



## College of Agriculture, Engineering and Science | Annual Report 2013

by Professor Deo Jaganyi



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The year 2013 was a positive and productive one for the College of Agriculture, Engineering and Science.

A snapshot reveals that the College recruited three SARCHI Research Chairs, 161 postdoctoral scholars, 11 fractional professors, three research professors, and 242 honorary researchers. Research productivity units increased by 10.5% from 41,907 to 46,306 during the period 2011-2012. Once again the College dominated UKZN's Top 30 researcher list, with 20 academics from the College included. Professor Johannes van Staden and Professor Colleen Downs retained the top male and female UKZN researcher positions respectively, whilst Professor van Staden also received the honour of being rated by Thomson Reuters as the world's leading researcher in the area of pharmacology and toxicology.

In 2013 the College graduated an impressive 76 PhDs. We received a positive outcome from the Engineering Council of South Africa (ECSA) engineering accreditation process. We reinstated our Property Development Programme, and the five Schools within the College consolidated and developed their identities through individual business plans and summary dashboards, so as to monitor progress towards targets.

### Teaching and Learning

In April 2013 the College graduated 1,646 students: 1,020 undergraduate and 626 postgraduate (including the 76 PhDs). Importantly, 216 graduands (151 undergraduate and 65 postgraduate) were originally Access students.

To increase enrolment, two courses were developed to help students gain entry to the mathematical and related sciences and are being offered through UKZN Extended Learning. The first is a condensed Foundational Mathematics course, intended for students who do not have the Mathematics marks to gain entry to UKZN (in any field). The second, semester-long course is for students who took Mathematical Literacy at high school and provides instruction in Core Mathematics. The mark obtained by learners on this course is used to evaluate their qualification for University admission.

The College exceeded its enrolment target overall for 2013 (9,258 students versus a target of 8,550), but achieved a 98% enrolment of postgraduate students, a percentage which included the 161 postdocs referred to earlier.

The Mastering Masters Programme rolled out research capacity-building workshops for staff and postgraduate students, empowering them to make the progress needed towards the timely and successful completion of their postgraduate studies.

The Property Development Programme in the School of Engineering will be reinstated from 2014 with the support of the Construction Education and Training Authority (CETA), which has committed for five years, with a fund of R13.4 million for the year 2013/2014. This will result in the recruitment of 100 new students. The accreditation of the Engineering programmes in 2013 by ECSA had a positive outcome: the Mechanical, Chemical and Agricultural Engineering programmes received full accreditation until 2018; whilst the remainder were accredited and will be revisited in 2015. The College Access Programmes (Science Access and UNITE) underwent a review and recommendations will be implemented in 2014.

## Research

College strategic funds were used to improve local and global research competitiveness and create synergy and scaling effects. Recruitment of postdoctoral scholars was spread throughout the five Schools: 26 in the School of Agricultural, Earth and Environmental Sciences; 32 in the School of Chemistry and Physics; 17 in the School of Engineering; 58 in the School of Life Sciences; and 28 in the School of Mathematics, Statistics and Computer Science. Some 149 postgraduate scholarships were awarded (79 masters and 70 PhDs), mostly to Black South African students. Moreover, the College was also able to shift supervision of postgraduate students from well-established academics to new and younger academics by linking the bursaries to this group of staff.

In order to strategically build high-end research capacity and a critical mass of staffing in selected research areas, a research professor in Astrophysics was appointed in addition to the another three in the areas of Biological Mathematics (Epidemiology), Medical Microbiology and Artificial Intelligence respectively. Eleven fractional professors, who are overseas professors internationally recognised as leaders in their field of research, were appointed to spend at least three months at UKZN collaborating with UKZN academics and were involved in recruitment and co-supervision of postgraduate students as well as postdoctoral scholars. One of these, Professor Fernando Albericio, was awarded a National Research Foundation (NRF) A-Rating during 2013. Two new SARChI Chairs were recruited, bringing the College total to six: one in Land Use Planning & Management (Professor Mathieu Rouget) and the other in Rural Agronomy & Development (Professor Paramu Mofongoya) A Biorefinery Research Chair was appointed in partnership with the Sugar Milling Research Institute (SMRI), and a Research Director was appointed to head the Eskom initiative in High Voltage Direct Current (HVDC) research.

In order to develop young, female and African academic staff, 12 female academics were awarded 'developmental sabbatical' through a teaching relief mechanism which enabled them to concentrate on research for one year. This resulted in the publication of articles, international linkages and PhD completions. In line with the College transformation strategy, 11 black South Africans with masters qualifications were appointed as 'developmental lecturers' in disciplines where demographic representation is poor, on the understanding that they should complete their PhDs in three years. Two have completed and are to be credentialed into lecturer positions in the School of Chemistry and Physics.

Some 242 honorary researchers (fellows, associate professors and professors) contributed positively to the College's research output via publications in reputable ISI journals and co-supervision of students. From this cohort, Professor Andrew Forbes was involved in the groundbreaking development of a digital laser that uses a liquid crystal display (LCD), the findings of which were published in the prestigious journal, Nature Communications.

## Awards and Achievements

In the year under review, the College celebrated individual and group achievements as well as the national and global recognition of a number of its students and staff. Amongst this number, Professor Kavilan Moodley was appointed by the NRF to its newly inaugurated Astronomy Advisory Council. This prestigious body will provide strategic and technical advice to the NRF on Astronomy matters. Professor Deresh Ramjugernath was the recipient of the South African Institute of Chemical Engineers' (SAIChE) gold medal award. Professor Delia North and Dr Sudan Hansraj were elected onto the UMALUSI Council for Quality Assurance. And on the non-academic front, animal scientist Dr Marion Young won the World Canoe Marathon Championships in the sub-veteran category.



The African Centre for Global Change and Water Resources Research (ACGCWRR) at UKZN has been made a UNESCO Category 2 Water Centre following a decision at the 37th UNESCO General Conference held in Paris in November 2013. Supported by Cabinet, the Centre's establishment signifies international endorsement of UKZN's strengths in the field of hydrology and water resources management.

In terms of outstanding students, second-year Chemical Engineering student Mr Kashmeel Bisseru received the Vice-Chancellor's Scholarship for 2013, whilst Electronic Engineering student Mr Ridwaan Amod received the award for the best single undergraduate in the entire university. PhD student Mr Milindi Sibomana received the UKZN Doctoral Research Scholarship to pursue research into the development of postharvest metrics of sugarcane deterioration. Ms Fezile Gwala, a first-year Civil Engineering student, received the Frene Ginwala Scholarship for the top black female entrant, and quantum physics PhD student Mr Ryan Sweke was awarded the prestigious S2A3 Medal for his MSc dissertation titled: 'Dissipative Preparation of Entanglement in Cavity QED'.

### **Community Engagement and Outreach**

Responsible community engagement that promotes science, engineering and technology has always featured prominently in the College's activities and 2013 was no exception. The College ran a number of school outreach programmes aimed at learners. These included the School of Engineering's annual Winter School and 'Be a Scientist for a Week'. Some 300 students attended National Science Week at the Science and Technology Education Centre on the Westville campus. College Open Day saw over 1,000 learners in the Pietermaritzburg and Durban districts interact with College staff and students, and the College successfully hosted the regional finals of the Eskom Expo for Young Scientists. In terms of rural community outreach, the Farmer Support Group, situated within the School of Agricultural, Earth and Environmental Sciences, is just one project that continued its community upliftment work, in the Msinga and Bergville areas. And the School of Mathematics, Statistics and Computer Science ran a number of successful initiatives aimed at upskilling Mathematics teachers and learners, as well as a very successful public lecture series on Astronomy.

### **Campus Development**

In closing, the major infrastructural achievement for the College in 2013 was the revamping of the Science and Technology Innovation Park (STIP) and the Smart Grid Research Centre on the Westville Campus. This facility was officially opened on 29 August 2013, in conjunction with Eskom's 90th birthday celebrations, and will promote research into smart grid electricity.

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**College of Agriculture, Engineering and Science**

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