



## College of Agriculture, Engineering and Science | Annual Report 2011

by Professor Rob Slotow



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and Head of the  
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Science

2011 was another year of exciting growth for the College of Agriculture, Engineering and Science, as it continued to focus on meeting the challenges and changing needs of the multi-faceted society it serves. With close on 700 academic and specialist support staff, the College maintained its pre-eminence as being home to the largest group of scientists, engineers and technologists under one structure in Africa. In 2011 our main fund budget was over R300 million.

A major focus of College strategic activity during 2011 was the College Reorganisation, namely, simplifying and streamlining College structures for ultimate academic success. A flatter structure was introduced with the removal of faculties and the formation of five new mega-schools (effective 1 January 2012), namely, the School of Agricultural, Earth and Environmental Sciences; the School of Chemistry and Physics; the School of Engineering; the School of Life Sciences; and the School of Mathematics, Statistics and Computer Science. The object of the exercise was structural and functional efficiency; streamlined and devolved decision-making; the creation of academic critical mass through the consolidation of Schools; the freeing up of academics to focus on research, academic and scholarly activity by creating a professional support sector of the highest calibre; and the alignment of the College with international best practice.

### Awards and Achievements

During 2011 our researchers continued to lead the university with regard to accolades and achievements. Professors Steve Johnson, Pat Berjak and Rob Gous retained their NRF A-rated research status. Of the four National Research Chairs currently held by academics within the College, Professor Steve Johnson's Chair in Evolutionary Biology was reviewed, confirmed and upgraded to a Tier 1 Chair; Professor Sunil Maharaj's Chair in Gravitating Systems was reviewed and confirmed for five more years; whilst Professor Daresh Ramjugernath's Chair in Fluorine Process Engineering and Separation Technology, and Professor Francesco Petruccione's Chair in Quantum Information Processing and Communication have been reviewed and are awaiting an outcome. Professor Bice Martincigh was honoured with a Distinguished Teacher Award for 2011; and Dr Vincent Nyamori received the Vice-Chancellor's Research Award. This honour is bestowed on a "quite exceptional young researcher".

Many students also shined within the College. MScAgric graduate Mr Garreth Sparks was awarded the prestigious S2A3 medal for original research at Masters level by the Southern African Association for the Advancement of Science. Masters student Mrs Tarylee Reddy won first prize in the 2011 South African Statistics Association (SASA) national Postgraduate Student Paper Competition, sponsored by Statistics South Africa. BSc first year students Ms Salona Gangaram and Ms Sarisha Ojageer were the first recipients of the new Pius Langa Scholarship. Both were ranked in the top 10 in the province for the National Senior Certificate exams. Computer Science Honours Student Mr Ross Lagerwall received the Zac Yacoob Scholarship for the best Honours-level student at UKZN. He and his twin brother, Brett, both graduated summa cum laude with a Bachelor of Science majoring in Computer Science at the April 2011 graduation ceremonies. Mr Blake Balcomb, who graduated cum laude with a MSc in Chemistry, was awarded a Fullbright Scholarship to pursue his doctoral studies in the United States. Electronic Engineering summa cum laude student Ms Anna Zawilska received the Vincent Maphai Scholarship for the top Masters Student at UKZN; she also received a prestigious DST Women in Science Masters Fellowship, to pursue a



MSc at UKZN in the field of digital image stenanography; as well as a Rhodes Scholarship to study at Oxford University in the United Kingdom. Other College recipients of the DST's Women in Science Doctoral Fellowships were Ms Tricia Naicker whose research focuses on the synthesis of novel chiral catalysts; and Ms Karen Pillay whose research interest is in amyloid diseases, in particular type II diabetes.

### **Campus Development**

A dream that has been ten years in the making came to fruition in December 2011 with the roof wetting for the new, multi-purpose, state-of-the-art and environmentally-friendly UNITE centre within the new School of Engineering Building. With a large lecture venue capable of accommodating approximately 200 students, the R16.1 million centre, located on the southern side of the Howard College campus, will become the official home of UKZN's Intensive Tuition for Engineers Programme (UNITE) and will provide university access to learners with high academic potential from educationally disadvantaged backgrounds. UNITE also received R1.8 million from Telkom SA Ltd, which will enable 30 high academic potential learners from economically disadvantaged background to study Engineering.

On the Pietermaritzburg Campus, the Carbis Road Space Planning and Upgrade Plan was initiated with funding from DoHET (Department of Higher Education and Training); and at Westville, the new, state-of-the-art Genetics lab was officially opened, paving the way for the rolling out of this programme on the Westville Campus. 2011 saw second year classes being taught, with third year to commence in 2012.

### **Teaching and Learning**

Enrolments for 2011 again exceeded DoHET targets, with the Faculty of Science and Agriculture housing 5893 students and Engineering 2722, resulting in a total of 8615 for the College. All programmes within Engineering at UKZN are now fully accredited by the Engineering Council of South Africa (ECSA), with the BScEng (Mechanical Engineering) being the final programme to be accredited in November 2011. The ASAP/TIES Project, which involved the strategic allocation and administration of DoHET funding for the throughput and retention of students, was successfully concluded in 2011. Academic support offered to students through this initiative included additional tutorial sessions, supplementary instruction sessions and hot seat tutoring. TIES funding also enabled the College to host Professors Simon Bates (University of Edinburgh) and Lorne Wolfe (Georgia Southern University) to run a series of workshops for academics on innovative teaching methods for large undergraduate classes, which were vigorously supported by academics drawn from all four Colleges.

July 30, 2011 saw UKZN host the launch of the Department of Science and Technology's National Science Week, during which 4 200 school children celebrated science on the Westville Campus. In addition, a series of public lectures were run by the College's A-rated scientists, and a week-long programme for school children operated out of the Science and Technology Education Centre. UKZN was congratulated by the Minister of Science and Technology, Ms Naledi Pandor, on successfully hosting this prestigious event, and on being a strong hub of scientific research in South Africa.

One further community outreach programme to mention involved Dietetics and Human Nutrition Professor, Frederick Veldman, and Dietetics Lecturer, Ms Chara Biggs, joining the humanitarian organisation, Gift of the Givers, on a disaster relief mission to Somalia – the first time ever that a dietitian and a nutritionist have been taken into a war zone, and have used their expertise to save lives.



## Research

The College continues to excel in research. Altogether, 105 of UKZN's 198 NRF-rated researchers emanate from its ranks. These include 3 A rated, 24 B rated, 64 C rated, 1 L rated and 13 Y rated scientists. Six of the top ten published UKZN researchers for 2011 came from the College. Most prolific was Professor Johannes van Staden in first place, followed closely by Professor Steve Johnson. Professors Colleen Downs and Urmilla Bob were the top women, in positions four and five respectively. These outstanding achievements were recognised at the university's annual research dinner, with Professor Downs receiving special mention as the top published female academic at UKZN. Professor van Staden, an expert in plant growth and development, conducted research in the fields of plant hormones, seed germination, senescence, stress physiology, post-harvest physiology, biotechnology and plant tissue culture, ethnobotany, secondary products and ethnomedicine. Professor Johnson's research included pollination biology in the South African flora, especially Orchidaceae, Asteraceae and Amaryllidaceae. Professor Downs' research interests were multifaceted and interdisciplinary, ranging from the ecophysiology of vertebrates in southern Africa to the conservation, ecology and general biology of vertebrates, to science education and problems experienced by second language Life Sciences students. Projects ranged from studying Zululand Nile crocodiles to research on sunbirds.

Continuing a tradition of climate atlasing, Professor Roland Schulze published a new 400-page book entitled Atlas of Climate Change and the South African Agriculture Sector: A 2010 perspective. COP-17, hosted by the City of Durban in December 2011 showcased various UKZN climate-change related research projects, including the Integrated Renewable Energy Advancement Programme (IREAP) led by Professor Christina Trois and her research group at the Centre for Environmental, Coastal and Hydrological Engineering in Civil Engineering (CRECHE). IREAP is developing a comprehensive energy solution for South Africa using biomass and waste as an energy source. In similar vein, Professor Glen Bright and the Mechatronics and Robotics Research Group is using the principles of Mechatronic Engineering to research and design robots which can perform search and rescue operations following natural disasters.

The College continues to invest in major research infrastructure, with Chemistry receiving two single crystal x-ray diffractometers, and the Microscopy and Microanalysis Unit acquiring a Transmission Electron Microscope (TEM) and a Scanning Electron Microscope (SEM), both ultra high resolution microscopes which translate into a multi-million rand investment for the College.

Finally, in terms of research partnerships, two notable milestones should be mentioned. 2011 witnessed the birth of the UKZN/CSIR Meraka Centre for Artificial Intelligence Research – now the largest artificial intelligence research centre in Africa. CAIR's vision is to create an environment that will provide world class research and contribute to the establishment of a strong artificial intelligence network and communication in South Africa. In November 2011 a Memorandum of Understanding was signed between UKZN and the University of Edinburgh, which will see a joint degree course in Chemistry being offered up to Masters level. The structure of the programme is such that talented students are encouraged to return to South Africa, well equipped to invest and build their future careers in this country.

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100 YEARS OF ACADEMIC EXCELLENCE

Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville