

National Science and Technology Forum



awards 2006/7

Photographer: André Botha
Golden islands on a
carbon substrate

Top scientists honoured: NSTF awards

Emperors Palace, Kempton Park, 23 May 2007

Outstanding contributions towards scientific, engineering and technological (SET) development were acknowledged at the ninth National Science and Technology Forum (NSTF) Awards gala dinner on 23 May 2007. Presenting the awards, was Minister of Science & Technology, Mosibudi Mangena.

The NSTF Awards event is unique in that it affords recognition to all practising scientists, engineers and technologists across the system of innovation, including not only researchers, but also individuals who have contributed to the promotion of SET in other ways; companies and organisations; individuals who have played a valuable mentorship role for young researchers; and Science communicators. At the Awards Gala Dinner, teachers, schools and students who excelled in the Mathematics, Science and Technology (MST) fields were also acknowledged. The NSTF Awards are a collaborative effort by the broader SET community in South Africa, made possible by the participation and sponsorship of a variety of stakeholders.

Said **chief adjudicator, Denis Hunt:** *"Today's research – Tomorrow's innovation emphasises the contribution that dedicated individuals, either working by themselves or as part of an organisation, can make in improving the quality of life for current and future generations. Our winners demonstrate that South African SET is on a par with global standards, but more importantly, that great innovation is only really achievable through people. We can be proud of the NSTF Awards winners and nominees."*

The winner in the category 'Individual Over a lifetime' was Prof Doug S Butterworth of the Department of Mathematics and Applied Maths, University of Cape Town. Through the development of mathematical and statistical techniques, Prof Butterworth has provided the scientific basis for decision making in the management of marine resources. His research has had two major foci: the development of methods to assess the size of fish, invertebrate and marine mammal populations and techniques to determine the trade-off between risk and return associated with different management policies. He has for many years advised nationally on the development of various stock assessment approaches in the demersal, pelagic, rock lobster, abalone, tuna and squid sectors and internationally on whale, tuna and Antarctic krill stock assessment in the Antarctic and other areas of the world. His contributions have been characterised by independence and tenacity as an articulate leader, demonstrating scientific expertise, innovation and integrity.



The award for 'Research and its outputs over the last five years or less' went to Prof Tshilidzi Marwala, Professor of Systems and Control Engineering, School of Electrical and Information Engineering, University of the Witwatersrand. Prof Marwala is involved in the development of a set of intelligent computer tools that are used to monitor bridges, buildings, as well as industrial processes and more recently in the medical field such as the detection of epilepsy. His work on modelling, based on probabilistic theory, has extended to stock markets using computational intelligence and condition monitoring in mechanical and aerospace structures, and formulation of ISO standards on condition monitoring; highway bridges in the USA and railways in the UK. Recent applications of the techniques include the development of a computer tool to predict inter-state conflict. Prof Marwala's extensively published and cited work has attracted attention from numerous prestigious centres.



The winner of the award for 'Activities other than research and its outputs over the last five years or less' was Dr Paul Bartels, Head of the Wildlife Biological Resource Centre/Biobank SA, NRF. Dr Bartels has established a regional Biological Resource Bank which grew from just an idea more than 10 years ago, to an NGO (Endangered Wildlife Trust) working group, to a project recognised by government as a national asset and finally a position under the NRF. The focus expanded from a single discipline of reproduction, to include a multi-disciplinary and multi-institutional platform promoting research into biodiversity conservation and biotechnology development, and linking biodiversity conservation, livestock production and people through promoting and securing the use of biomaterials in southern Africa, and finally institutionalising the management and security of components of southern Africa's genetic resources for the benefit of society.



Winetech, Stellenbosch received the award for 'Corporate organisation over the last ten years'. When a business case for transformation and deregulation of the wine industry was put forward in 1999 it was realised that for the industry to be globally competitive it would require a sound technology base and that South Africa was then far behind. Winetech was established as a vehicle for facilitating and financing research in the industry and transferring resultant technology to its stakeholders. This unique partnership between industry, government and providers of education and research was thus formed as a "virtual" organisation with only three employees, but sustained by the interaction of more than 150 representatives from the stakeholders on a voluntary basis, to manage the programmes through a system of committees. Winetech has earned an enviable reputation demonstrated by the growth achieved by the industry.



In the category 'SMME over the last three years', Hazleton Pumps (SA) (Pty) Ltd, Centurion, walked away with the trophy. In the stringent mining environment in South Africa, Hazleton Pumps SA (Pty) Ltd has, with the help of its customers, continued to develop new pumps in the Hippo Slurry Pump Range which compete successfully against the best in the world. The major contributions achieved have been the development and manufacture of the largest flameproof submersible pump range; the largest vertical spindle froth slurry pumps; the largest stainless steel submersible pump range; and the largest high voltage slurry submersible pump absorbing 575 kW at 6.6 kV with the capabilities of pumping 1200 l/s. The organisation strives to develop new pump products to enable it to better serve its markets and is at present developing an 11 kV submersible pump able to deliver in excess of 2000 l/s.



The award for 'Not-for-Profit organisation over the last two years' was won by the Paraffin Safety Association of SA, Cape Town. In the process towards improving the system of delivery and usage of paraffin in South Africa, the Safer System Project has contributed to the advancement of SET through its Safe Design Competitions and other initiatives. Simultaneously the project has been able to progress to the legislative development to secure these innovations through standardisation. The impact of the project is expected to be widespread through improvements to the quality of life of paraffin users and their communities, some of which are already apparent, and by drastically reducing the financial burden on the state and releasing capital for other purposes.



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Prof Annemarie Hattingh, Associate Professor and Director of the Centre for Mathematics, Science and Technology Education, University of Pretoria, was the female recipient of the Eskom-sponsored 'Researcher, for Research Capacity Development over the last 5-10 years.' Prof Hattingh has dedicated her life to creating intellectual and financial opportunities for the development of PhD research and supervision capacities in the MST field. She has a broad pan-African view of scholarship and has provided leadership in the African-Norwegian research network in this regard, set to continue. In a relatively short academic career, she has undertaken cutting edge research work by, for example, studying exceptional science teaching competence, and the practices of educators working in difficult learning environments. Her work provides new understanding and practice-based theories for the professional development and pre-service education of science educators. The Quality Assurance Framework that she developed for the African Virtual University sets new benchmarks for the delivery of qualifications in MST education on the African continent.



Prof Sunil Dutt Maharaj of the School of Mathematical Sciences, University of KwaZulu-Natal, Durban & Director of Astrophysics and Cosmology Research Unit, was the male recipient of the Eskom-sponsored 'Researcher, for Research Capacity Development over the last 5-10 years.' Prof Maharaj has studied and researched the workings of gravitational forces within the context provided by Einstein's theory of general relativity. This work has included inhomogeneous cosmological models, symmetries of the gravitational field, exact solutions of the Einstein field equations, the structure of ultra-compact stars and the evolution of radiating matter. To support and pursue this work, he has assembled a group of post-graduate students, post-doctoral fellows and researchers in this research unit, unique in South Africa in linking mathematicians, physicists and astronomers in bridging abstract mathematics, with physical theories, by focusing on observations in space.



The NRF-sponsored TW Kambule Award for the 'Senior Black Female Researcher over the last 5 to 10 years' went to Dr Saloshna Vandeyar, Senior Lecturer, Faculty of Education, University of Pretoria. Exceptional patterns, evident of desegregation in schools i.e. schools formerly white which have experienced significant levels of black enrolment without significant levels of white flight, have been studied in depth using multimedia research techniques. Some experience has been that a tipping point is reached at which white students abandon the school en masse. However, there are significant numbers of schools where this has not happened. The objective of her research is to find out what can be learned from these schools, particularly where the experience has been positive. A further study on best practices in school environments in the areas of integration, capturing the dynamic environment of such schools, has attracted considerable interest.



The NRF-sponsored TW Kambule Award for the 'Senior Black Male Researcher over the last 5 to 10 years' went to Prof Pragasen Pillay, Professor of Electrical Engineering, University of Cape Town. Research on renewable energy technology has enjoyed little attention and the Department of Science and Technology (DST) has signalled a need for greater attention in this area. Professor Pillay's research programme responds to this by advancing renewable energy technology and energy efficiency and developing the much needed human resource capacity in this area. A comprehensive range of research projects is being undertaken which includes work on wind machines in collaboration with overseas researchers, a composite flywheel as a low-cost energy storage device and other more conventional projects in the machines environment, an area in which he has published extensively on subjects such as core loss formulation and prediction and pole modulation for traction purposes.



The NRF-sponsored TW Kambule Award for 'Distinguished Young Black Female Researcher over the last 2 to 5 years' was awarded to Dr Heidi Segal – Lecturer and Senior Medical Scientist, Division of Medical Microbiology, University of Cape Town. Antibiotic treatment is the mainstay of modern curative medicine, yet is increasingly complicated by the emergence of antibiotic resistance, most recently highlighted in the outbreak of multi-drug resistant TB in South Africa and where the HIV/AIDS epidemic has contributed to the resurgence of clinical pathogens that were formerly treatable with routine antibiotic therapy. Dr Segal's work, carried out over the past ten years and with a network of collaborators, has contributed to the identification of pathogenic bacteria with novel or unique drug susceptibility profiles and to understanding the various and complex mechanisms for resistance in common pathogens causing disease in humans.



The NRF-sponsored TW Kambule Award for 'Distinguished Young Black Male Researcher over the last 2 to 5 years' went to Prof Thokozani Majazi, Associate Professor, Chemical Engineering, University of Pretoria. Research on optimising batch processes using fuzzy logic in Prof Majazi's department has been applied to the solution of problems in batch plants which have flexibility and adaptability compared to their continuous counterparts. This has been the basis for the development of a continuous-time mathematical formulation for scheduling. A further development has been a process integration technique for systems involving heat and mass transfer with the objective of minimising or eliminating effluent in chemical industries. The efficiency of the chemical processing models built was tested for three real life situations, and has shown a 50% reduction in freshwater demand and wastewater generation in an agrochemical facility, more than 10% wastewater reduction in a multinational pharmaceuticals facility and more than 40% water savings in an explosives plant.



The winner of the 'SAASTA Science Communicator Award over the last 5 years' was Dr George N Claassen – Senior Deputy Editor of Die Burger, Cape Town. Dr Claassen was the driving force behind the establishment of the module on Science and Technology (S&T) journalism at the University of Stellenbosch and extending this to a master's programme. This pioneering work represents an extension of his highly regarded career as a science journalist, particularly at Die Burger where he has provided S&T journalism focused on his daily column and science desk at the paper over the last four years. He is used for talks on the radio and interviews and is internationally renowned as an ombudsman. He has had extensive experience abroad and his material is widely used in overseas periodicals.

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