



College of Agriculture, Engineering and Science | Annual Report 2015

by Professor Deo Jaganyi



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The College scooped three of the five South African Research Initiative Chairs that were awarded to UKZN. For the first time the College broke through the century mark and awarded 106 PhDs degrees, being 40% of the university total.

Our academics continued to attract substantial grants – in the year nine big research projects secured over R17 million. A total of 31 academics received NRF-Ratings in 2015 and we recruited 197 postdoctoral scholars.

Awards and Achievements

In 2015 a number of our academics and students received awards and recognition both locally and internationally for their achievements both as individuals and as groups.

- Professor Michael Savage and Dr Aneshkumar Maharaj were awarded UKZN's Distinguished Teacher Award for 2014. The two academics were also recipients of the CHE / HECTASA National Teaching Excellence Awards which are awarded to only five candidates each year. These awards were in recognition of commitment to students and the Agrometeorology discipline for Professor Savage. In the case of Dr Maharaj, the honour was for his pedagogy, excellent management and diversity of teaching, learning and assessment.
- The College for the first time introduced and awarded a College Distinguished Teacher Award to an academic in each of its five Schools. The recipients were Dr Augustine Gubba (School of Agricultural, Earth and Environmental Sciences); Dr Naven Chetty (School of Chemistry and Physics); Dr Nishani Harinarain (School of Engineering); Professor Ademola Olufolahan Olaniran (School of Life Sciences); and Professor Precious Sibanda (School of Mathematics, Statistics and Computer Science).
- UKZN was ranked in the top 200 Universities in agriculture and forestry in the world, according to QS World University Rankings, out of more than 3 000 institutions. This is because of the close working relationships between our staff in the School of Agricultural, Earth and Environmental Sciences with many of the institutions in the top 200, including Cornell, Wageningen, Purdue and Lincoln Universities
- Ms Kholosa Magudu was awarded the prestigious World Wildlife Fund's Prince Bernhard Scholarship for Nature Conservation, one of only two South Africans to have received the international honour.
- Dr Adriana Marais, a postdoctoral scholar in the School of Chemistry and Physics, was awarded the prestigious Meiring Naudé Medal by the Royal Society of South Africa for her extraordinary achievement as a young scientist. She was also named as one of 15 promising young scientists – "International Rising Talents" – from around the world at the 14th L'Oréal-UNESCO - "For Women in Science" Awards Ceremony in Paris.



- The UKZN Solar Car, Hulamin, driven by our Engineering students and staff, successfully crossed the length of Australia from Darwin to Adelaide, a total of 3 022 kms in 47 hours, 53 minutes and 59 seconds, to take the 12th spot out of 42 starters. This was the first time an African team had entered this international event.
- Miss Kenda Knowles, an Astrophysics PhD student, was one of the winners in the Doctoral Fellowship category at the Women in Science Awards presented by the Department of Science and Technology.
- The work of PhD graduate, Dr Tiwonge Mzumara-Gawa on incidents of waterhole poisoning affecting Lilian's Lovebirds was featured by BBC News Africa.
- Dr Mzamo Shozi became the third developmental lecturer in the College to graduate with a PhD since the transformation programme aimed at increasing the number of black African academics was initiated in 2012. He specialized in organometallic chemistry.

Research

On the research front, the College made a number of strides and maintained its longstanding position as the top producer of research in the university. Topping the list in the year was the award of five new South African Research Initiative (SARChI) Chairs to UKZN by DST/NRF, with the College scooping three of the five chairs. Professor Theresa Coetzer, a biochemist, was awarded the Chair for Proteolysis in Homeostasis Health and Disease, whilst Professor Colleen Downs was awarded the SARChI Chair in Ecosystem Health and Biodiversity in KZN and the Eastern Cape. The third chair went to Professor Fanie van Heerden, who was appointed the Chair of Chemistry of Indigenous Medicinal Plants. This increases the total number of SARChI Chairs in the College to 9. It is worth noting that these new SARChI Chairs are the first female researchers to be awarded Chairs. Still with NRF, a total of 31 academics in the College got NRF-Ratings in 2015. This means that as a whole 49% of academic staff holding PhDs in the College are NRF-rated.

The University top 30 Publishing Researchers' list was again dominated by AES (19 out of 30). This included the top publisher (Professor Johannes van Staden) and top female publisher (Professor Colleen Downs), who are both biologists in Ethnobotany and Terrestrial Vertebrates respectively.

In 2015, a number of our academics were involved in big and sometimes multidisciplinary projects. One such example is the DELTAS Africa (Developing Excellence in Leadership, Training and Science). This is an African Biostatistics Programme funded by the Wellcome Trust in collaboration with the African Academy of Sciences for R3.5 million. The aim is to advance research and training in Biostatistics and Epidemiology in Sub-Saharan Africa. The programme is a collaboration between UKZN, Wits, the London School of Tropical Hygiene and Medicine, Warwick University and KEMRI in Kenya. The UKZN team is led by Professor Henry Mwambi of the School of Mathematics, Statistics and Computer Science. In addition, nine big projects totaling R17 million were secured during the year across a number of schools in the College.

The year also saw the College acquire expensive state of the art equipment to promote and advance research. The School of Life Sciences received a Nanosight N5500 Equipment worth in excess of R1.5 million and funded by the National Research Foundation and UKZN. This Nanoparticle tracking and characterization system is the first in Africa. This will be used to train young scientists in the physicochemical characterization of nanoparticle carriers being used in the treatment of cancers.



Through the infrastructure and efficient funding programme of DHET and College support, the School of Chemistry and Physics purchased two new Shimadzu Single Quadrupole Liquid Chromatograph Mass Spectrometers – one for the Pietermaritzburg and the other for the Westville campus, at a cost of approximately R4 million. The instruments are ‘workhorses’ designed to provide high throughput of chemical sample analysis.

Teaching and Learning

At the 2015 graduation ceremonies the College once again made a significant contribution to South Africa’s much-needed brain pool of highly-qualified science, technology and engineering specialists, by breaking through the century barrier and awarding an impressive 106 PhDs out of the university total of 264. This is a noteworthy increase over previous years with 98 PhDs being awarded in 2014, 76 in 2013, 77 in 2012 and 69 in 2011. In total, the College conferred 1 952 degrees, Masters being 255 and Honours, some 352.

On registration, the College met its enrolment targets powered by the high numbers of post graduate students (822 PhDs / 127% of target; 951 Masters / 110% of target). The college also registered 197 postdoctoral scholars.

The College hosted a well-attended 2015 Academic Monitoring and Support Research Colloquium, under the umbrella theme, ‘Coherence of Student Support within UKZN’. In addition our academics continued to improve their teaching skills as evidenced by the high number that attended the University Education Induction Programme Modules.

The Minister of Higher Education, Dr Blade Nzimande officially launched the Bachelor of Science in Property Development Degree, a three year programme that will help meet a growing demand for more graduates in the Built Environment disciplines. The programme was made possible through a partnership between the Construction Education and Training Authority (CETA) and UKZN. The programme is hosted in the School of Engineering.

The other programme that was launched was the new Masters Programme in Plant Breeding in the School of Agricultural, Earth and Environmental Sciences. The aim of the project is to train 30 industry-ready, modern plant breeders from at least six Southern African countries, namely Tanzania, Malawi, Mozambique, Zambia, Zimbabwe and South Africa. The initiative is financially supported by the Bill and Melinda Gates Foundation, through the Alliance for a Green Revolution in Africa (AGRA).

The Oppenheimer family, owners of the farms Wakefield and Umgeniport, entered into an agreement with UKZN to make their properties available for research and teaching activities. The ideal location of these properties and their varied habitats create opportunities for research in a range of ecological and environmental fields, including grassland ecology, forest ecology, applied behavioral ecology, animal behavior, entomology, water related ecological research, veld management, environmental research and human/nature interactions. The centre is also ideally placed for undergraduate field based learning. These will form important components of the curricula for ecological, environmental and agricultural students with opportunities to get involved in ecological survey of vegetation, animals and soils, which are requirements for several degree programmes.

In order to promote international collaboration, the School of Life Sciences hosted a delegation of scientists from the Jiangsu Academy of Agricultural Sciences (JAAS) in China. Academics from both institutions are co-supervising nine Chinese PhD students. This is the result of several visits and the signing of a five-year Memorandum of Understanding. The College, through Dr Yinzhe Ma, an Astrophysicist in the school of Chemistry and Physics, is also pursuing collaboration with Chinese groups to tackle the Big Data linked to the Square Kilometer Array (SKA).



Community Outreach

Responsible community engagement and the promotion of science, engineering and technology has always formed part of the College activities. During the year the 'BSc for Northern Cape Educators' initiative, launched by UKZN and the Northern Cape Department of Education reached a successful conclusion after a period of five years. The project funded by BHP Billiton saw 16 Northern Cape teachers receive Bachelor of Science degrees, having majored in Physics and Applied Mathematics. This programme, UKZN's Northern Cape Maths and Science Educator Development, was a pilot project designed to develop deeper competence and confidence in content knowledge for delivery of the new Further Education and Training (FET) Mathematics and Physical Science curriculum at Grade 12 level. The programme was a foundational intervention to develop highly qualified Mathematics and Science BSc teacher graduates and will go a long way towards improving matric mathematics and science pass rates, especially amongst disadvantaged learners in the Northern Cape.

Other notable activities within the College included collaborating with the Human Settlements, Engineering and eThekweni Transport Authority and Trading Cluster in organising the Science, Technology, Engineering and Maths (STEM) Careers Symposium on the Edgewood campus. The event was attended by more than 2 000 pupils from schools in the eThekweni Metro. The aim of the cluster is to groom future engineers by identifying and managing the various STEM programmes for disadvantaged schools in the eThekweni Municipality region.

Through generous sponsorship from the Japanese Embassy, UKZN's Science and Technology Education Centre (STEC@UKZN) in the College received a mobile science lab, in the form of a converted Mercedes Vito van. The van, known as 'Science4U', aims to provide science education to outlying schools. The interior of the van has been especially designed and is equipped to carry out experiments in the field of physics and chemistry. This colourfully branded mobile science lab will go out to schools to provide hands-on activities and lab experiences to learners who do not have access to such facilities.

Campus Development

UKZN's School of Mathematics, Statistics and Computer Science proudly took delivery of its first 0.75 metre telescope that was donated by the South African Astronomical Observatory (SAAO). UKZN was one of the two Universities in the country that were chosen by SAAO to receive a telescope, which will be used for student training, advancing scientific research and public engagement.

A fully equipped satellite workshop, under the control of the School of Chemistry and Physics, has been commissioned on the Westville campus to support the mechanical instrument workshop on the Pietermaritzburg campus. This is to address particularly the experimental needs of astrophysics research projects.

It is important to remember that 2015 was '*the year of efficiency*'. As a College a number of initiatives were implemented. One that stands out is the online booking system for counselling which has improved the College service delivery to our students.



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1910 - 2010

100 YEARS OF ACADEMIC EXCELLENCE

Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville