

**OPENING OF THE FOURTH ANNUAL POSTGRADUATE  
BURSARY CONFERENCE ON 02 DECEMBER 2009 AT  
THE WALLENBERG CENTRE, STELLENBOSCH  
INSTITUTE FOR ADVANCED STUDY**

Our hosts, the University of Stellenbosch

The Vice Rector , Professor van Zyl

NRF President, Dr Van Jaarsveld

NRF and South African SKA Project Office  
management

Students

Ladies and Gentlemen

Imagine the capacity to view from here in Africa, events that took place long before the Earth came into being. That is what the SKA radio telescope will enable us to do – to see back to a time just after the Big Bang signalled the birth of our universe; a time some billions of years prior to the formation of the planet on which we live.

The SKA is going to a truly global initiative, with partnerships in the Southern and Northern hemispheres. South Africa – long involved with pioneering developments in the fascinating science of astronomy – has proposed that this major array be built in the African continent. The SKA forms a significant part

of the drive to establish Africa as an emerging global home for astronomy. Africa is without any doubt the most ideal site for such an instrument. And to back this effort, South Africa is driving two preparatory initiatives. One is the introduction of legislation that will protect the SKA investments. The other is our decision to build what is essentially a scaled-down version of the SKA – a proof-of-concept instrument – the MeerKAT telescope.

The MeerKAT effort is developing and testing some of the technologies which are at the very cutting-edge of what will be needed for the SKA; and thus the MeerKAT will itself be one of the world's largest and most powerful radio telescopes, and will remain so for a long time to come. The MeerKAT, together with the equally impressive and world class SALT optical telescope located in Sutherland, and the HESS Gamma Ray telescope in Namibia, will together provide African and international scientists with very powerful tools to examine our Universe.

Most importantly, the excitement and challenges of astronomy and space science are already attracting some of our best students into studying science and engineering.

The South African SKA Project's Human Capital Development Programme has a deliberate focus on capacity development, and this has been recognised internationally as unique and highly successful. Heads of astronomy departments and radio astronomy engineering facilities around the world have commented on the high quality of research being done by the postgraduate students and academic staff working with the MeerKAT team. A big thank you must go to all the students, postdoctoral fellows and the supervisors for boosting South Africa's reputation internationally.

The Department of Science and Technology, continues to solicit a collective South African Government support. We greatly admire the South African SKA capacity development initiative. In addition to other considerations, it is aligned with the Department's goal of increasing the number of MSc and PhD qualifications in South Africa. A PhD is seen as a particularly significant qualification because individuals with a PhD tend to be those who can innovate and who can teach others how to innovate. And we see innovation as the key to moving from a resource-based economy to a knowledge-based economy. In this context, my Department gratefully acknowledges the students and academics here present, for their hard work in helping to achieve both their own goals and that of their country.

Not the least of the achievements of this programme has been its use in positively utilising South Africa's Astronomy Geographic Advantage to excite and attract young people into science and engineering. Science, Engineering and Technology capacity - or SET capacity - is scarce throughout the world, and the South African SKA project team is definitely working in the right direction to address this shortage in the African continent. Individuals who are attracted to the SET sector tend to be people who thrive on intellectual challenges. In the absence of such an environment the chances are that the right calibre of person will not be sufficiently excited to get involved. That is why the DST is committed to supporting exciting SET projects - like the SKA and the Sumbandila Satellite- to ensure the promotion of a stimulating and vibrant SET sector; one that will attract our brightest and best young people to study further.

If we succeed in bringing the SKA to Africa, it will be a major catalyst for development in the continent. Antenna stations are to be located in a further eight African countries, both neighbouring and distant. The SKA will become one of the largest research and ICT facilities in the world, consolidating Africa as a major hub in world astronomy. The best scientists and engineers will want to work in Africa and the infrastructure

will provide opportunities for scientists and engineers from African countries to work on cutting-edge research, and to collaborate in joint projects with the best universities in the world.

For these reasons, the SKA represents an unprecedented opportunity for the development of very high level scientific and technological skills and expertise in Africa; skills which will be crucial in the next ten to twenty years in the global knowledge economy. These technologies include very fast grid computing; very fast data transport; data storage; wireless engineering; digital electronics; image processing; and software development, amongst others. Hosting the SKA would make Africa a world centre of physics, astronomy and high tech engineering thus dramatically strengthening Africa's capacity to innovate in harmony with its industries and universities.

The quality of the research work being done by the students and postdoctoral fellows associated with the engineering and science of the SKA and MeerKAT is of a very high standard, and has been recognised as such by top international astronomers and radio astronomy engineers attending the 2006 to 2008 postgraduate bursary conferences. The message is loud and clear: South Africa is developing a formidable team of highly skilled radio astronomers and engineers.

Professor Mike Jones of Oxford University said “Your work is comparable with that of top students in other countries, and even with the work of professional astronomers.”

Professor Arnold van Ardenne of ASTRON noted that “Your deliberate and concentrated capacity development is unique in the world, and is clearly working”.

Professor Peter Wilkinson, a pioneer of the SKA Project and Associate Director at Jodrell Bank Observatory in the UK, remarked that he was "amazingly impressed" by what South Africa has achieved with its SKA effort over the last few years. And further said "With this quality of people, science and engineering work, you have taken a major step forward in a very short time and achieved a remarkable turnaround in radio astronomy in South Africa to put the country on the international stage,"

Prof Steve Rawlings, Head of Department of Astrophysics Oxford remarked that He is really awfully impressed by what he has seen at this conference and how things have exploded on the science and engineering side in such a short time scale. South Africa is doing all the right things for the SKA!

Dr. Clive Dickinson, staff scientist at CALTECH says “South Africa is the future of radio astronomy.”

These are warm and encouraging remarks, and there are other, equally positive spin-offs, which includes or should include:

- Increased collaboration between industry and universities in South Africa and the rest of the world around the engineering challenges of the MeerKAT.
- Collaboration between the SKA team and local universities with the universities of Oxford, Cambridge, Manchester, Berkeley and Caltech, and the National Radio Astronomy Observatories of the USA, and with institutions in the Netherlands, Sweden, Germany, Italy, Canada and Australia.

In 2004 the DST, through the NRF, and the South African SKA Project Office initiated a human capital development programme. From the outset, the programme set itself the goal of increasing the number of highly-skilled scientists and engineers able to support the SKA and MeerKAT during the design, construction and operational phases of the telescopes. To date the programme has provided bursaries and grants awarded to:

- 11 postdoctoral fellows

- 83 PhD and MSc students
- 43 undergraduate and honours students
- 6 interns
- 5 trainee technicians
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- Thirty seven postgraduate bursaries have been awarded to students from other African countries.
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- And the movement of students and postdoctoral fellows supported by the South African SKA Human Capital Development Programme has been tracked to understand where the students move to after completing their studies supported by the programme and to understand if the programme is fulfilling its objectives of developing and retaining capacity in radio astronomy.

In a further effort to expand the human capital development programme in August this year, as part of the South African Research Chairs Initiative, I was pleased to announce the creation of five Research Chairs dedicated to research relating to the SKA and its exciting challenges. The creation of these Chairs represents an investment of R240 million over fifteen years by the DST, and is a further effort to attract even more of our young people and young people from other countries in Africa into science and engineering. The Research Chairs will

be allocated to South African universities through an open and competitive process and they will then be expected to find internationally recognised and dynamic researchers to take up these posts and to build world class research and teaching at the universities. This in turn will strengthen our bid to host the Square Kilometre Array and demonstrates once again the South African Government's commitment and dedication to bringing one of the world's most exciting science and technology projects to Africa.

As a further consideration the South African SKA Project is engaging with the primary and high schools in Carnarvon and Williston, the towns closest to the South African SKA site. The project has established good relations with the principals, teachers, learners and the general community and has facilitated numerous astronomy outreach events and educator workshops focused on the teaching of astronomy. The project has also facilitated funding, by the Universal Service and Access Agency of South Africa, of a Cyberlab at Carnarvon High School. The Cyberlab is equipped with 45 brand new desk top computers, two printers, a server and a laptop for the teacher. Generous donations from Microsoft and Learnthings have provided all the PC's with MS Office packages, antivirus software and curriculum-based education content. The project has also facilitated the recruitment of two additional maths and

science teachers at Carnarvon High School further boosting the quality of maths and science education at the school.

The SA SKA Project wishes to support the communities in Carnarvon, Williston and vicinity to further develop the mathematics and science education available to their learners so that they acquire the skills and knowledge needed to take advantage of the opportunities available through the project's bursary programmes and other opportunities in the country. In order to ensure a level of success the project has recognized that interventions must be available at all developmental levels from early childhood through to high school and that the interventions must be customized according the unique requirements of the communities.

As you can see we are taking a whole lot of positive momentum with us into the final stages of this important bid.

It's all exciting, exhilarating stuff, and I know that not one of you here can wait a moment longer to come to grips with these mysteries, so it gives me particular pleasure to declare this Postgraduate Bursary Conference, open.

Thank you and good luck.

