

UP honours ACADEMIC achievers

The University of Pretoria recently presented its annual Academic Achiever Award function to honour its academic achievers and researchers – and to recognise their commitment to quality education and research. The awards were presented to 30 researchers across three categories: the Chancellor’s Award in each of the categories Research, Exceptional Academic Achievers and Exceptional Young Researchers.

Prof Sue Nicolson received the Chancellor’s Award in the category Research. She teaches in the Department of Zoology and Entomology in the Faculty of Natural and Agricultural Sciences. Her research focuses on the physiological aspects of pollination biology by examining pollination from the context of the animals involved, rather than the plants.

The Exceptional Academic Achievers are as follows:

Faculty of Engineering, Built Environment and Information Technology

Prof Theo Bothma is Head of the Department of Information Science and chairperson of the School of Information Technology. His research focuses on information organisation and retrieval (including aspects of information literacy and e-dictionaries),



Prof Sue Nicolson, middle, received the Chancellor’s Award in the research category. Here she is with the Chancellor of the University of Pretoria, Prof Wiseman Nkuhlu, and the Vice-Chancellor and Principal, Prof Cheryl de la Rey



The Vice-Chancellor and Principal, Prof Cheryl de la Rey, fourth from right, photographed with 16 of the University's 19 Academic Achievers. In the back row from the left are Profs McKechnie, Pattinson, Bothma, Kirsten, Myburg, Steyn, Meyer and Xia. In front from the left are Profs Engelbrecht, Van Marle, Coutinho, Auret, Lubuma, Vice-Chancellor De la Rey, Taylor, Du Toit and Craig.

web development, electronic publishing and curriculum development.

Prof Ian Craig is Section Head of Control Systems in the Department of Electrical, Electronic and Computer Engineering in the School of Engineering, a position he has held since 1995.

His research interests include the economic performance assessment of advanced process control; HIV/Aids modelling, identification and control; and modelling and control of systems in mineral and metal processing.

Prof Madeleine du Toit is a professor in the Department of Materials Science and Metallurgical Engineering, where she manages the Southern African Institute of Welding (SAIW) Centre for Welding Engineering. Her primary field of interest is welding metallurgy, in particular the welding of stainless steels and aluminium alloys. She is a qualified international welding engineer (IWE).

Prof Andries Engelbrecht is Head of the Department of Computer Science. He holds the SARChI Chair in Artificial Intelligence.

His main research focus is on computational intelligence, with a particular interest in computational swarm intelligence, evolutionary computation, artificial neural networks, artificial immune systems, and learning from zero-knowledge using competitive co-evolution.

Prof Josua Meyer is Head of the Department of Mechanical and Aeronautical Engineering, and chair of the School of Engineering.

His area of research is convective heat transfer, which relies on the engineering sciences of heat transfer, fluid mechanics and thermodynamics. He and his students and colleagues have made it possible to predict the heat transfer characteristics in the previously unknown transitional flow regime.

Prof Xiaohua Xia is a professor in the Department of Electrical, Electronic and Computer Engineering,



Prof Xiaohua Xia, a NRF A-rated scientist, receives his award from the Vice-Chancellor and Principal, Prof Cheryl de la Rey



The University recognised Prof Karin van Marle from the Faculty of Law as an Exceptional Academic Achiever.

Director of the Centre of New Energy Systems and Director of the National Hub for the Postgraduate Programme in Energy Efficiency and Demand-side Management. A certified measurement and verification professional, Prof Xia leads the measurement and verification team of the University of Pretoria. His research interests are control systems and automation, and more recently, the modelling and optimisation of energy systems. Prof Xia is an A-rated NRF scientist.

Faculty of Health Sciences

Prof Robert Pattinson is a professor in the Department of Obstetrics and Gynaecology. He is the director of the Medical Research Council's (MRC) Maternal and Infant Health Care Strategies Research Unit and Head of the Department of Obstetrics and Gynaecology at Kalafong Hospital. His main research interests include obstetrics, medical audits, health systems and effective methods of outreach. He focuses mainly on determining the most effective means of implementing new healthcare strategies and improving current programmes.

Prof Maryna Steyn is a professor in the Department of Anatomy and Director of the Forensic Anthropology Research Centre. Her research focuses on human skeletal remains found in both forensic and archaeological contexts. She regularly consults with the South African Police Services on forensic cases and has also been involved in several repatriations of skeletal remains, such as those of Nontetha Bungu, Queen Thomo and the 'Ebo Four'.

Faculty of Humanities

Prof Charles van Onselen is a historian and research professor in the Centre for the Advancement of Scholarship, which is affiliated with the Faculty. He has a long-standing interest in the transnational history of Southern Africa, and has worked in various sub-disciplines within the field, ranging from criminal, labour and rural history on the one hand, through to the economic and social history of industrialising regions on the other. Prof van Onselen is an A-rated NRF social scientist.

Faculty of Law

Prof Karin van Marle is Head of the Department of Jurisprudence. Her general area of research is in the field of jurisprudence, legal philosophy and legal theory. The specific focus of her work is to reflect critically on the features of a post-apartheid jurisprudence, but beyond that also to reconfigure such jurisprudence.



Exceptional Academic Achiever Prof Maryna Steyn is Director of the Forensic Anthropology Research Centre (FARC).

Prof Frans Viljoen is Director of the Centre for Human Rights. His research area is international human rights law, with a focus on the African regional human rights system, established under the auspices of the African Union. Prof Viljoen has been involved in advocacy and training on the African regional human rights system.

Faculty of Natural and Agricultural Sciences

Prof Danie Auret is a professor in the Department of Physics and his research focuses on semiconductor materials and devices, and their applications. The semiconductors that his group investigates include silicon (Si) and germanium (Ge) used for high-speed computers, and compound materials such as AlGaIn used in the fabrication of daylight-blind ultraviolet (UV) light detectors. In particular, he investigates the defects introduced into semiconductors in fabrication processes and the influence of these defects on device quality.

Prof Nigel Bennett is a professor in Zoology and Entomology and he occupies the SARChI Chair in the field of mammalian behavioural ecology and physiology; and the Austin Roberts Chair of African Mammalogy at UP. Prof Bennett's research focus is ecology, animal physiology and behaviour, using the African mole rat as his model animal. Prof Bennett is an A-rated NRF scientist.

Prof Teresa Coutinho is a professor in the Department of Microbiology and Plant Pathology and the Forestry and Agricultural Biotechnology Institute (FABI). Her research interests include forest pathology, specifically bacterial tree pathogens. She sequenced the genome of the first plant pathogen in Africa and is an authority on *Pantoea* taxonomy and pathogenicity.

Prof Johann Kirsten is Head of the Department of Agricultural Economics, Extension and Rural Development. His research activities remain focused on critical aspects of agricultural policy in South Africa. Major research focus areas include a new institutional economic analysis of agribusiness, the commercialisation of small-scale farmers, and bringing black farmers into the mainstream economy of South Africa.

Prof Jean Lubuma is Head of the Department of Mathematics and Applied Mathematics and holds the SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences. His research interests include the numerical analysis of ordinary and partial differential equations, with an emphasis on differential models that occur in engineering and applied sciences. Recently, this focus has been extended to mathematical biology.

Prof Andrew McKechnie is a professor in the Department of Zoology and Entomology and a core team member of the Department of Science and Technology (DST) and the NRF Centre of



UP Exceptional Academic Achiever Prof Jean Lubuma holds the SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences.

Excellence at the Percy FitzPatrick Institute of African Ornithology, based at the University of Cape Town. He is an ecological and evolutionary physiologist whose research focuses on energy and water balance in birds and mammals. A major focus area for Prof McKechnie's research group is the development of models predicting the impacts of climate change on birds and bats inhabiting hot, arid environments, such as Southern Africa's Kalahari Desert.

Prof Bob Millar is director of UP's Mammal Research Institute and director of the UCT/MRC Research Group for Receptor Biology. Broad training, an extensive publishing history and a large patent portfolio have placed Prof Millar at the forefront of health and medical sciences in areas such as



Prof Zander Myburg receives his certificate from Prof De la Rey, Vice-Chancellor and Principal.

biochemistry, neuroendocrinology and cancer research. His work has not only broken new ground in understanding human and animal physiology, but also led to new treatments for cancer and other diseases. Prof Millar is an A-rated NRF scientist.

Prof Zander Myburg is a professor in Genetics. He holds the Chair in Forest Genomics and Biotechnology. His research programme in the Forestry and Agricultural Biotechnology Institute (FABI) focuses on the genomics and molecular genetics of wood development in fast-growing forest trees and, in particular, the genetic regulation of cellulose biosynthesis in trees.

His research group isolated and characterised the cellulose synthase (CesA) genes active in Eucalyptus trees. More recently his research team produced the first whole-plant gene expression atlas of a Eucalyptus tree and a high-density genetic map of the Eucalyptus genome.

Prof Louis Nel is a professor in Virology in the Department of Microbiology and Plant Pathology who

has done outstanding work on the subject of rabies in South Africa and the rest of the world. Under his guidance many rabies-related research projects are undertaken to promote the quest to eradicate the disease. The research topics include vaccines, dog ecology, epidemiology and diagnostics. As a result of Prof Nel's work in championing this cause, KwaZulu-Natal has recently been selected as a demonstration site in an international project with the aim to eliminate rabies.

Prof John Taylor is a professor in the Department of Food Science, and theme leader for Functional Biomolecules and Health-promoting Foods at UP's Institute for Food, Nutrition and Well-being. In recent years, Prof Taylor's research has focused on the problem of the poor protein quality of foods made from sorghum, a major staple foodstuff of many of the most food-insecure people in Africa's semi-arid tropics. His research group has developed innovative solutions to alleviate this problem.

Prof Mike Wingfield is the Director of the Forestry and Agricultural Biotechnology Institute (FABI),



The Exceptional Young Researchers

Prof Slippers, Dr Oosthuizen, Dr Maritz-Olivier, Prof Birkholz, Dr Folorunso Oludayo Fasina, Prof Fioramonti, Prof Swanepoel with the Vice-Chancellor and Principal, Prof Cheryl de la Rey, at the award ceremony.

which he established in 1998. His research focuses on insect pests and diseases that threaten forests and forestry globally. Using a broad range of approaches (but especially molecular genetic techniques), pests and pathogens arising in many different countries of the world are identified – often for the first time. Prof Wingfield is an A-rated NRF scientist.

The Exceptional Young Researchers are as follows:

Faculty of Humanities

Prof Lorenzo Fioramonti is an associate professor of Political Science and Jean Monnet Chair in Regional Integration and Governance Studies where he directs the Centre for the Study of Governance Innovation (GovInn). His current research focuses on governance processes and innovations, in particular regional integration, bottom-up citizen-driven change and global ‘crises’ – including environmental degradation and climate change.

Prof De Wet Swanepoel is an associate professor in Audiology in the Department of Communication Pathology. Hearing loss is the most prevalent chronic disability and is ranked among the top contributors to the global burden of disease. Prof Swanepoel’s research and clinical interests span the field of early identification and diagnosis of hearing loss, objective measures of auditory functioning, and ear and hearing telehealth. His research aims to improve timely access to hearing health care to underserved populations.

Faculty of Natural and Agricultural Sciences

Prof Lyn-Marié Birkholtz is an associate professor in the Department of Biochemistry. As part of the Centre for Sustainable Malaria Control, Prof Birkholtz heads the Malaria Parasite Molecular Laboratory and is a leader in the discipline of antimalarial target discovery for sustainable malaria control. She holds the SARChI Chair in Sustainable Malaria Control.

Dr Christine Maritz-Olivier is a senior lecturer in the Department of Genetics who does research on ticks and tick-borne diseases. Her research includes the development of anti-tick vaccines, and in collaboration with Pfizer Animal Health (Pty) laboratories, her group is focusing on understanding the genetic diversity of ticks throughout South Africa, their current acaricide resistance status and tick-borne pathogen profiles. The third research focus area involves tick-borne pathogens, *Babesia*

divergens and *Anaplasma marginale* and the fourth is the development of vector-control strategies for haematophagous vectors such as mosquitoes and biting midges in collaboration with the NHLS Vector Control Unit.

Dr Marietjie Oosthuizen is a research fellow in the Department of Zoology and Entomology. Her research interests include neuroendocrinology and anatomy of reproduction, circadian biology, memory and learning of African mole rats in particular, although other small mammals are not excluded.

Prof Bernard Slippers is a professor in Genetics. He is one of the research leaders of both the Tree Protection Cooperative Programme and DST/NRF Centre of Excellence in Tree Health Biotechnology at the Forestry and Agricultural Biotechnology Institute (FABI). His research focus is on the molecular ecology and evolution of insects and micro-organisms that affect tree health, with a particular focus on anthropogenic influences on these populations and ways of reducing their impact.



Dr Folorunso Oludayo Fasina is a senior lecturer in the Department of Production Animal Studies

Faculty of Veterinary Science

Dr Folorunso Oludayo Fasina is a senior lecturer in the Department of Production Animal Studies. His area of research is viral epidemiology of transboundary animal diseases, animal disease economics and ecology, and disease modelling. Specifically, he has worked on highly pathogenic avian influenza H5N1, African swine fever (ASF), and other animal diseases.

UP awarded research chairs

The University of Pretoria was awarded two research chairs from the South African Research Chairs Initiative (SARChI).

The University received the SARChI Chair in Mathematical Models and Methods in Bioengineering and Biosciences. Prof Jean Lubuma, Head of the Department of Mathematics and Applied Mathematics, will lead this prestigious research chair with a budget of R2,5 million per year.



Prof Jean Lubuma

The University was also awarded the SARChI Chair in Sustainable Malaria Control with a budget of R1,5 million per year, funded by the Department of Science and Technology (DST) through the National Research Foundation (NRF).

SARChI was established by the South African government as a strategic intervention to reverse the brain drain in the public academic and research sector. In particular, the programme aims to increase scientific research capacity through the development of human ability and to stimulate the generation of new knowledge.

Although mathematics has long been associated with the biological sciences, a heightened synergy between biology and mathematics has emerged over the past few decades, contributing greatly to the enrichment and expansion of both fields.

The Department of Mathematics and Applied Mathematics has been working with the School

for Biological Sciences since 2007. Since then milestones in research activity include the 2008 and 2010 workshops on mathematical epidemiology and the launch of the Biomath Forum in 2011 – an interdisciplinary research gathering for the exchange of ideas between mathematicians and biologists at the University.

The research focus of the Chair in Mathematical Models and Methods in Bioengineering and Biosciences lies at the intersection of mathematical modelling of biological processes, and a spectrum of mathematical specialisations broadly located within analysis. 'The biological processes to be considered by the Chair are highly relevant to the needs of the country,' says Prof Lubuma. These include mathematical epidemiology – specifically the identification of adequate responses to new diseases and older forms of new diseases, such as HIV/Aids and other communicable diseases that pose a massive threat to development in South Africa and beyond.

Another interesting initiative created within this Chair is the Under-Twenty Mathematicians (UTM) programme, which aims to identify, recruit and groom talented young South Africans to become mathematicians, a category that dominates the national scarce skills list.

Sustainable malaria control

UP is one of the leading institutions in malaria research in South Africa, recognised for its focus on malaria parasite biology, functional genomics, structure-based drug discovery efforts, innovative vector control strategies, and public health and community engagement. These are a few of the reasons why the University was awarded the SARChI Chair in Sustainable Malaria Control with a budget of R1,5 million per year, funded by the Department of Science and Technology (DST) through the National Research Foundation (NRF).

The Chair will be headed by Prof Lyn-Marie Birkholtz, an associate professor in the Department of Biochemistry and a member of the UP Centre for Sustainable Malaria Control (UPCSMC). She is also a member of the European Virtual Institute of

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