with major industry partners such as the Cochlear Foundation, Murray Darling Basin Authority, University of Melbourne and many more.

According to Vhutshilo Nekhwalivha, SAASTA’s project coordinator who acted as the learners’ chaperone, all these experiences vastly improved their understanding not only of the field of science they are interested in, but also of the myriad fascinating opportunities that science presents.



*From left: Vhutshilo Nekhwalivha (SAASTA Project Coordinator and chaperone) with learners Thomas Orton, Keitumetse Mokoena and Luthando Mdadane at the 2014 Australian National Youth Science Forum*

## Free State school wins National Astronomy Quiz

A team of four learners from Unicom Primary School in Tweespruit, Free State won the “Currie Cup of Astronomy” when they beat nine other teams in the 2013 National Astronomy Quiz in Pretoria. Kagisho Motale, Boitumelo Mokoena, Mbotywase Mafereka and Mphakalasi Thabiso were rewarded with a telescope for their school; and a tablet computer, trophy and gold medal each.

Susan Usher, their educator, is very proud of her team. “They put in such a lot of hard work and were very committed, forgoing their breaks to study for the Quiz finals. They do not live close to the school, so coaching had to take place in every free minute during school hours. I believe they deserved to win, especially after beating very strong teams in the knockout rounds at Boyden Observatory,” she says.

Since the first-ever Astronomy Quiz in 2005 at the Sci-Bono Discovery Centre in Johannesburg, the annual SAASTA Astronomy Quiz has become a favourite on the school science calendar, with 3 300 learners from 825 schools participating in 2013. Ten teams of four learners each from all nine provinces in South Africa battled it out in the Astronomy Quiz 2013 finals, organised and sponsored by SAASTA. The quiz is open to Grade six and seven learners and consists of four eliminating rounds at 10 centres across the country.

The winning team scored the highest marks in the quiz that consisted of 30 tough questions on astronomy, with a limited time for coming up with each answer. Questions the learners had to face in the quiz ranged from one about the most accurately measured location on the African continent (Hartebeesthoek Radio Astronomy Observatory near Krugersdorp in Gauteng); which of Mercury or Venus is the hottest, and why (Venus, because of the hothouse effect on the planet); the colour of the hottest stars in the universe (blue); to why you would weigh more on Saturn than on Earth (because of the greater gravity on Saturn).



*A rich bounty of prizes for the deserving winners from Unicom Primary School*



*The team from Kimberley Junior School took second place in the competition*



## FameLabSA 2014: “Pop idols for scientists”

South Africa is producing world-class research in a multitude of different disciplines and now young scientists are finding ways to share their passion for science on a global platform. For the second year in a row, SAASTA supported the FameLab project to grow science communication in South Africa and to identify new role-models for science and technology. FameLab is the international competition which gets everyone talking science. Billed as a “pop-idols for scientists”, participants are given just three minutes to present their science to a panel of judges and a live audience. Their speeches are judged on three C’s - Content, Clarity and Charisma - ultimately a measure of the extent to which they can engage a public audience with a topic in science, technology, engineering or mathematics.

FameLab was started in 2005 at the Cheltenham Science Centre in the UK with the purpose of identifying the UK’s best young science communicators, and, in the process, throw a spotlight on the need to develop the art and scope of science communication. The competition concept was simple: scientists taking part had three minutes to talk about an area of science they found fascinating. There was one critical proviso: the talk had to connect with a non-scientific audience; oh yes, and it had to be done on a stage under the glare of a spotlight – a nightmare scenario for most scientists.

Despite the challenge, the concept took off, and FameLab is now an annual event in 25 countries around the world, with the international final held each year at its spiritual home at Cheltenham.

### FameLab comes to SA

In 2013 the British Council teamed up with Jive Media Africa and SAASTA to bring FameLab to South Africa, and FameLabSA was born. Heats were held in Cape Town, Durban and Johannesburg, and the national final was part of Scifest Africa in Grahamstown. Cosmologist Michelle Knights walked off with the first prize and jetted off to the UK to represent South Africa at the international finals.

In 2014 SAASTA decided to take FameLabSA to a much higher level. It established a dedicated team to help manage it; implemented workshops for competitors; and added more sparkle to the staging. Over a period of five weeks, a FameLabSA stage, lighting and production crew criss-crossed the country taking the competition to seven regional heats: Durban, Polokwane, Johannesburg, Mafikeng, Bloemfontein, Cape Town and Uitenhage.

At each event a different team of four judges – comprising two scientists, a science communicator and a media specialist – ranked the performances according to three criteria: content (how factually correct it was), clarity (how understandable it was for a non-scientific audience), and charisma (how well the performer connected with the audience).

A total of eighteen finalists were chosen from the regional heats and taken to Grahamstown ahead of the national finals for an intensive training regime with Malcolm Love, a presentation specialist from FameLab International. The semi-finals were held on 13 March at the St Andrews’ Drill Hall, where the eighteen were then whittled down to the final nine. Before a packed Scifest Africa audience, the nine finalists – who only a few weeks earlier had taken the first frightened and tentative steps into the spotlight, and were now trained, focused and better-versed in the challenges of science communication – each pulled off a faultless performance.



*The winner of FameLabSA 2014, Raven Motsewabangwe (centre) with runners-up Gugu Mabuza from the CSIR (left) and Cornelis van Niekerk from the University of Pretoria*

### Who is SA's 2014 Pop Idol of Science?

It was a 25-year-old microbiologist from Mafikeng in the North West Province - Raven Motsewabangwe - who emerged as the judges' favourite. Raven will be jetting to the UK to compete against winners from around the globe.



*A 25-year-old microbiologist from North-West University, Raven Motsewabangwe, emerged as the judges' favourite*



*Raven explains the concept of viral infections during his three-minute slot*



### Natural Science Olympiad

The Natural Science Olympiad was launched three years ago and targets learners in Grades 6 to 9 across the nine provinces. The aim of the Natural Science Olympiad is to identify and nurture talent in Natural Science, Life Science and Accounting and to increase the number of learners who opt for these subjects as well as Mathematics at high schools. The competition also acts as a feeder for SAASTA's National Science Olympiad for Grades 10 to 12, which is now in its 50th year. Learner and educator manuals for the Natural Science Olympiad are available on the SAASTA website as an educational resource.

The 2013 Natural Science Olympiad examination was written in May 2013 and the awards ceremony was held in Pretoria in October. The olympiad attracted attention from beyond South Africa's borders and Willow International School from Mozambique registered 80 learners.

### Learner participation in the Natural Science Olympiad

Reach by 31 March 2014	
Learners	43 489
Schools	722
Provinces	9
Learner manuals	1
Educator manuals	1



*The aim of the Natural Science Olympiad is to identify and nurture talent in Natural Science, Life Science and Accounting and to increase the number of learners who opt for these subjects as well as Mathematics at high schools*

## German-South African Year of Science Essay Competition

For the German-South African Year of Science Essay Competition, 132 essays were submitted by learners from 16 schools on the following topics: Urbanisation, Climate Change, Human Capital Development, Bio-Economics, Astronomy and Innovation in the Healthcare Industry. The best essays were shortlisted through a stringent selection process by a panel consisting of DST and SAASTA representatives.

The authors of the selected essays were invited for an interview at the DST and guided in terms of presentation. Zandile Mashabane (Mahuhushe Agricultural High School, Mpumalanga), Thandeke Nzimande (Letsibogo Girls High School, Gauteng) and Mukundi Mushiana (Mbilwi Secondary School, Limpopo) were selected to represent South Africa at the closing session for the German-South African Year of Science in Berlin, Germany in April 2013.

### Mungana-Lonene FM competition

In collaboration with Mungana Lonene FM, SAASTA was given a 30-minute slot per week to talk about science engagement (awareness, education and communication) activities. Questions were asked at the end of each talk. Altogether 81 participants responded through an SMS and prizes were given to the winners.

## Building a career in physics: booklet reaches out to talented learners

SAASTA has produced a booklet packed chock-a-block with information on physics, physicists, their work and places to study physics.

“Physics is not just rocket science. It is a route to many possibilities,” reads the book. “Although their work doesn’t always have an obvious application in everyday life, by pushing technology to the limits physicists are responsible for lots of useful spin-offs. These include new ways of sterilising food using particle accelerators, to the invention of the World Wide Web. They may also spend time finding out how frogs can levitate, how much toast you could make with a bolt of lightning or how earthquakes happen.

“To follow a career in physics you need to ensure that your subjects include Mathematics, and Physical Sciences. If you need a bursary, your average mark will have to be in the upper 70% or higher. You will also need a healthy dose of curiosity!”

The booklet explains the difference between theoretical and experimental physics and how they feed into and guide each other. It gives advice on the school subjects one should take to be accepted to pursue physics studies at university and the variety of career choices for someone with a degree in physics.

It focuses on the careers of eighteen South African physicists working in fields as varied as astronomy, biophotonics, high performance computing, nuclear physics, and many more.

For a copy of the book, or to request books for learners and students, contact [info@saasta.ac.za](mailto:info@saasta.ac.za).





## Unlocking worlds of opportunity in SET careers

*Written for secondary and high school learners as well as early tertiary students, Get SET Go offers practical steps to help steer young minds towards careers in science, engineering, technology and innovation.*

Making a career choice is one of life's most important decisions. For anyone considering a career in science, engineering and technology (SET), and also for those who are unsure of what career path to follow, a new SAASTA publication, Get SET Go, will be an invaluable resource.

The book aims to make learners aware of the range of career options in SET, which path may be best for them, and includes various steps that they need to take when making a career choice. The five sections of the book cover:

- Basic issues, such as the value of a SET career, when to start planning your career, and choosing the right kind of institution for your studies;
- SET areas that are currently of great importance in South Africa, such as biotechnology, space science and technology, climate change, hydrogen and fuel cell technology, engineering and nanotechnology. The book profiles people working in these areas, what they do, what they enjoy about their jobs, and what qualifications one needs to pursue similar careers. Many of these role models had to overcome challenges to reach their goals and are a source of

inspiration to young people;

- Profiles of some of South Africa's top SET researchers at the cutting edge of their fields and why their work is so important to our country and the world;
- A "how to" section covering information on financing your studies, practical advice on how to apply for funding, writing applications and a CV; and
- Advice on where to find more information.

### Preparing our youth to be economically active

In his opening address at the launch of the career guide, SAASTA's MD, Dr Jabu Nukeri, expressed the hope that the publication would open "worlds of opportunities for learners, thereby contributing to the human capacity development in the critical areas of SET to improve the quality of life of all the people of the Republic of South Africa".

"SAASTA believes this book, together with other projects such as our career profiling events, science, technology, engineering and mathematics olympiads and competitions, and our educational resources will play an important role in preparing our youth to be



economically active in a society built on information technology, rather than on industrial systems," Dr Nukeri said.

"We are preparing students for jobs that don't yet exist, using technologies that haven't yet been invented ... in order to solve problems we don't even know are problems yet." ([www.shifthappens.wikispaces.com](http://www.shifthappens.wikispaces.com)).

To ensure the widest possible dissemination of the publication, SAASTA will be distributing copies (18 800 copies printed) across the country through its own channels and also via science centres, science councils and the Department of Education at national, provincial, district and circuit levels.

For your own copy of the book, send an email to [info@saasta.ac.za](mailto:info@saasta.ac.za)

## CHAPTER 3

### Providing cutting-edge research, technology and innovation platforms

#### Did you know?

- The hardness of the diamond makes it useful for industrial applications. It is the hardest known substance, it is the greatest conductor of heat, and it has the highest melting point of any substance (4090 °C).
- Because of heat conduction, diamonds are cold to the feel at or below room temperature. When heated, a diamond will remain hot long after the heat source is removed.
- A rough diamond goes through several processes to transform it into the exquisite brilliant of commerce. A brilliant is a diamond or other gemstone, cut in a particular form with numerous facets so as to have exceptional brilliance.

Sources: Wikipedia and <http://www.newworldencyclopedia.org/entry/Diamond>



# Training the trainers of our future biotechnologists

Cutting-edge technologies, like biotechnology and nanotechnology, do have a place in the school curriculum, but educators often find it difficult to convey the knowledge of these fascinating, fast-changing fields to their learners. Realising this, the DST'S Public Understanding of Biotechnology (PUB) programme, managed by SAASTA, initiated educator training sessions on biotechnology in 2009.



*Educators in Pinetown present their group project on the topic of artificial insemination and cloning*

SAASTA's Science Education Unit has been running educator workshops all over the country on behalf of PUB, a SAASTA programme that promotes a clear understanding of the potential of biotechnology and also ensures broad public awareness, dialogue and debate on current and potential future applications, including genetic modification (GM). A well-researched and comprehensive folder with material related to the subject has been compiled and printed and a group of biotechnology specialists has been facilitating the workshops, using these manuals, over the years.

Four such two-day workshops were conducted early in 2014 by Drs Renata Rebello, Mauritz Venter, Tony Lelliot and Professor Valerie Corfield: in Stanger and Pinetown in KwaZulu-Natal, and at the National Zoological Gardens of South Africa and Johannesburg Zoo in Gauteng. About 200 educators – 50 to 60 per workshop on average – benefitted from these workshops in the past year.

Topics that are covered include basic biotechnology concepts such as forensics, biotechnology and plants, medicines, evolution and genetics. Study courses and career opportunities are often covered in the workshops, which the educators find very useful. Educators have indicated that they feel empowered by the workshops.

"Many educators benefitted from attending the workshop. If this, in turn, can benefit many learners, SAASTA has achieved its aim," writes Dr Renata Rebello in her report.



*Dr Renata Rebello explains insulin production using biotechnology to the educators in Pinetown*



# Grade 9 learner names SA's first nano-satellite

---

*Tshepiso* is the chosen name of South Africa's first nano-satellite, code-named ZACube-1, which was launched into space from the Yasny launch base in Russia on 21 November 2013.

Meaning *Promise* in Setswana and Sesotho, the name *Tshepiso* was submitted by Chachane Kgothlang, a grade 9 learner of Bethel Junior Secondary School in Matatiele, Eastern Cape. The winning name was among the entries received in a national competition launched by the DST and managed by SAASTA.

According to Dr Jabu Nukeri, MD of SAASTA, the purpose of the competition was to create awareness of the cube satellite and give learners an opportunity to contribute to the space science and technology programme. Dr Nukeri handed over the prizes at the launch. Chachane, who attended the live streaming of the launch of the satellite in Cape Town, received a tablet computer and a voucher for laboratory equipment for her school. She also had the opportunity to visit the South African National Space Agency (SANSA) site at Hermanus. She was accompanied on the trip by her educator, Ms Mpho Mvulana.

"I gave the satellite the name *Tshepiso* because it gives hope and will provide our country and its people with many opportunities," said Chachane. She was very excited about boarding a plane for the first time, and now dreams of studying astronomy when she has passed her matric.

## CubeSats – revolutionising space technology

Funded by the DST, the nano-satellite was designed and built by Cape Peninsula University of Technology (CPUT) postgraduate students in collaboration with SANSA, following the CubeSat programme at the French South African Institute of Technology (F'SATI).

Professor Robert van Zyl, director of the F'SATI programme, explained that CubeSats were extremely small satellites in the form of 10-cm cubes and with a mass of up to 1 kg (although there are some made up of two or three such cubes). Van Zyl said, "Originally developed in the US, CubeSats are becoming increasingly popular with universities and technology institutes around the world due to their considerable educational benefits. These tiny satellites have come a long way since Sputnik, the first satellite that was launched in 1957, weighing 83 kg. The success of the CubeSat programme has revolutionised space technology. CubeSats provide hands-on experience for engineers and technologists in their design and construction, and, once in orbit, the data needed to support scientific experiments and projects."

Van Zyl explained that *Tshepiso* would be placed in orbit at an altitude of 600 km. Its main mission would be to gather data on space weather for SANSA. Space weather refers to the ever changing conditions on the Sun and in space that can affect technological systems on Earth or in space, or which could imperil human life or health.

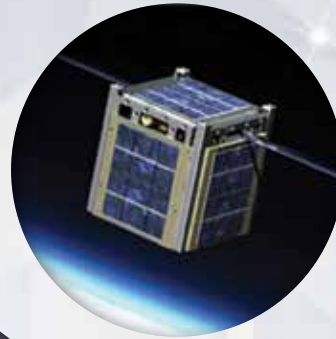
TshepisoSat was one of fourteen cube satellites launched from a 30-metre tall, three-stage rocket. All were successfully released at a height of 600 km above Earth and at 11:13 on the launch date, the first signals were already received from TshepisoSat, amid loud cheers from those watching the live streaming of the launch. According to Francois Visser, principal engineer and student mentor, TshepisoSat is functioning well, circling the Earth almost 15 times per day in a polar orbit.

## Technology platforms for training and research

Van Zyl said the strength of the CubeSat programme lay in its use of cube satellites as technology platforms for practical skills training and applied research. "This approach offers our students a unique learning experience and prepares them to participate in the South African space industry."

Established in 2009, the CubeSat programme has graduated 32 master's students, bringing to 42 the total number of F'SATI alumni at CPUT. The programme has also provided internships to 15 of the graduates as engineers-in-training.

The nano-satellite, designated "ZA-003" in the national register of space assets, follows in the footsteps of micro-satellites Sunsat and SumbandilaSat. For more information, visit [www.cput.ac.za](http://www.cput.ac.za) or join the conversation on Facebook or Twitter: @CPUT #ZACUBE1 #CubeSat #Tshepiso.



▲  
*Chachane Kgothlang receives her prize for naming South Africa's first CubeSat. From the left are Professor Robert van Zyl, Dr Jabu Nukeri, Managing Director of SAASTA, the winner and Humbulani Mudau, Chief Director: Space Science and Technology at DST*



▲  
*In a tribute to the late President Nelson Mandela, TshepisoSAT was reprogrammed to transmit the name 'Madiba' as its callsign for the duration of the country's official mourning period. The signal could be received by radio amateurs and CubeSat groups worldwide*

## CHAPTER 4

### Contributing to a sparkling national innovation system

#### Did you know?

- The high dispersion of light gives the diamond its characteristic “fire” – making it desirable as jewellery.

Source: <http://www.newworldencyclopedia.org/entry/Diamond>





## The NRF geared to engage people with science

*“SAASTA will assist to ensure that the knowledge that is produced through NRF funding is more widely disseminated, shared, understood, and used broadly for the common good.”*

The Science Communication team at SAASTA has been involved in drawing up a plan to integrate Science Engagement more consistently across NRF-funded projects.

The renewal of the NRF's Research and Innovation Support and Advancement (RISA) division during 2012/2013 saw an emphasis placed on the value of communication of research and broader engagement with public audiences. This is requiring a more integrated approach to science communication and engagement across the whole NRF. SAASTA will assist to ensure that the knowledge that is produced through NRF funding is more widely disseminated, shared, understood, and used broadly for the common good.

The national facilities and NRF-funded researchers, particularly emerging researchers, provide a rich pool of experts who can play a crucial role in engaging the public with science, engineering and technology and inspiring learners to pursue careers in science. The integration concept will afford NRF-funded researchers, including established and emerging researchers, the opportunity to be involved in various

aspects of science communication, outreach and awareness.

Emerging researchers are already being invited to SAASTA's various science communication development workshops, critical thinkers' forums and round tables. Grantholders of the NRF's Thuthuka funding instrument participated enthusiastically in science communication workshops at the Universities of Limpopo, Free State and KwaZulu-Natal. The participants represented diverse fields including health sciences, water research, biological sciences, agricultural sciences, educational studies, social science and humanities. The introduction of key concepts in science communication initiated lively discussions around responsible communication, challenges in communicating science and opportunities for communication. The participants also shared their insight into the perceptions around science in their local communities. Feedback from the workshops has been positive and many participants have requested further workshops to delve more deeply into science communication through specific platforms such as radio, TV, popular writing and social media.



▲  
*Joanne Riley, Science Editor in the Science Communication Unit at SAASTA, presenting an 'Introduction to Science Communication Workshop' at the University of Limpopo*

## Matatiele honours its bright young innovators

Glen Makhoba and Peter Theron were honoured by the small community of Matatiele in the Eastern Cape for their outstanding performance during the Learner Focus Week in Energy and the International Science Fair. Peter and Glen presented their project on alternative energy to an audience of enthusiastic guests that included professional scientists, educators, learners and members of the community. The crowd ululated and applauded while the two demonstrated the solar power project that won them numerous prestigious awards and prizes, and earned their school, Focus High School, the award for Best Rural High School.

“We want to nurture these young scientists and unleash their full potential,” said Dr Jabu Nukeri, Managing Director of SAASTA. These budding scientists will be supported through various projects and programmes implemented by the National Research Foundation (NRF) to ensure their ongoing interest and success in science and technology. They were also presented an opportunity to visit the 2014 Beijing Science Festival by SAASTA.

Prof. Malik Maaza, the UNESCO UNISA Africa Chair of Nanoscience/Nanotechnology, will be taking these two young scientists under his wing to mentor them through their innovative science project. Maaza also guaranteed the learners a science excursion to Paris. “I want these learners to advance to a higher science level and I want them to succeed and see for themselves that science opens up ample opportunities in life,” he said.

### Following in the footsteps of science legends

Mr Benny Thobejane of the Department of Energy said that he was impressed with the standard of the project entered by these two learners. He noted that the learners were following in the footsteps of great science legends such as Oliver Tambo, who was also a science graduate from the Eastern Cape.

Dr Nukeri encouraged Matatiele’s learners to follow their purpose and use their science talent for the greater good. “You must maintain the right environment for you to grow and flourish; you might be talented ... but if you don’t find yourself in the right environment you will not grow. Maintain your focus on education and your future will remain bright,” he said.



*Young innovators – Glen Makhoba (left) and Peter Theron*



## CHAPTER 5

### Catalysts for change – the people of SAASTA

At SAASTA you'll find multi-faceted, dedicated people who contribute to the world with an encouraging smile, hard work, an idea – some big, some small – and by supporting others to grow and flourish.



## The science of giving back

So much of our future depends on preparing our children to become well-educated adults. That's why we at SAASTA invest our time and resources to support communities around us, by mentoring and giving through our community outreach programmes. Giving back to our communities has long been an important part of SAASTA's goal to help make the world a better place. As such, we go beyond our core mandate to support programmes that help enrich the lives of people in our communities.

We realised one of our philanthropic goals of encouraging and keeping young future scientist in school during our "Science of Giving Back" crusades in Olievenhoutbosch early in 2014. The learners at Philena Primary School were presented with a wide variety of SAASTA's science educational materials. We hope that these resources will contribute in spreading awareness about the importance of education and also encourage young learners to fall in love with science and mathematics.

The learners were very excited about their new science educational materials. "I love science, one day I want to create my own spaceship," said one of the learners. These bold dreams make us at SAASTA realise that our contributions, however small, are making a significant difference in the lives of the children in our communities.

"For SAASTA this is more than just a mandate; it is a social responsibility that defines our existence," says Dr Jabu Nureki, SAASTA's Managing Director. "Let's do a little more to uplift our communities!"

Together with the National Zoological Gardens of South Africa, SAASTA also hosted an educational science excursion at the Pretoria Zoo for learners from Philena Primary School. The aim of the outing was to provide a rich science learning experience for the learners, as they learned more about wildlife.



*Girl learners display the selection of books their school received*



*Dr Jabu Nureki, MD of SAASTA, is flanked by learners showing off their new sets of "Super silly science games"*



*Learners proudly display their SAASTA goodie bags during an excursion to the National Zoological Gardens of South Africa*

## Taking action, inspiring change

*“What counts in life is not the mere fact that we have lived. It is what difference we have made to the lives of others that will determine the significance of the life we lead.” – Nelson Mandela*

The people of SAASTA celebrated Mandela Day 2013 with the children of Mohau Centre for children affected by, and infected with, HIV/Aids.

In celebration of Madiba’s life and legacy, as well as to honour his life’s work and act to change the world for the better, SAASTA staff members delivered the food to Mohau on 18 July 2013. The SAASTA visitors met and played with the children and received information on the current status of the Centre, which has experienced serious financial challenges this past year.

### What is Mohau?

Mohau is situated in the Kalafong Hospital in Atteridgeville. Babies are sometimes abandoned by their desperate HIV-infected mothers at the Kalafong and Steve Biko Academic Hospitals. Mohau steps in to fill the dire need for a home for these precious children.

The Centre caters for 45 children, with some of the older children living in a satellite house in Kilnerpark. Esther Jaca, manager of Mohau Centre explained that the main reason for the purchase of the satellite house was to reintegrate children back into communities as the National Children’s Act does not allow the Home to accommodate children aged 18 years and older.



◀ SAASTA project officer Lithakazi Lande shares some good times with two of the younger children of Mohau on Mandela Day 2013



▶ SAASTA staff members with children of Mohau Centre



## Science Communication



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Science Awareness

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