NRF AWARDS 2015

Ensuring research excellence within a transformed research workforce and a sustainable environment, for the benefit of the present and future generations of South Africans

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

NRF
National Research Foundation

Welcome

It is a pleasure for me, as the Acting Chief Executive Officer of the National Research Foundation, to welcome our esteemed guests to the 2015 NRF Awards ceremony.

On this occasion, the NRF recognises and rewards research excellence in the different stages of the Human Capacity Development Excellence Pipeline, Science Engagement, Transformation and Lifetime Achievement. We are glad that you are able to share in the celebration of the achievements of our eminent scholars.

My personal congratulations to everyone receiving due acknowledgement this evening for their valuable inputs to the national science landscape. We salute your achievements!

Also, a special word of appreciation to everyone who contributed to making this event possible: institutions that submitted nominations for the various award categories; peer reviewers and panel committee members for the evaluation of various applications; the Department of Science and Technology for their support; and the eager involvement of members of the research community.

Dr Beverley Damonse
Acting Chief Executive Officer

Human Capacity Development Excellence Pipeline

As an agency of Government, the NRF translates the science and technology strategies and policies of government into initiatives that support research, researchers, and the provision of world-class research infrastructure. The Research and Innovation Support and Advancement (RISA) Division of the NRF, as the grant-making programme, ensures that the country has appropriate qualified human resources and the necessary high-level infrastructure to produce knowledge that is globally competitive and that can transform the socio-economic landscape of South Africa.

RISA's contribution to the National System of Innovation (NSI) can best be described through the Human Capacity Development Excellence Pipeline. The success of the Pipeline lies in the fact that it caters for researchers from an undergraduate level, and continues to provide support, stimulate competitiveness and the pursuit of excellence as the career of a researcher unfolds. It is aimed at increasing the number of next generation researchers; improving student throughput; developing emerging researchers; and growing the number of established researchers.

By investing in the top tier of the Excellence Pipeline, the entire system benefits from improved student throughput in each category through establishing adequate supervisory capacity and the prospect of research career support. The NRF therefore recognises that established researchers not only contribute to the generation of knowledge, but also provide supervision and training to next generation and emerging researchers, thereby ensuring that the Pipeline has a self-sustaining continuity.

NRF Evaluation and Rating System

The NRF Rating System was created from the principle that the key element in contributing to quality research with international standing lies in the quality of the researchers. It underscores the value of globally competitive research and stimulates healthy competition in South Africa's research arena. It identifies researchers who count among the leaders in their fields of expertise and gives recognition to those who constantly produce high quality research outputs, thereby being recognised as established researchers.

RESEARCH EXCELLENCE AWARD FOR NEXT GENERATION RESEARCHERS

The NRF provides funding to postgraduate students in order to address the skills shortages in the fields of science, engineering and technology and humanities and social sciences. One of the aims is to increase the chances of retaining suitably qualified young scientists, and thus increasing the pool of researchers and knowledge workers in the NSI.

This award recognises outstanding academic performance by final year doctoral students.

Ms Nasreen Peer

Department of Zoology, Nelson Mandela Metropolitan University

Ms Peer's research interest is focussed on the diversity and ecology of true crabs in the St. Lucia Estuary. On the basis of outstanding performance, she was granted an upgrade from MSc to a PhD degree. Her PhD thesis is centred on environmental change in the iSimangaliso Wetland Park, and the influence this has on crab dynamics.

Mr Ethan Newman

Department of Botany and Zoology, Stellenbosch University

Mr Newman sees a role for himself as both scientist and educator in the field of evolutionary ecology, particularly in the field of pollination biology. During his Master's degree, later upgraded to a PhD, he received a National Geographic Young Explorers Grant.

RESEARCH EXCELLENCE AWARD FOR EARLY CAREER / EMERGING RESEARCHERS

The Thuthuka Programme is central to the NRF's human capital development strategy in so far as it relates to advancing the equity and redress agenda within the research sphere. Operating in the ever evolving higher education landscape, the Programme aims to develop human capital and to improve the research capacities of designated researchers, ultimately redressing historical imbalances.

This award recognises Thuthuka grantholders for exceptional research performance.

Dr Nuraan Davids

Department of Education Policy Studies, Stellenbosch University

Dr Davids' interests include democratic citizenship education, Islamic education and ethics in education, with a particular focus on educational policy, gender, theory and practice, management and leadership inquiry. She has received the Rector's Award for General Performance, and the Mellon Academic Staff Development Award.

Dr Ntobeko Ntusi

Department of Medicine, University of Cape Town

With cardiovascular disease a leading cause of death throughout the world, Dr Ntusi's research focuses on achieving a better understanding of pathophysiology and treatment of heart disease common among Africans. He was named one of 200 Most Influential Young South Africans by the *Mail and Guardian* in 2011.

P-RATED RESEARCHERS

A "P" rating is assigned to researchers (normally under 35 years of age), who have held a doctorate or equivalent qualification for less than five years at the time of application. These researchers are considered likely to become future international leaders in their respective fields, on the basis of exceptional potential demonstrated in research performance and output during doctoral and/or early post-doctoral careers.

Dr Reinette Biggs

Centre for Studies in Complexity,

Stellenbosch University

With her interest set in the field of environmental sciences, Dr Biggs's dream is to draw on the skills and networks she has gained abroad to develop a world-leading social-ecological research centre in South Africa that has a tangible impact on environmental policy and practice. Her core research focuses on developing an interactive online database and synthesis of social-ecological regime shifts and their impacts on ecosystem services, which has provided for a wide variety of collaborations with international scientists and research centres, and has been used in several policy processes. Some of her many achievements include the Council for Scientific and Industrial Research (CSIR) *Most Promising Young Researcher Award* for showing exceptional promise of developing into a world leader in the field of society and environment, and a Fulbright Fellowship (one of only fifteen in South Africa) to pursue PhD studies in the USA.

AWARD FOR EXCELLENCE IN SCIENCE ENGAGEMENT

The Science Engagement Programme of the NRF aims to advance science, engineering and technology through science communication, science education and science awareness at all levels of society.

This award recognises individuals in the research community, at South African higher education institutions and science councils, who make outstanding contributions to public engagement with science over a sustained period. The aim of the award is to encourage academics, while working in their fields, to also contribute substantially and be committed to enhancing the public's awareness and engagement with science, technology and innovation.

Professor Marcus Byrne

School of Animal, Plant and Environmental Sciences,

University of the Witwatersrand

With a series of lectures with titles such as "*Talking Crap: Using Dung Beetles as Agents of Discovery*", and a TED talk entitled "*Dance of the Dung Beetle*", you would be right in thinking that Professor Byrne has made insects, particularly African dung beetles, the focus of his research. However, bringing his science to the public in an engaging and captivating way that is easy to understand, is another passion of his.

> *It is the duty of we as scientists to not only report our findings to the scientific community, but also to translate our discoveries into captivating stories, which allow us to share our work with the general public, who after all, pay and support us.*

A-RATED RESEARCHERS

A-rated researchers are unequivocally recognised by their peers as leading international scholars in their respective fields, for the high quality and impact of recent research outputs. Acquiring an NRF rating generates considerable acknowledgement and respect for the individual researchers as well as their institutions.

A-RATED FOR THE 1ST TIME

Professor Quarraisha Abdool Karim
Centre for the AIDS Programme of Research in South Africa (CAPRISA), University of KwaZulu-Natal
Professor Abdool Karim is one of the world's foremost medical and scientific authorities in the field of HIV and AIDS research, with ground-breaking contributions in understanding the evolution and impact of the HIV epidemic, while also fighting for the rights of those affected by HIV and AIDS.

Professor Romeel Davé
Department of Physics, University of the Western Cape
Professor Davé is a leading researcher in numerical studies of galaxy evolution, the intergalactic medium, large-scale structure, reionization and cosmology. Writing the world's first parallel hydrodynamics code for galaxy formation is one of his many career highlights.

Professor Andries Engelbrecht
Department of Computer Science, University of Pretoria
Professor Engelbrecht's research interests include swarm intelligence, evolutionary computation, neural networks, artificial immune systems, and the application of these paradigms to data mining, games, bioinformatics, finance, and difficult optimization problems.

Professor Maxim Finkelstein
Department of Mathematical Statistics and Actuarial Sciences, University of the Free State
Professor Finkelstein has dedicated a significant portion of his research career to the Mathematical Reliability Theory and its application to models of repair and maintenance, point processes, structural reliability, and stochastics in demography. His work has shed considerable light on vast areas in his field.

Professor Jacques Grosset
KwaZulu-Natal Research Institute for Tuberculosis and HIV (K-RITH), University of KwaZulu-Natal
With tuberculosis infecting over 1,7 billion people, causing disease in over 8 million people, and killing more than 2 million people every year, Professor Grosset has directed much of his research at finding ways in which to improve treatment and prevent the development of drug-resistant strains of the disease.

Professor Christopher Henshilwood
Evolutionary Studies Institute, University of the Witwatersrand
Researching the Middle and Later Stone Age in Africa, Professor Henshilwood's ground-breaking discoveries have challenged accepted paradigms regarding the evolution of human behaviour, and imposed new standards on the analysis of prehistoric material culture. He has excavated more than 20 archaeological sites in southern Africa.

Professor Bruce Rubidge
Evolutionary Studies Institute, University of the Witwatersrand
Palaeontological research of fossils and sedimentary rocks in the Karoo sedimentary basin forms the foundation for Professor Rubidge's work. He played a key role in establishing the Institute for Human Evolution, and then the Evolutionary Studies Institute at Wits, particularly the Palaeoscience Centre's world-class fossil facilities.

A-RATED RESEARCHERS

Dr Roger Smith

Natural History Department, Iziko Museums of South Africa

Dr Smith's research focuses on the combination of field-generated geological and palaeontological data into reconstructions of ancient ecosystems. He has found, logged, excavated and accessioned more than 5 000 vertebrate fossils in the Karoo into South African national collections.

Professor Andrew Taylor

Department of Astronomy, University of Cape Town and University of the Western Cape

Professor Taylor's research over the past several years has focussed on the pathway to the Square Kilometre Array science, in the area of cosmic magnetic field – primarily through exploration and the interpretation of the polarisation properties of the galaxy and of extragalactic radio sources.

Professor Yves van de Peer

Department of Genetics, University of Pretoria

Professor Van de Peer's research into gene prediction and genome annotation; comparative and evolutionary genomics; and systems biology, has placed him at the forefront of his field. He has a special interest in the evolution of genes and genomes, with an emphasis on gene and genome duplications.

Professor Melanie Walker

Centre for Research on Higher Education and Development, University of the Free State

Professor Walker's research focuses on human development, understood as the expansion of people's human capabilities in and through higher education for more equality and justice. Her work considers dis/advantage, well-being and agency, addressing the complex challenges of inequalities.

Professor Patricia Whitelock

Astronomer, South African Astronomical Observatory

Professor Whitelock's research into stellar evolution, galactic structure and the stellar content of Local Group galaxies, has helped to broaden the frontier of astronomy worldwide. She has taken special interest in how pulsating red giants can be used as distance indicators, helping to establish the distances of various galaxies, and to study the structure of our own.

Professor Robert Wilkinson

Institute of Infectious Disease and Molecular Medicine, University of Cape Town

Professor Wilkinson has established an enviable track record in the study of infectious diseases, particularly Tuberculosis (Mycobacterium tuberculosis) and Human Immunodeficiency Virus (HIV). He has shed considerable light in areas such as TB-HIV drug interaction and early detection of treatment response.

A-RATED FOR THE 2ND TIME

Professor Eric Bateman

Department of Medicine, University of Cape Town

Professor Bateman's major research interests include the pharmacology and management of asthma, chronic obstructive airways disease, community-based interventions to improve the care of patients with chronic respiratory diseases, and tuberculosis. He was the founder of the University of Cape Town Lung Institute.

Professor Jill Farrant

Department of Molecular and Cell Biology, University of Cape Town

Broadening the understanding of the mechanisms of desiccation tolerance in plant tissues has been the overarching theme of Professor Farrant's work. Her research aims are to biotechnologically improve drought tolerance in crop species of relevance to food security in Africa.

A-RATED RESEARCHERS

Professor Michael Henning

Department of Mathematics, University of Johannesburg

Professor Henning's research interests are in the field of combinatorics. He is regarded a world leader in graph theory and the concept of domination theory in graphs. He has obtained several important results on total domination in graphs that appear very difficult to obtain, using purely graph theoretic techniques.

Professor Isabel Hofmeyr

School of Literature, Language and Media, University of the Witwatersrand

Professor Hofmeyr's work has been concerned with African literature and its global role, and she has established herself as a leading scholar of world literature. Over the last decade, she has turned her attention to the Indian Ocean world, a strategic arena in which Africa's futures will be shaped.

Professor Steven Johnson

School of Life Sciences, University of KwaZulu-Natal

Professor Johnson's research has opened up new areas of understanding, particularly of pollination systems and floral specialisation in the South African flora, and how plants attract and utilise pollinators such as insects, birds and rodents, as well as of the reproductive ecology of invasive plant species.

Professor Rajend Mesthrie

School of African and Gender Studies, Anthropology and Linguistics, University of Cape Town

Professor Mesthrie's work focuses on the significance of sociolinguistics in understanding heritage, culture and social change in a multilingual society. Sociolinguistics offers tools to examine interactions between different languages, and the degree of social change occurring in society.

Professor Mark Solms

Department of Psychology, University of Cape Town

Professor Solms has dedicated his career to understanding the phenomena of dreams within the field of neuroscience. He is best known for his discovery of the forebrain mechanisms of dreaming, and integration of psychoanalytic theories and methods with those of modern neuroscience.

Professor Johannes van Oort

Department of Church History and Church Policy, University of Pretoria

As theologian, Professor Van Oort is best known for his study of the gnostic world religion of Mani; the Gospel of Judas; and the church father Augustine, which have proved important for many Africans, as Augustine's African descent has provided a sense of identification, illuminating a deeper understanding of this field.

A-RATED FOR THE 3RD TIME

Professor Daya Reddy

Department of Mathematics and Applied Mathematics, University of Cape Town

Professor Reddy's research has broadly focused on the realm of mathematical modelling and analysis, as well as the development of approximations and associated algorithms. He has made significant contributions to the theory of plasticity and the development of stable and convergent mixed finite element methods.

Professor Charles van Onselen

Centre for the Advancement of Scholarship, University of Pretoria

Professor Van Onselen's career has taken him across a wide swathe of social science, from his early research into labour repressive structures in the southern African mining industry, to more recent work on the nature of social banditry in the region which looks at crime as politics.

A-RATED RESEARCHERS

A-RATED FOR THE 4TH TIME

Professor William Bond

Chief Scientist, South African Environmental Observation Network (SAEON)

Professor Bond is an ecologist with broad interests in the processes most strongly influencing vegetation change in the past and present, including fire, vertebrate herbivory, atmospheric CO_2 and climate change. He was recently ranked by Thomson Reuters as one of the top 3 200 most influential researchers around the globe.

Professor Richard Cowling

Department of Botany, Nelson Mandela Metropolitan University

Professor Cowling has established a reputation as a world renowned vegetation ecologist and conservation scientist. During his 35 year career as a professional botanist, he and his colleagues have conducted ground-breaking research in community ecology, plant diversity and evolution, conservation science and palaeoecology.

A-RATED FOR THE 6TH TIME

Professor Brian Warner

Department of Astronomy, University of Cape Town

An astronomer for more than 60 years, Professor Warner has dedicated much of his research to the study of new and unusual phenomena. His interest in the area of the physics of compact stars and binaries has broadened the understanding of pulsating white dwarf stars and interacting binaries such as cataclysmic variable stars.

A-RATED FOR THE 7TH TIME

Professor Jean Cleymans

Department of Physics, University of Cape Town

Professor Cleymans contributed considerably to the area of plasma and particle physics with particular focus on relativistic heavy ion collisions. His current research work focuses on the phase diagram separating nuclear matter from quark matter, and exploring areas of high baryon density. He has held an NRF A-rating since 1985.

Professor George Ellis

Department of Mathematics and Applied Mathematics, University of Cape Town

From looking at inhomogeneity in the different scales of the Universe, to studying the nature of primary emotional systems in the human brain, Professor Ellis' work has opened many new doors of knowledge. He obtained an A-rating in 1984, the first year of the NRF Rating System, and has managed to retain this rating to the present day.

> *With the number of rated researchers at more than 3 000, we have exceeded our target for NRF Vision 2015. This is exceptionally good news as it means the system is achieving recognition as a credible benchmarking tool to measure the impact and standing of our research community.*

HAMILTON NAKI AWARD

Hamilton Naki was working as a gardener at the University of Cape Town, where he had started at the age of 14, when Robert Goetz of the University's surgical faculty asked him to assist with laboratory animals. Naki's responsibilities progressed from cleaning cages to performing anaesthesia.

Despite his limited conventional education, Naki had a remarkable ability to grasp intricate anatomical structures and medical procedures, and started working as an assistant in the laboratory for Christiaan Barnard, who had studied open-heart surgery techniques. Naki first performed anaesthesia on animals for Barnard, but was then appointed principal surgical assistant of the laboratory because of his remarkable skill and dexterity. Operating on animals, Naki taught surgical techniques to generations of medical students. He later assisted in developing the heterotopic or "piggyback" heart transplant technique. Barnard was quoted as saying that Naki was "one of the great researchers of all time in the field of heart transplants".

In 2003, the University of Cape Town awarded Mr Naki an honorary Master of Science degree in medicine.

Named after this self-taught surgeon, the award recognises an individual for outstanding efforts to advance his/her career in science against all odds, and for achieving world-class research performance, despite considerable equity challenges.

Professor Alan Christoffels

South African National Bioinformatics Institute,

University of the Western Cape

Professor Christoffels has cemented his reputation in the genomics field, and more recently made a lasting impact on health innovation in South African schools. He currently holds the DST/NRF Research Chair in Bioinformatics and Public Health Genomics at UWC.

CHAMPION OF RESEARCH CAPACITY DEVELOPMENT AND TRANSFORMATION AT SA HIGHER EDUCATION INSTITUTIONS

This award acknowledges an individual for his/her contributions to the transformation of South Africa's science community and landscape. The aim of this award is to encourage and promote this activity across the South African research community.

Professor Tshilidzi Marwala

Deputy Vice-Chancellor: Research, Innovation, Postgraduate Studies and the Library, University of Johannesburg

With an extensive track record in human capacity development in the field of engineering, Professor Marwala's research interests are multi-disciplinary and include the applications of computational intelligence to engineering, computer science, finance, social science and medicine.

EXCELLERATION AWARD FOR SOUTH AFRICAN RESEARCH INSTITUTIONS

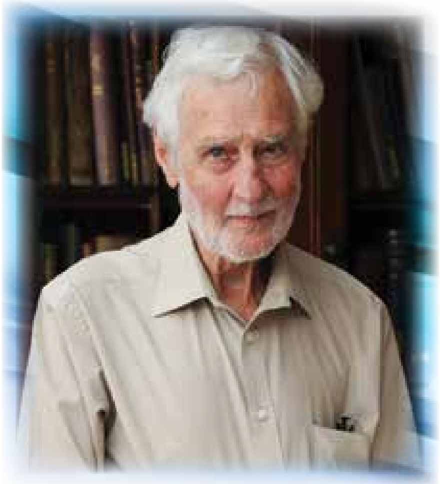
Derived from the words "excellence" and "acceleration", the Excelleration Award acknowledges South African research institutions for achieving the most improved research performance over recent years, measured against a selection of critical indicators.

Central University of Technology

University of Limpopo

This accolade is awarded to individuals considered to have made extraordinary contributions, of international standard and impact, to the development of science in and for South Africa over an extended period of time, and for the manner in which his/her work has touched and shaped the lives and views of many South Africans.

Professor Michael Feast
Department of Astronomy, University of Cape Town



Very few people can claim to have had a minor planet named after them, and few academics have published papers in the international science journal *Nature* 66 years apart! That is why it is no surprise that Professor Michael Feast's significant contributions to the strong positioning of South Africa in astronomy have earned him the 2015 NRF Lifetime Achievement Award.

Professor Feast obtained a PhD degree in Physics at the Imperial College of Science and Technology (London University) in 1949. In 1952 he came to South Africa and joined the Radcliffe Observatory in Pretoria. He used the 1.9 m reflector, at that time the largest telescope in the Southern Hemisphere, to open up the southern sky to modern astrophysics. His work on the brightest stars in our neighbour galaxies, the Magellanic Clouds, was a crucial step in our understanding of stellar evolution, and even today scientific literature still refers to his early work, although it was published over 50 years ago. He has also made important contributions to our understanding of variable stars and their use in studies of the Milky Way and other galaxies.

More recently, he has been working with South African and international colleagues using data from the Hipparcos Satellite, the Hubble Space Telescope and various telescopes at the South African Astronomical Observatory (SAAO, Sutherland), to provide a better insight of the structure of our own galaxy and a new calibration of the general extragalactic distance scale.

In his capacity as director of SAAO (1976 – 1992), he turned the facility into an entirely South African operation, and a research centre for both South African and international astronomers. As he approached retirement from this position, he was strongly aware of the growing need for a large optical telescope to keep South African research competitive into the 21st century, and consequently laid the groundwork that eventually led to the construction of the Southern African Large Telescope (SALT), the largest single optical telescope in the Southern Hemisphere.

He has held a number of influential positions within the International Astronomical Union (IAU), the main international co-ordinating body, including Vice-President of the Union, President (Commission 29, Stellar Spectra), President (Commission 27, Variable Stars), Chairman (Working Group on Magellanic Clouds) and Member (Scientific Organizing Committee, Commission 28, Galaxies).

Professor Feast has received a number of honours and awards over the years, the most recent of which was the JFW Herschel Medal from the Royal Society of South Africa. Other awards and fellowships include the Gill Medal from the Astronomical Society of South Africa, the De Beers Gold Medal from the South African Institute of Physics, and Fellowships of the Royal Society of South Africa, the South African Institute of Physics, and an Honorary Fellowship of the Royal Astronomical Society (UK). He is also a founding member of the Academy of Sciences of South Africa and an NRF A-rated researcher.

Professor Feast has 499 published contributions listed in the SAO/NASA Astrophysical Data System, with 257 in international refereed journals. At present he is continuing to publish his work in some of the top academic journals in the world. In 1993 he became an editor of one of these, published by the Royal Astronomical Society, London. He was the first person outside the UK to hold this position and continues to deal with over 200 research papers a year submitted by astronomers from all over the world.

Professor Feast's research continues to be innovative and to produce unexpected results that question conventional wisdom. A recent surprise was the discovery using the SALT telescope of young stars in the flared outer disc of our Milky Way Galaxy.

National Research Foundation

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