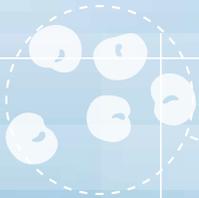




**SAASTA**  
South African Agency for Science  
and Technology Advancement

# SAASTA SCIENCE ADVANCEMENT HIGHLIGHTS REPORT 2011/12



from small seeds mighty baobabs grow



science  
& technology

Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA

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

## from small seeds mighty baobabs grow

Although South Africa has a relatively small science community, it does significant work in the global arena. SAASTA advances this community through:

### planting the seed...

Sparking the interest of the scientists of tomorrow

### nurturing...

Nurturing young scientific minds

### bearing fruit...

Growing the scientific community and sharing knowledge

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# FOREWORD

by Beverley Damonse, Group Executive: Science Advancement of the NRF

Ten years ago, a seed was planted when the Foundation for Education, Science and Technology became part of the National Research Foundation (NRF) and had a change of name and leadership. The new name, the South African Agency for Science and Technology Advancement, which was voted in by our staff, still reflects our organisation's mission to promote the public understanding, appreciation and engagement with science and technology among all South Africans.

This seed grew into a sturdy young sapling over 10 years. Our recurring projects have increased from about 13 in 2004 to at least 29 currently. The reach of these projects is across the country, from the cities to deep rural areas and also include some SADC countries. Examples of the increase in participation in our projects are National Science Week (which SAASTA manages on behalf of the Department of Science and Technology (DST)) which has seen an increase from 72 000 participants in 2004 to 338 625 in 2011. The number of learners who wrote the National Science Olympiad exam increased from about 9000 in 2004 to over 24 000 in 2011.

“ This seed grew into a sturdy young sapling over 10 years. Our recurring projects have increased from about 13 in 2004 to at least 29 currently. The reach of these projects is across the country, from the cities to deep rural areas, and also include some SADC countries. ”

Photo courtesy of Destiny



The organisation's allocation from the MTEF has increased from R11 million in 2004/05 to R16 million in 2011/12, an increase of 48% for the seven-year period and our income from contracts have increased from R12 million in 2004/05 to R47 million in 2011/12, an increase of 284%. We have recently also managed to secure funding for projects from the business sector for, among others, our SET careers role-modelling campaign, and the National and Natural Science Olympiads.

SAASTA has made changes in the country's science advancement system, one being the introduction of an annual award for excellence in science communication, made in collaboration with the National Science and Technology Forum and BHP Billiton. The Science Communication unit initiated the African Science Communication Conference in 2006 and strong links have been built with the media through regular science media round tables and media training for scientists. Links with the research community have been secured through interventions by the Public Understanding of Biotechnology programme, Nanotechnology Public Engagement programme and the Hydrogen South Africa Public Engagement programme – all managed by SAASTA on behalf of the DST.

This growth has not happened in isolation, though. The whole science advancement sector has evolved into a force to be reckoned with. The number of science centres in the country has been growing rapidly; the science festivals have grown in

number from two when we started out to 10 that we are currently supporting in partnership with the DST.

Internationally we have had a large presence in the past year. I accompanied learners to the Beijing Youth Science Creation Competition for the first time; the winners of the SAASTA Schools Debates visited the American Museum of Natural History in New York; and six staff members from South African science centres were sent to Miami to learn more about science awareness projects in the US. I presented a paper at the Association of Science-Technology Centers' annual conference in Baltimore, USA which introduced the audience to science awareness projects in South Africa.

An Institutional Review of the NRF in 2010, which was made available last year commented on SAASTA's unique position in the National System of Innovation. I would like to share this excerpt from the Review Panel's report:

*"The Panel congratulates SAASTA on achieving a high international profile and an enviable reputation as an exceptionally trustworthy Science Advancement Agency [...]. Further, SAASTA has built up a loyal stakeholder base, particularly in the science centre arena and with those scientists who have participated in SAASTA activities and events. We are confident that, with proper resourcing, SAASTA will fulfil a wider mandate than it can presently achieve."*

In the year under review, the post of Group Executive Director for Science Advancement has been established in the NRF. Science advancement has now truly become one of the three pillars of the NRF in line with the organisation's Vision 2015. In this role I have been tasked to work at the policy level assisting with the development of a national strategy for Science, Technology, Engineering, Mathematics and Innovation (STEMI) awareness which will allow the sector to work in a more coordinated and focused manner. The NRF is also committed to driving science advancement across all its business divisions in a more integrated manner.

We may still be some way from being an imposing baobab tree, but science advancement, with SAASTA at the forefront, has definitely grown into a sturdy young tree, on its way to casting its influence over ever larger parts of our society.

“ We may still be some way from being an imposing baobab tree, but science advancement, with SAASTA at the forefront, has definitely grown into a sturdy young tree, on its way to casting its influence over ever larger parts of our society. ”

#### Acknowledgements

I would like to acknowledge the support and encouragement SAASTA received from the NRF management team. My sincere appreciation goes to Dr Albert van Jaarsveld and his Executive for making it possible for SAASTA to thrive through their insightful leadership.

Allow me to thank our partners in the private sector, higher education and government departments, and at national facilities and science centres. They support us and contribute to our success and often serve as our hands-on implementers of programmes. We cannot achieve what we do without you.

I would like to express my sincere appreciation towards the 55 SAASTA staff members for the team spirit, their dedication and many hours of hard work in the past year. I am proud of what we have achieved together and I know that you will build on this hard work. I am leaving you in capable hands.

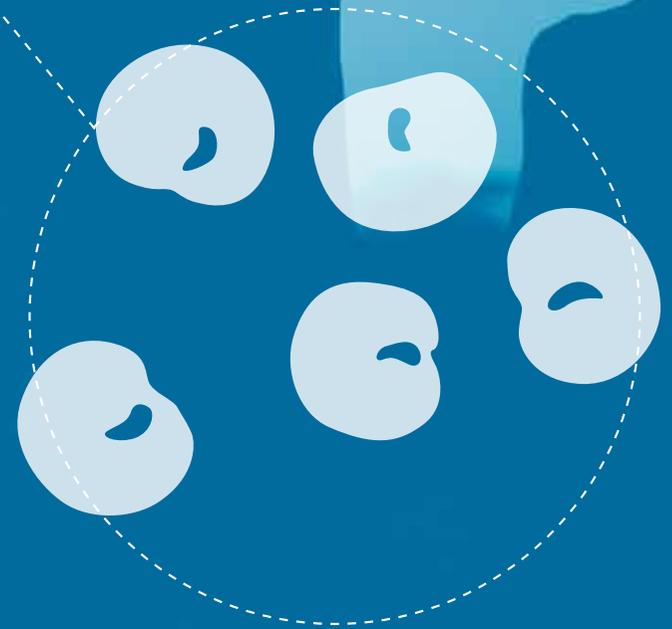
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## PLANTING THE SEED

SAASTA inspires learners to pursue careers in science, engineering and technology.

“ Out of today will come the solution makers of the future who will ensure a better quality of life for us all. ”

- Beverley Damonse, Group Executive:  
Science Advancement of the NRF



# 1.1

## PLANTING THE SEEDS OF GREATNESS IN YOUNG MINDS

Inspire learners. Leave your mark. Lead them. Watch them blossom. One role model has done just this and passionately continues to do so on a daily basis. Onica Phayane, together with her colleagues in SAASTA's Education Unit, has ventured into many different areas of our country with the Role-modelling Campaign, in the quest to show learners that they too can grab the opportunity to follow a career in science, engineering and technology (SET).

"The long hours of travelling and being away from home for extended periods are all worthwhile when you have an experience like I recently had," says Onica. She met a former student at the East London Airport, who told her that she had inspired him to overcome numerous hardships and follow a career in science. He was on his way back to the University of the Witwatersrand where he is currently in his final year of Mechanical Engineering studies.

"I have a passion for this job and if I can succeed in motivating a few students, especially those who live under tough circumstances, to make something of their lives; if I can plant a seed that will put them on the path to success, it will be such a great reward."

"During a role-modelling event in Atteridgeville near Pretoria, I met a former student from the days when I was a physical science teacher. He had recently joined the Makombandlela Organisation as a role model. He told me that it was my dedication, my passion for my subject, and my love for the students that inspired him



Onica Phayane interacting with learners and educators during a presentation at the Quantum Physics Camp

**“ If I can plant a seed that will put them on the path to success, it will be such a great reward. ”**

to be somebody in life," says Onica. The student is now completing his final year BSc Civil Engineering studies at the University of Pretoria. "He says that my strictness and guidance at school have paid off as far as he is concerned."

"The fact that numerous learners I taught have achieved success in their lives makes me proud. I believe one should leave a positive mark behind, like a footprint that cannot be erased, so that others can follow in our footsteps."

The SAASTA Role-modelling Campaign gives learners an opportunity to interact with role models and mentors in SET careers, and has grown in leaps and bounds. In this year alone, the campaign has taken SAASTA staff to Atteridgeville, Khayelitsha, schools in the rural areas around Port Elizabeth and Fort Hare University in the Eastern Cape, as well as Kuruman in the Northern Cape.

## 1.2 SCIENCE CLUBS - THE NEW BUZZWORD AT SCHOOLS

Science clubs create an opportunity for learners to develop skills that cannot be acquired in a formal setting. These clubs also become platforms for learners to socialise and develop problem-solving skills without adult involvement. But most importantly, science clubs stimulate learners' interest in science, engineering and technology.

The Department of Science and Technology therefore decided to fund a science club initiative at 18 Dinaledi

schools, under the guidance of SAASTA. SAASTA's Science Awareness and Education units joined forces to set up the clubs; ensure that they have programmes filled with educational, informative, fun, interactive and challenging activities; and provide them with the necessary resources to get started.

Seventeen clubs were established in August and September 2011, with the first step being to elect a committee to co-ordinate meetings.

As members of the clubs, learners are encouraged to organise speakers from industry, universities, national research facilities and professional/scientific bodies to address them on specific topics. They also organise educational excursions, make posters and demonstrate their favourite experiments.

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*The popularity of science clubs at schools continues to grow at a rapid rate, with learners being more enthusiastic than ever to join clubs where they can learn together, share information, develop their skills and be challenged intellectually.*

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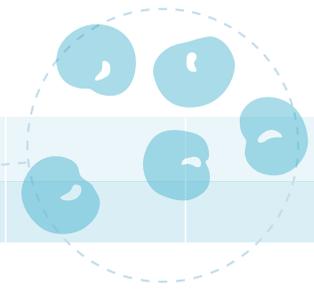


Who said science clubs were boring? These students prove this assumption wrong as they excitedly prepare an experiment to see if they predicted the end result correctly

Each school at which a club is established is teamed up with a nearby science centre that helps to build the club and ensure that its programme runs smoothly. For example, in the Eastern Cape, the Fort School of Science and Technology (FOSST) at the University of Fort Hare donated laptops to the science clubs at schools in their area.

"We received an overwhelming reception at the schools and enthusiastic support from the science centre community," says SAASTA's Thandamanzi Mtsweni. "Some of the science centres, such as FOSST, have taken it upon themselves to provide more support to the schools than required. Learners are very excited about the project as it brings them together to share and debate intellectual issues."

# 1.3 TAKING THE WORLD OF SCIENCE TO SEKHUKHUNE



SAASTA presenter, Nare Selolo, "wows" a group of learners with a science show

Three SAASTA staff members opened the eyes of learners to the wonders of science in a deep rural area of South Africa, a very welcome surprise in an area where science outreach is a scarce occurrence.

Hubert Mathebula, Dira Marule and Nare Selolo travelled to the Sekhukhune area in Limpopo with various exhibits, two inflatable planetaria and equipment to conduct science shows. For three days they talked astronomy and careers in science, and amazed their audiences with the possibilities these fields of study hold.

"These schools are very disadvantaged in terms of science equipment and access to ways of enhancing science learning in the classroom," explains Hubert. "The learners, teachers and education officials welcomed our road show with open arms."

The road show was held at two venues: Mazwi'a Nape Primary School in Mamphokgo and Mang Le Mang Secondary School in Ramogwerane near Tafelkop. The education officer in charge of a number of circuit offices in the area expressed his appreciation for the fact that SAASTA was prepared to reach out to his community, and has asked SAASTA to organise another visit to cater for the remaining circuit offices.

“ The learners, teachers and education officials welcomed our road show with open arms. ”

## 1.4

# SCHOOLS ABUZZ WITH EXCITEMENT ABOUT THE SKA

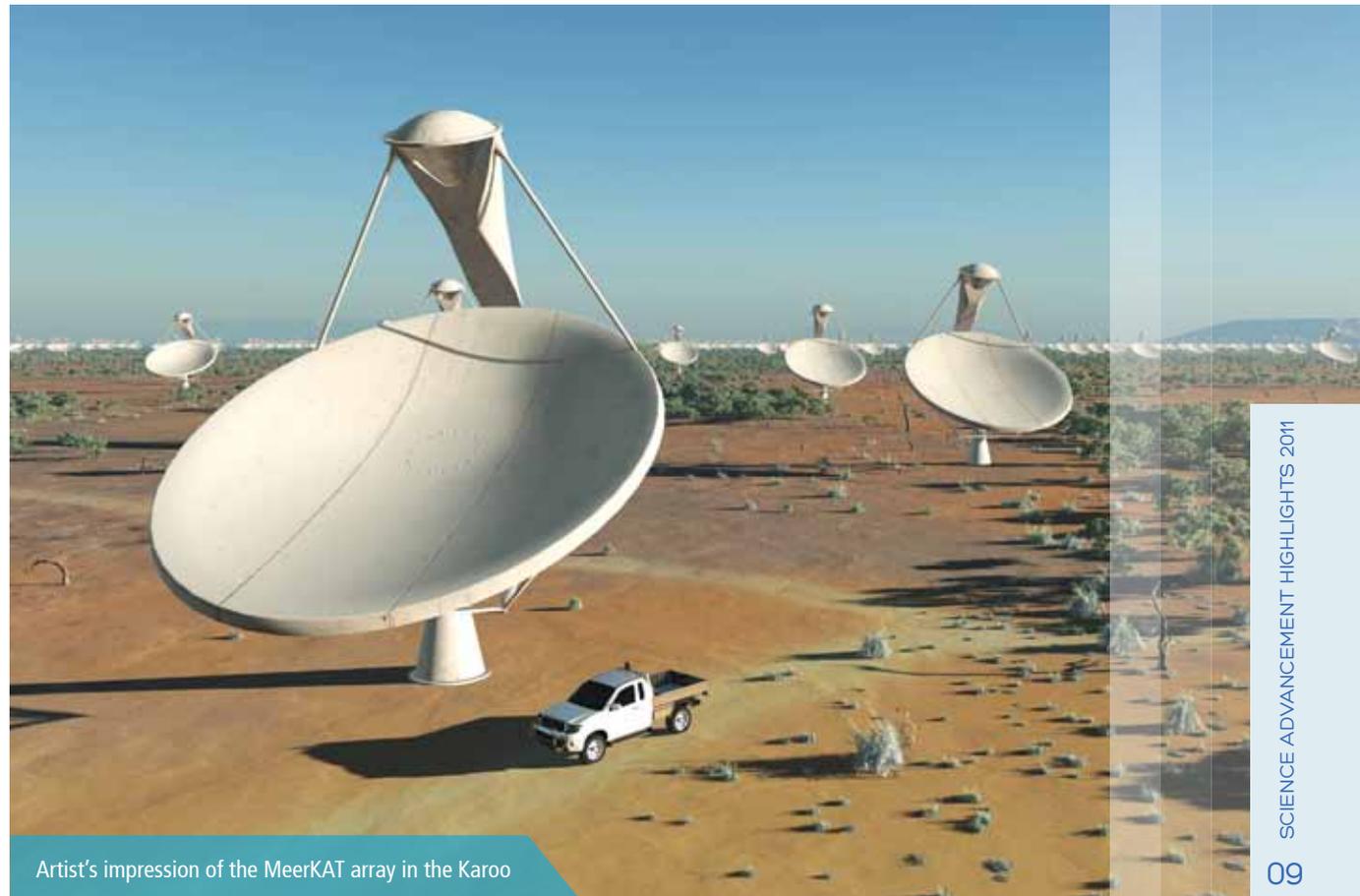
As part of the build-up to the announcement of the awarding of the international Square Kilometre Array (SKA) radio telescope project, of which Africa is one of the bidders, two high profile competitions were launched at school level to create awareness and excitement among pupils. One competition was aimed at learners in grades 4-7 and the other at learners in grades 8-11.

The SKA will be a mega international radio telescope, consisting of about 3 000 dish-shaped antennae spread over an area of over 3 000 km. Africa and Australia-New Zealand are the only two bidders in the running to host the SKA, which will be used to collect radio waves from space.

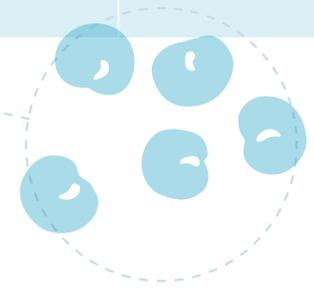
SAASTA distributed 200 000 entry forms to primary schools, high schools, science centres and the Department of Education's provincial and selected district offices around the country.

“ Considerable hype was created in the media for this campaign, including interviews on community radio stations. ”

The excitement among learners and teachers was evident from the high numbers of requests that were received for more application forms.



Artist's impression of the MeerKAT array in the Karoo



Learners had to answer five simple questions about the MeerKat, South Africa's own world-class radio telescope being built in the Karoo. Competition prizes included laptops, printers, digital cameras and tours to the nearest astronomy observatory.

Considerable hype was created in the media for this campaign, including interviews on community radio stations such as Lesedi FM, Ikhwekhwezi FM, Ukhozi FM and Phalafala FM. The buzz among learners and teachers was evident from the high numbers of requests that were received for more application forms. Schools were excited to be part of such a major initiative by the Department of Science and Technology.

"Co-ordinating the SKA competition has made me realise that there is still a lot of work to be done in our country to make South Africans aware of the benefits that the SKA could bring to us," says Anacletta Koloko, Project Co-ordinator at SAASTA's Science Communication Unit.

# 1.5 YOUNG SCIENTISTS EXCEL

Gauteng was abuzz with young science boffins from across South Africa attending the first ever Natural Science Olympiad Award Ceremony for primary school learners on Friday, 28 January. Over 18 000 grade 4-9 learners from all nine provinces participated in the Olympiad, with only the 59 top achievers selected to attend a two-day visit to Gauteng and the awards event.

The competition is managed by SAASTA with CNA as the main sponsor. The aim of the Natural Science Olympiad is to identify and nurture talent in natural science, life science, mathematics and accounting and increase graduate output in careers where there are shortages of skills. The competition also acts as a feeder for SAASTA's National Science Olympiad for grades 10-12, which is now in its 47<sup>th</sup> year.

The Eastern Cape, Free State, Northern Cape and Mpumalanga boasted the ten best performing learners, with Masande Shumane from the Mandela Junior Secondary School in Mhlontlo, Qumbu (Eastern Cape) walking away with the top accolades (100% pass rate). Nine students, including fellow grade 9 learner, Siphamandla Mhlabeni, scooped joint second position with a 98% pass rate.

When asked about her achievements and future plans, the shy Shumane responded that it took hard work and lots of studying to achieve her 100% pass rate. She hopes to become a medical doctor when she finishes school. Her advice to learners who want to participate in the next round is to study hard and stay focused.



The winner of the first ever Natural Science Olympiad for grades 4-9, Masande Shumani from the Mandela Junior Secondary School in the Eastern Cape (centre), with one of her many prizes. With her are four of the other top 10 learners, NP Lumpholo from Tsandzanani Primary School in Mpumalanga, JA de Beer and AJ Oosthuizen from Hoër Volksskool in the Eastern Cape, and S Mhlabeni from Mandela Junior Secondary School in the Eastern Cape

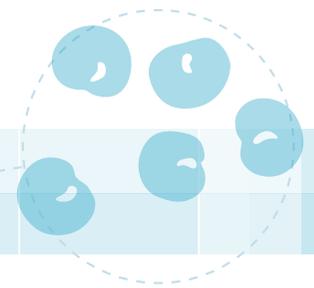
Natural Science Olympiad winner, Masande Shumane wants to become a medical doctor when she finishes school.

The winners walked away with wonderful prizes, including laptops, iPods, digital cameras and book vouchers. The schools with the greatest number of participants and the top performing schools received laboratory equipment and vouchers for library books.

The two-day visit to Gauteng included a visit to the Sci-Bono Discovery Centre, the University of the Witwatersrand Planetarium and the Johannesburg Observatory ahead of the awards ceremony.

## 1.6

# MORE LEARNERS THAN EVER ENTER THE NATIONAL SCIENCE OLYMPIAD



More than 24 000 learners from around southern Africa wrote the National Science Olympiad exam in 2011 – the largest number ever in the 47 years of the competition's existence.

The competition, started in 1964, was initially aimed at promoting physical science among grade 12 learners. In 2005 the competition grew to include grade 10-12 learners from all nine provinces, as well as learners from other Southern African Development Community (SADC) countries such as Namibia, Zimbabwe and Lesotho. The learners can now also choose between Physical Science (Physics and Chemistry) or Life Sciences for their projects.

In 2009 the Harmony Gold Mining Company, the fifth-largest gold producer in the world, entered into a R7.5 million sponsorship agreement with SAASTA for a period of three years to fund the National Science Olympiad and some of its associated activities. The Harmony sponsorship has enabled SAASTA to increase overall participation in the olympiad and reach learners in rural and disadvantaged communities, many for the first time.

Thirty five prizes and awards were handed out to deserving learners and schools in the different competition categories for 2011, including the top performing national school, the top performing SADC school and the top 5 national learners per stream.



At the 47<sup>th</sup> National Science Olympiad awards event were Dr Gansen Pillay, Deputy CEO: Research and Innovation Support and Advancement of the NRF (left), and Graham Briggs, CEO of Harmony Gold (right) with Susan Mahachi, a science educator from Chisipite Senior School in Zimbabwe.

## 1.7

# COMPETITION GETS CHILDREN TALKING ABOUT SCIENCE



Learners debating various scientific topics

Five learners from Hudson Park High School in the Eastern Cape Province showed in convincing style that science is not something only scientists and the government should be talking about. The young team was victorious in the national finals of the SAASTA National School Debates Competition held at the Holiday Inn in Sandton on 26 and 27 August 2011. The competition is funded by SAASTA, the Department of Science and Technology and its related science communication programmes.

The Debates Competition, held since 2008, is not only a fun and challenging intellectual activity, but also provides the ideal platform to disseminate scientific information. It aims to produce a generation of communicators who will be able to help counter the misinformation and misconceptions that often form



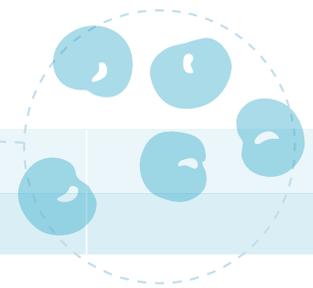
The winning team from Hudson Park High School

part of debates on scientific topics. Debating about science challenges the youth to explore the relevance of science to themselves and their communities. It provides the ideal tool to engage learners on scientific issues and expose them to the scientific research happening on our doorstep.

The first competition was initiated by the South African Schools Debating Board that was responsible for the marketing and selection of the schools, as well as training and general logistics. The Public Understanding of Biotechnology (PUB) programme, a Department of

Science and Technology (DST) initiative, funded the provincial competitions.

The 2011 competition was rolled out by The Collective Genius (TCG) which was awarded a three-year tender for the project. Through its extensive work with schools and debating contests, TCG put together a unique debating style which is currently being used in the competition. What distinguishes this debating style is the fact that a conference paper is compiled for each debate topic through which all teams need to reach consensus on a resolution. Teams sign the conference paper and



declare whether they are for or against the resolution – if all are in agreement, the motion is passed.

Since the competition serves as a science communication tool, the SAASTA team decided that the resolutions be debated using five of the arguments for science communication, namely:

1. Utilitarian – practical use/benefit of a science
2. Economic – monetary implication of a science
3. Socio-cultural – societal dynamics of a science
4. Democratisation of science – ownership, use and institutionalisation of a science
5. Advancement of science – developing science for the better

These arguments have added to the depth of the Debates Competition and have allowed learners to look beyond the normal for/against stances, thus broadening their knowledge and viewpoints.

PUB, the Nanotechnology Public Engagement Programme (NPEP) and Hydrogen South Africa (HySA) have all played a role in the competition, not only with respect to funding, but also with the development of debate topics related to biotechnology, nanotechnology and hydrogen fuel cell technology. Other topics incorporated into the 2011 Debates Competition included palaeontology and biodiversity.

Currently, the competition is divided into three phases. Firstly, workshops take place in each province to provide participating learners and their educators with information on the provincial topic and introduce them to the debating style. Information packs with topic information, fact sheets and other SAASTA resources related to the science are handed out. The next phase is the provincial competitions, the winners of which meet in the finals to determine who will walk away with the title of SAASTA National Debate Champion. The grand prize is international science exposure with a trip to New York City in 2012 where the American Museum of Natural History is preparing a diverse programme with activities ranging from visiting exhibitions, to participating in science and anthropology programmes and a boat ride around New York City to learn more about its geography.

**“ The SAASTA National School Debates Competition aims to establish a generation of communicators who will be able to help counter the misinformation and misconceptions that often form part of debates on scientific topics. ”**

The winning team was announced at an awards dinner on 27 August 2011. Beverley Damonse encouraged the learners, as future leaders of the country, to spread the message of science communication. She said “Out of today will come the solution makers of the future who will ensure a better quality of life for us all.”

The 2012 Debates Competition is already under way, with topics linked to the International Year of Sustainable Energy for All being debated. Provincial workshops have been completed and the provincial rounds are set to take place in May 2012. The national final will take place from 3-4 August 2012 in conjunction with National Science Week.



Learners presented well formulated arguments during the competition

# 2

## NURTURING

SAASTA motivates young scientists and science educators to keep growing in their careers.



I was really left inspired and have some newfound ideas on how to utilise these methods to increase learner and public participation.



- Candice Potgieter, KZN ScienCentre



## 2.1 SCIENCE INFORMATION AT YOUR FINGERTIPS

We are living in a world where technology has ensured that we now literally have information available at our fingertips, and the SAASTA Science Communication Unit has taken advantage of this fact with an innovative touch screen exhibit which promotes its science communication competitions, showcases SAASTA's role in science advancement and provides the reader with reason to communicate with others about science.

The touch screen exhibit is set up in the Didacta Building, the Pretoria offices of SAASTA, and is intended to promote excellence in science communication.

The exhibit profiles three competitions, namely the Young Science Communicators Competition, Southern African Science Lens and the SAASTA-NSTF-BHP Billiton Science Communicator of the Year Award. Each competition is portrayed in detail on the touch screen, along with ideas and examples for possible entries, information on how to enter and examples of previous winning entries.

The new SAASTA touch screen exhibit provides readers with reason to communicate with others about science



Kopano Setlhare, Corporate Communicator and Michelle Joubert, Audience Analyst at SAASTA, showcasing the new touch screen that awaits visitors to the Didacta Building

## 2.2

# SOUTH AFRICANS INSPIRED BY US SCIENCE AWARENESS PROJECTS

In a capacity and knowledge building effort by the Department of Science and Technology, SAASTA sent four South African science centre staff members to Miami, USA, to learn more about how the Americans manage their science awareness projects.



Shadrack Mkansi, Manager of SAASTA's Science Awareness Platform, assists an elementary school learner with a squid dissection in Miami, USA

Science centre staff members from all over South Africa were invited to send SAASTA a proposal on why they should be selected to participate in this exciting event. SAASTA's Science Awareness Manager, Shadrack Mkansi accompanied Candice Potgieter, from the Old Mutual-MTN Science Centre in KwaZulu-Natal, Elize de Jager from the National Zoological Gardens, Irene Schoeman from the University of Pretoria's SciEnza Science Centre and Norman Mthembu from the Giyani Science Centre on their foreign adventure.

Their first stop was the Miami Science Museum where the group was introduced to the museum's Entrepreneurship Career Day for grade 10-12 pupils. The museum works closely with their Department of Education and the Miami University, to run an exciting programme that ensures an 89% pass rate of high school graduates, who are then accepted to local universities via a scholarship and funding model.

"This programme is really worth replicating, especially since there are many similarities in socio-economic problems that exist between the disadvantaged populations of Miami and South Africa," says Candice.

On the second day, the group held talks on collaborations with the Dean of Education and the

President of the University of Miami, as well as Professor Mike Gaines who is involved in multiple informal and formal learning interventions.

One of the tour highlights was the discussion on the role social media can play in the classroom, and its impact on educators, facilitators and learners. The University of Miami recently introduced Twitter, Facebook and Wikispace in the classroom, allowing students to interact on a real time basis with their classmates and teachers.

"This type of participation is a really creative outlet and can be used as a tool for monitoring and evaluation. I was really left inspired and have some newfound ideas on how to utilise these methods to increase learner and public participation at The KZN ScienCentre," says Candice.

The tour also included a visit to the Miami Zoo where the group studied worksheets developed by Grade R educators, which are used to teach young children about different animals and the ecosystem.

The group returned to South Africa, inspired by what they had seen and ready to implement some of what they have learnt in their own science centres.

**“ I was really left inspired and have some newfound ideas on how to utilise (new media) methods to increase learner and public participation. ”**

## 2.3

# EDUCATION, OUTREACH AND AWARENESS FOR SPACE ENTHUSIASTS

From 3 to 7 October 2011, Cape Town was overrun by space boffins as the 62<sup>nd</sup> International Astronautical Congress (IAC2011) graced African shores for the first time. The initiative was organised by the International Astronautical Federation (IAF), together with the International Academy of Astronautics and the International Institute of Space Law. The National Research Foundation (NRF) was the local host, while SAASTA managed the focus areas dealing with education, outreach and awareness.

Through funding from the Department of Science and Technology, SAASTA managed to send 45 educators to attend the IAC2011 events. The excited group attended a two-day workshop by the Space Education and Outreach Committee entitled the IAF Educator Professional Development Programme 2011, geared towards educators at primary and secondary levels. The workshop was facilitated by graduate students sponsored by the Canadian Space Agency (CSA) and the USA's National Aeronautics and Space Administration (NASA).

PP Mashalaba, Deputy Chief Education Specialist, Mathematics, Science and Technology Education (MSTE) Co-ordination (Eastern Cape Department of Education) and one of the SAASTA delegates, saw the workshop as a wonderful opportunity to interact and share knowledge with various people from different countries. "We got more than we expected, all that is left for us to do is implement what we have learnt," he said.



Lizna Retief (left) and co-delegate Loudeau Groenewaldt (right) with NASA astronaut Leland Melvin at the IAF Educator Professional Development Programme



This opportunity has rekindled my enthusiasm for this subject. Learners often ask about outer space and planets and I will enjoy sharing the knowledge I have gained.



Lizna Retief, a science educator from Ermelo Hoërskool was also very inspired by the workshop. "This opportunity has rekindled my enthusiasm for this subject. Learners often ask about outer space and planets and I will enjoy sharing the knowledge I have gained."

During IAC2011, the Space Education Board, together with NASA, gave grade 8 learners from the Western Cape the chance to learn more about their role in future space activities. Learners were invited into the "student zone" to discover the role they can play in the future of space technology and exploration.

IAC2011 also played host to the annual Space Generation Congress (SGC), hosted by the Space Generation Advisory Council (SGAC) – a non-governmental organisation with permanent observer status in the United Nations Committee on the Peaceful Uses of Outer Space, and a network of thousands of international university students and young professionals, mainly between the ages of 18 and 35.

SAASTA sponsored the SGC outreach working group session and its related implementations, aimed at advancing space science outreach attempts in South Africa. The topic for the outreach session was "Space

for developing regions: The African case study", and the group examined both the benefits of space for developing countries, as well as the steps necessary to implement space technologies in these societies. Bradford Inngs and Kevin Govender were content expert and speaker respectively, and some 16 participants attended the session. A position paper was presented to the congress for submission to the UN for comment.

Outreach activities included public lectures, rocket-building exercises, astronomy-related activities and a simulated lunar rover uplink through which members of the public are able to control a rover in a simulated lunar environment on the other side of the world.

As part of the negotiations for the sponsorship, SAASTA asked SGC delegates to participate in outreach activities during their stay in South Africa. These included public lectures, rocket-building exercises, astronomy-related activities such as stargazing, and a simulated lunar rover uplink through which members of the public are able to control a rover in a simulated lunar environment on the other side of the world.

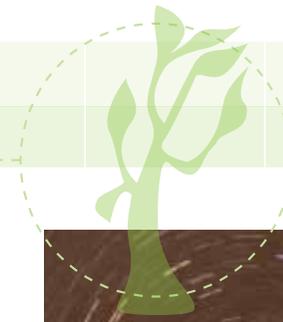


Photo: Chris Oosthuizen, runner-up in the Space Science Category of the 2011 SA Science Lens Competition.

## 2.4

# NANOTECHNOLOGY MORE ACCESSIBLE TO EDUCATORS AND LEARNERS



Nanotechnology has just become more accessible to learners and educators alike, with the publishing of two manuals on the subject for grades 10-12 on the website of the Department of Science and Technology's Nanotechnology Public Engagement Programme (NPEP), which is administered by SAASTA.

These educational resources contain lesson plans, rubric evaluation and data sheets aligned to the current academic curriculum. The focus is on four recommended learning areas, namely the use of nanotechnology in water, medicine, energy and mining.

“ Ultimately, the objective is to inspire debate and critical thinking around nanotechnology in the classroom. ”

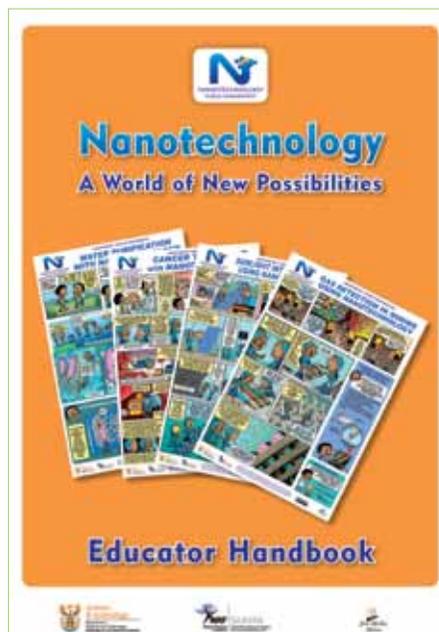
A diverse range of specialists, including education curriculum specialists, nanotechnologists from the various sub-fields of the discipline and experienced science education writers were called in to assist with this project. The project grant holders, Dr Colleen Aldous from the University of KwaZulu-Natal and freelance science communicator Helen Malherbe, both of whom have extensive prior experience in developing similar resources, were major contributors to the material contained in the manuals.

NPEP also commissioned Jive Media Africa to develop public engagement material on nanoscience and nanotechnology for Grade 7-9 learners. The result was a set of four posters and learner/educator resources to accompany each poster, all of which are available on the NPEP website.

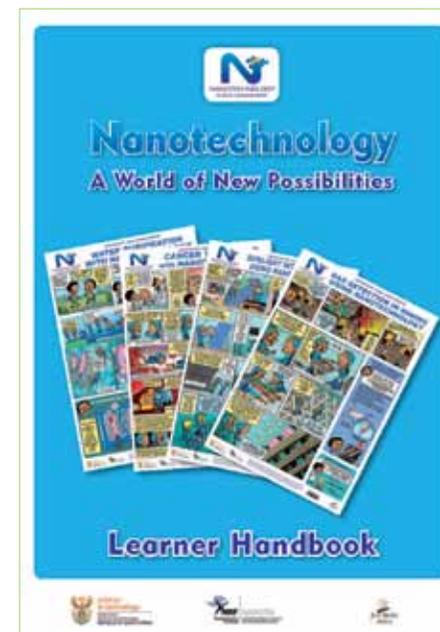
A total of 2 000 educator handbooks, 10 000 learner workbooks and 8 000 posters were printed to date.

“These resources will be distributed firstly to under-privileged schools, then to other schools and at science festivals around the country,” says Mthuthuzeli Zamxaka, SAASTA Project Co-ordinator.

Ultimately, the objective is to inspire debate and critical thinking around nanotechnology in the classroom.



Educators now have access to extensive information on nanotechnology with material linked to the curriculum



The learner handbook aims to introduce learners to the use of nanotechnology in water, medicine, energy and mining



# 3

## BEARING FRUIT

SAASTA not only encourages communication between scientists, but also between scientists and the general public.



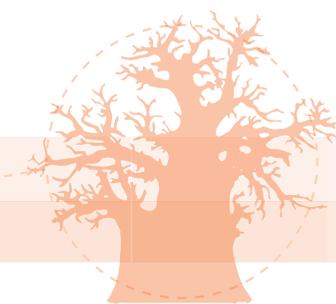
We have to learn to sell our country as a science and technology powerhouse. Our researchers provide value for money, even though we have a small science system, and we should promote our cost efficient system.



- Imraan Patel, Deputy Director-General of the Department of Science and Technology



# 3.1 UNLOCKING NANOTECHNOLOGY'S POTENTIAL



The Nanotechnology Public Engagement Programme (NPEP) took centre stage at Lab Africa 2011, the largest laboratory technology show on the African continent. The exhibition hosted in excess of 80 exhibitors, including significant international representation by companies from Germany, India, the United Kingdom and Australia with displays featuring literally thousands of products and services.

The DST/NRF/SAASTA/NPEP hosted a conference on nanotechnology, which included a number of special lectures.

The conference created awareness about developments in nanotechnology and served as a platform to get local industry involved in this cutting-edge field of science.



Professor Jan Neethling of the Nelson Mandela Metropolitan University telling his audience at Lab Africa 2011 about the latest developments in nanotechnology research



The DST/NRF/SAASTA/NPEP exhibit at Lab Africa 2011

“ The conference created awareness about developments in nanotechnology and served as a platform to get local industry involved in this cutting-edge field of science. ”

## 3.2

# BIOTECHNOLOGY CHANGES THE FUTURE OF FARMING



As part of the Agricultural Research Council's (ARC) involvement in the Water Efficient Maize for Africa (WEMA) project, SAASTA's Public Understanding of Biotechnology (PUB) team met with farmers in the Western Cape to discuss the pros and cons of biotechnology and allow the farmers to make informed decisions.

In late November 2011, the PUB team journeyed to the remote town of Ebenhaezer, a few kilometres from Lutzville in the Western Cape. The team was invited to profile the PUB programme at the ARC's public engagement campaign. The ARC works with a number of African and international companies on the WEMA project, which includes countries like Kenya, Mozambique, Tanzania and Uganda.

Droughts are one of the main natural disasters faced by African farmers producing viable crops and maize. When droughts affect a country's yield, they also affect food prices, security and supply, which ultimately lead to famine, starvation and death. As a result, producing drought-tolerant crops using genetic engineering has become a key focus area of agricultural research worldwide.

The ARC is currently conducting research into creating these genetically modified (GM) maize crops and soon the resulting seeds will be planted on ARC-owned land in Lutzville. The idea has been met with opposition from the Ebenhaezer and Lutzville communities and local anti-GM groups. The public engagement campaign

was therefore initiated to create awareness and understanding of the science that underpins the concept of genetic modification.

**“ This will enable them to understand science in a more practical way and as a result make informed decisions that can work to their advantage. ”**

A total of 66 farmers and members of the community attended the event to listen to talks by the ARC scientists and Biosafety SA. PUB also solicited the help of BIANKE BARNARD, who has completed her Master's Degree in Biotechnology, to explain the concept of genetic modification to the farmers in their home languages. The local farmers responded positively to the talks, which in turn led to lively discussion and debate.

The PUB Programme takes a neutral stance on the science of biotechnology and provides all the relevant information on the matter. People often fear the unknown, which is why PUB strives to enlighten and empower through knowledge-sharing. This enables the general public to understand science in a more practical way and as a result make informed decisions that can work to their advantage.

### 3.3

# SCIENTISTS DEBATE HUMAN GENOMES



SAASTA's Public Understanding of Biotechnology (PUB) Programme, in collaboration with the National Science and Technology Forum, hosted its fourth Critical Thinkers' Session during the review period. The focus was on the human genome, the associated Southern African Human Genome Project (SAHGP), as well as human genome research and legislation in South Africa.

Under the guidance of Professor Michael Pepper from the University of Pretoria, a SAHGP member, an interesting programme was put together with a host of specialists from various fields addressing and attending the event.

**Increased knowledge on the human genome could have a reciprocal effect on skills, technology and medical applications.**

The discussion on human genome legislation in South Africa, led by Professor Melodie Slabbert from UNISA, was an eye-opener to many delegates. There is currently no proper legislation in place pertaining to this research activity, which leads to unscrupulous doctors taking advantage of individuals who are desperate for medical solutions.

Professor Michele Ramsay from the University of the Witwatersrand, another prominent scientist working on the SAHGP, discussed the unique human genome situation in South Africa. Certain populations and race groups are more pre-disposed to some diseases than others, and understanding their different genomes and the diseases to which they are prone, could have both short- and long-term health benefits.

According to Professor Louise Warnich from the University of Stellenbosch, increased genome knowledge could have a reciprocal effect on skills, technology and medical applications. In addition, it could lead to improved legislation on genetics research and an overall advancement of science and public health.

Anthony Egan from the South African Jesuit Institute delved into the issue of bridging the communication gap between the science behind the SAHGP and the different religions and cultures in South Africa. He highlighted the diversity and the complexity of religious, ethnic and moral beliefs when looking at sequencing the human genome, as well as social issues such as abortion, genetic discrimination, genetic predetermination of criminals and cloning.

The Critical Thinker's Session raised several social and medical issues and led to intense discussion and debate. One thing was clear: South Africa desperately needs secure legislation around human genome research to protect the country's economic and genetic interests.



## 3.5 REVEALING THE WORLD OF THE VERY SMALL

After two years of intense planning and working on the project, the tour of the National Centre for Nano-structured Materials at the CSIR was launched on Thursday, 23 February 2012. This tour, the first of its kind, was developed to create awareness of nanotechnology by providing students, educators, the media, industry, as well as the general public with the opportunity to visit the facilities and learn more about the science and resources available.

The Nanotechnology Public Engagement Programme (NPEP), which SAASTA manages on behalf of the Department of Science and Technology, developed the tour in partnership with the DST/CSIR Centre and Jive Media, a KwaZulu-Natal-based company that specialises in science communication.

The tour allows visitors to enjoy special presentations, fact sheets and equipment that will introduce them

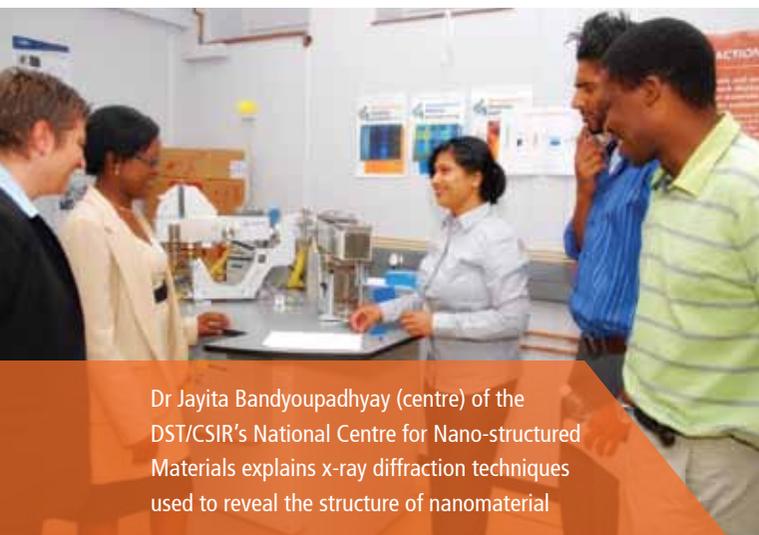
to nanoscience and nanotechnology and its potential applications in our day-to-day lives. It also aims to encourage industry to be involved in the development of nanotechnology and take the lead in nanotechnology innovation.

**“ This tour was developed to create awareness of nanotechnology by providing students, educators, the media, industry, as well as the general public with the opportunity to visit the facilities and learn more about the science and resources available. ”**

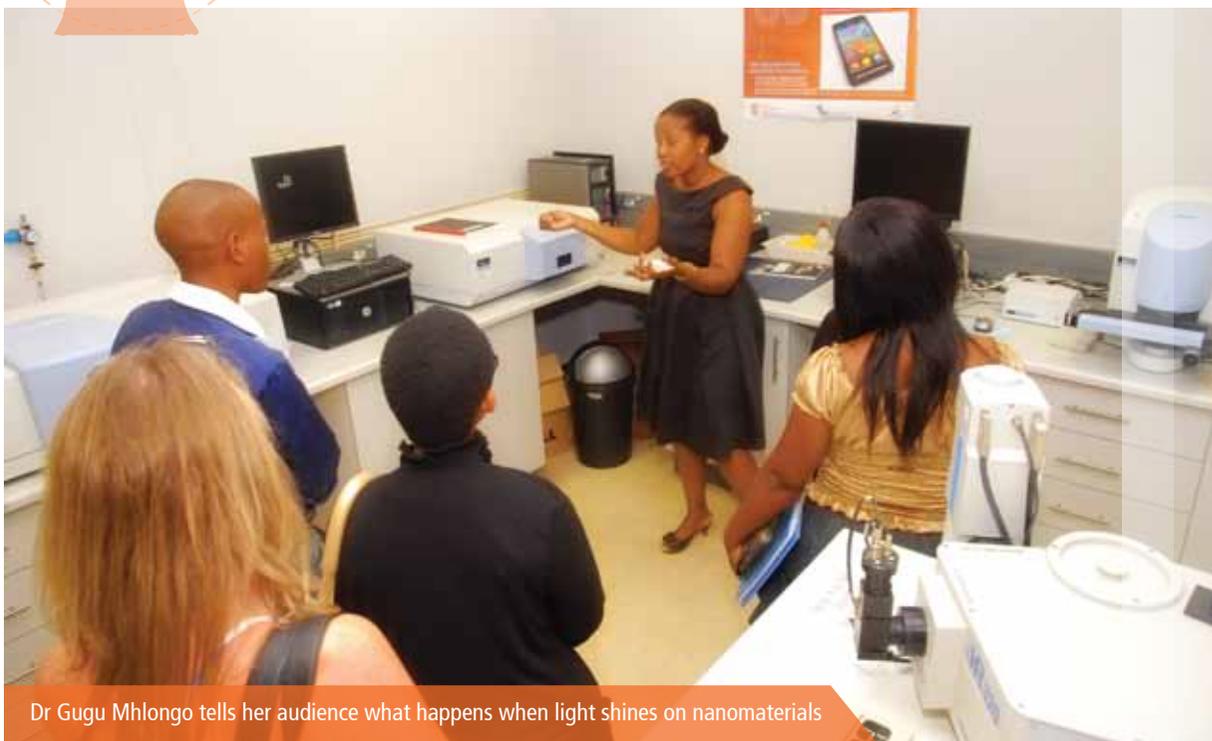


At the launch of the Nanotechnology Tour were, from the left, Dr Suprakas Sinha Ray, Director of the DST/CSIR National Centre for Nano-structured Materials at the CSIR; Lorenzo Raynard, Manager of SAASTA's Science Communication Unit; Imraan Patel, Deputy Director-General of the Department of Science and Technology; Robert Inglis of Jive Media; Beverley Damonse, formerly Executive Director of SAASTA and Mthuthuzeli Zamxaka, Project Manager at the Nanotechnology for Public Engagement Programme

“The role of science communication is to open science up to society to enable more informed debate and discussion on science matters that are central to our lives,” says Beverley Damonse, then SAASTA Executive Director. “With the support of the Department of Science and Technology, we are proud to bring science communication to the fore as an intrinsic part of this emerging science. This tour will open the communication channels for dialogue between scientists, the public and industry partners so that the science is not practiced in an ivory tower,” she continued.



Dr Jayita Bandyopadhyay (centre) of the DST/CSIR's National Centre for Nano-structured Materials explains x-ray diffraction techniques used to reveal the structure of nanomaterial



Dr Gugu Mhlongo tells her audience what happens when light shines on nanomaterials



Charity Maepa explains how the Transmission Electron Microscope can open up a new world to nanotechnologists

Also speaking at the launch was Imraan Patel, Deputy Director-General of the Department of Science and Technology. "We have to learn to sell our country as a science and technology powerhouse," he said. "Our researchers provide value for money, even though we have a small science system," he said, "and we should promote our cost efficient system." He added that scientists should be aware of the basic problems that South Africans are faced with daily and communicate

what science can provide in the form of solutions.

The tour includes information hand-outs, a 10-minute audio-visual presentation on nanoscience and nanotechnology, as well as access to nine stations in the Centre where participants can learn more from the scientists themselves about the various nanostructures created at the facility, and the devices that are used to look at them.

# 3.4 BEAUTY IS IN THE EYE OF THE SCIENTIST

In an effort to promote science awareness, SAASTA's 2011 Southern African Science Lens Competition (SASL) encouraged science enthusiasts to share their view of the world through the medium of photography. The striking, spectacular and intriguing photographs offered a glance through the camera lens and provided a creative opportunity for communicating science.

The four main categories of the competition were Science in Action, Science as Art, Science Close-up and the International Year of Chemistry. Entries were judged by a panel of scientists, photographers and designers.

Professor Bruce Cairncross won the Science and Art category for his image titled *Arid landscape*, which depicts the striking patterns of red-brown iron oxides that precipitate from Namibian sandstone. Chris Oosthuizen and his image titled *Aurora australis*, won the Science in Action category. His beautiful image captures the scientific phenomenon of the Southern Lights framed in a setting that inspires awe and wonderment.



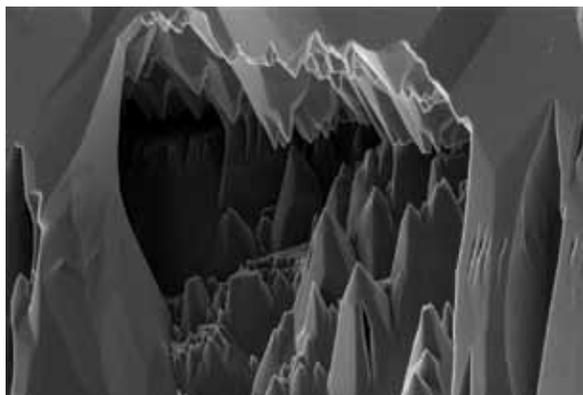
*Arid landscape* by Professor Bruce Cairncross,  
Science as Art category winner



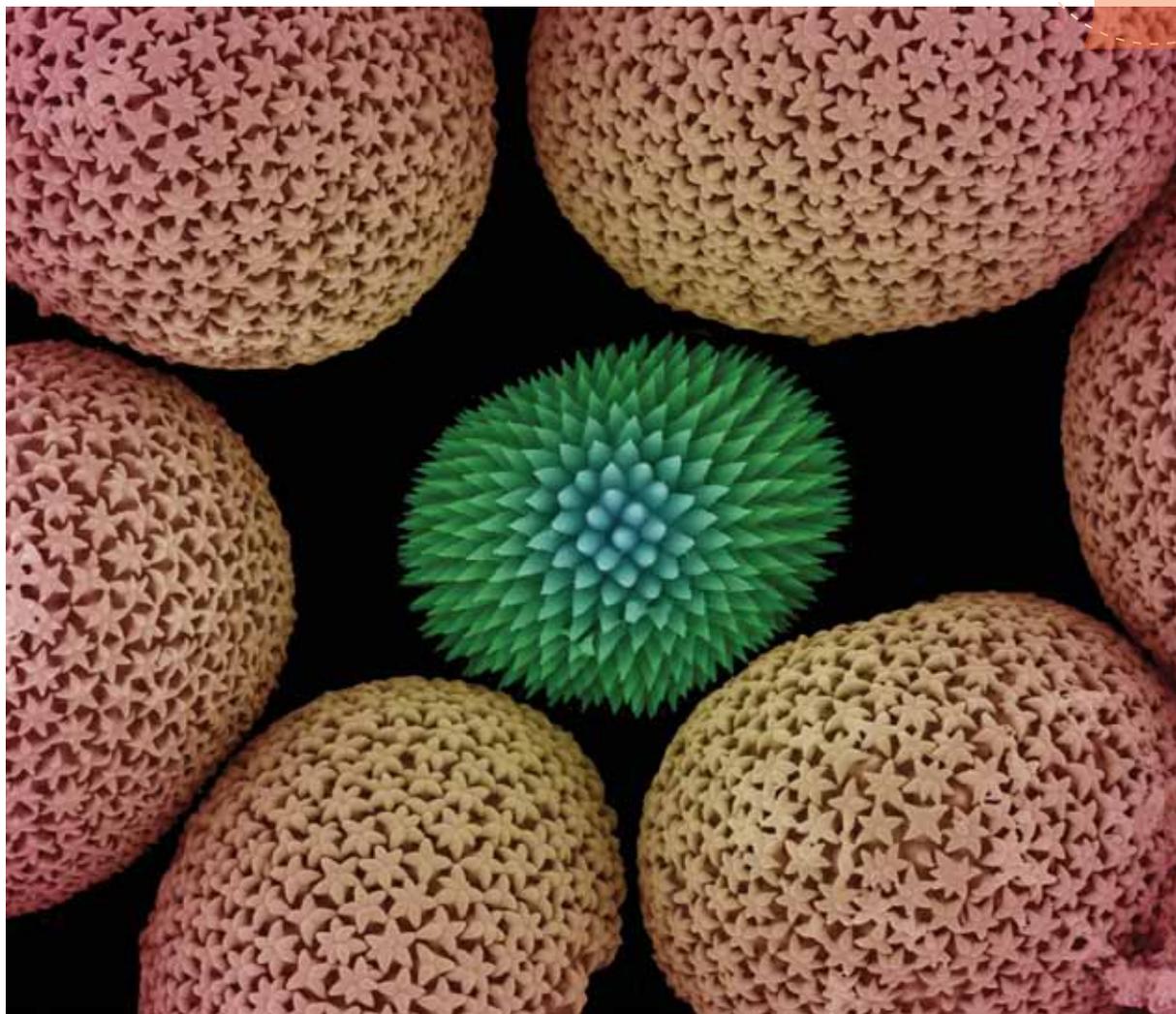
*Aurora australis* by Chris Oosthuizen, Science in Action  
category winner



The Science Close-ups category was won by Miranda Waldron, whose image of *Sponges galore*, shows a close-up of the structural elements of sea sponge, detailing the fantastic and beautiful architecture of the tiny species. The winning image in the International Year of Chemistry category was *Cave of wonders* by Heinrich Badenhorst. The photograph was taken with a scanning electron microscope to a magnification of over 30 000 times. It depicts a natural graphite cave, formed when impurities in the graphite crystal burn in oxygen and cause the formation of stalagmites and stalactites.



*Cave of wonders* by Heinrich Badenhorst,  
International Year of Chemistry category winner



*Sponges galore* by Miranda Waldron, Science Close-up category winner

# THE PEOPLE OF SAASTA 2011



Dr Beverley Damonse, Executive Director. Appointed Group Executive: Science Advancement, NRF from 1 November 2011



Morongwa Motiane, Information and Resources Officer and Personal Assistant



Ina Roos, Corporate Editor



Kopano Sethlare, Corporate Communicator

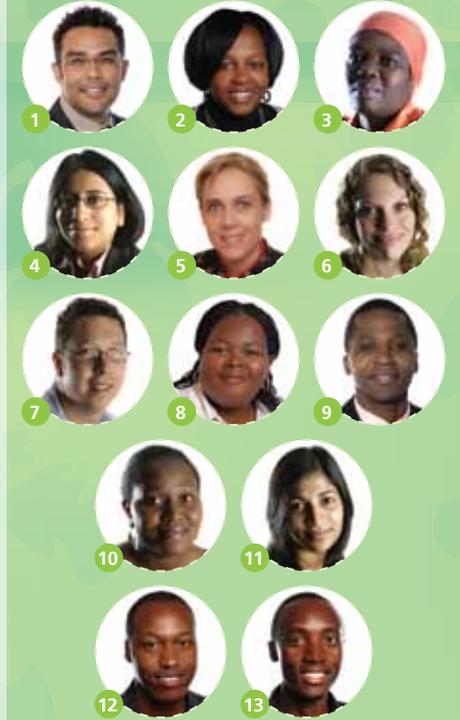
## Science Education

- 1 Dr Jabu Nukeri, Manager. Appointed Managing Director, SAASTA from 1 May 2012
- 2 Lindie Brazer, Administrative Assistant
- 3 Ntuthu Mdloti, Administrative Officer
- 4 Debbie van der Westhuizen, Administrative Assistant
- 5 Erna Taljaard, Project Coordinator
- 6 James Tlhabane, Project Coordinator
- 7 Onica Phayane, Project Coordinator
- 8 Aaron Nkosi, Project Officer
- 9 Lithakazi Lande, Project Officer
- 10 Faith Shabangu, HR Assistant
- 11 Sello Rasodi, Project Officer
- 12 Vhutshilo Nekhwalivha, Project Officer



## Science Communication

- 1 Lorenzo Raynard, Manager
- 2 Refilwe Mogami, Unit Administrator
- 3 Martha Mokgoko, PUB Administrator
- 4 Dr Manjusha Joseph Sunil, Biotechnology Science Communicator
- 5 Joanne Riley, Science Editor
- 6 Michelle Joubert, Audience Analyst
- 7 Nick de la Hunt, ICT Coordinator
- 8 Anacletta Koloko, Project Coordinator
- 9 Mthuthuzeli Zamxaka, Project Coordinator
- 10 Maphefo Chauke, Project Officer
- 11 Melissa Govender, Project Officer
- 12 Sizwe Khoza, DST Intern
- 13 Tony Dhlamini, DST Intern



## Finance and Administration

- 1 Lucy Coetsee, Manager
- 2 Jolien Martins, Receptionist
- 3 Mari-Louise Snyman, Financial Controller
- 4 Marlize Delpert, Financial Controller
- 5 Medupe Moeng, Administrative Controller
- 6 Tshidi Seboni, Financial Officer
- 7 Mariet Tolmay, Financial Officer
- 8 Jacob Manchidi, Registry
- 9 Hendrick Modjadji, Building and Maintenance
- 10 Michael Monametsi, Driver and Messenger



## Science Awareness Platform

- 1 Shadrack Mkansi, Manager
- 2 Vanessa Naidoo, Senior Administration Officer
- 3 Bafedile Kgwadi, Project Coordinator
- 4 Hubert Mathebula, Project Coordinator
- 5 Thandamzani Mtsweni, Project Coordinator
- 6 Nomathemba Mdlalose, Project Officer
- 7 Mncedisi Mthetwa, DST Intern
- 8 Kholofelo Mohlabo, Volunteer
- 9 Edwin Ramonnye, Maintenance
- 10 Wilson Kompleni, Messenger
- 11 Mavis Mohumotjie, General Assistant and Receptionist





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SAASTA

South African Agency for Science  
and Technology Advancement

This outreach report was produced by the South African Agency For Science And Technology Advancement (SAASTA).

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