UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

NEWSletter

COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE

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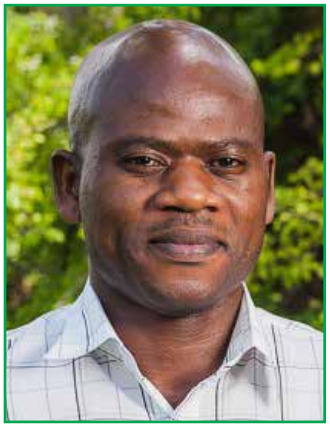
Message from the Acting DVC and Head of College



Professor Albert T Modi.

Firstly, I would like to welcome all new staff who have joined the College of Agriculture, Engineering and Science in 2017. In some ways this year has been a mixture of torment and joy for our College as we started the year with uncertainty over leadership, with some College and School leaders in acting positions until early next semester. Working on the good foundation of CAES leadership at all levels, however, the College remains steadfast in its progress to achieve its identified goals for 2017 and beyond.

At a university level, the College has made a significant contribution to the revision of the UKZN strategy. This is an interesting exercise notable for its participatory nature, where we are not starting from scratch but are starting afresh. We look forward to the finalisation of the new strategy and the enhancement of our performance in a collegial and cooperative spirit.

From the College perspective, we recognise the challenge of staff shortages, particularly with respect to academic posts. While UKZN has made excellent attempts to enhance transformation through the appointment of target candidates and developmental lecturers, it is necessary for all Schools to be innovative and hardworking to ensure that the transformation agenda is achieved while top quality education and research, with which UKZN is identified, are not compromised. The Human Resources Division of the College remains helpful in assisting us in this endeavour.

We congratulate our support and academic staff for the major achievements of the College for 2017 to date. While full statistics will be provided at the end of the year, it is worth noting that:

- We have achieved student enrolment figures that will allow us to meet the 2017 target in the second semester.
- We achieved excellent graduation numbers across all Schools.
- We remain one of the top UKZN achievers when it comes to research productivity. Indeed, the revised UKZN strategy requires that going forward, we emphasise quality over quantity.
- We continue to have excellent services provided to our students and staff by ADO, Mastering Masters, Student Support, Science Access and Public Relations.
- Our student leadership has made a marvellous contribution to assist the leadership with regards to matters that affect the student body.
- We congratulate all staff and students who ensured that the disruption of examinations this semester was handled well so that all our students wrote examinations.

This year, we shall have a second graduation ceremony in the first week of September. Congratulations to all students who made sure that the 2016 academic disruptions did not discourage them from focusing on completing their degrees. The 2017 second graduation should also allow all students who have completed their degrees by the end of the first semester to graduate and start their livelihoods as employees or postgraduate students.

Please enjoy the good stories about CAES achievements so far in 2017 as presented by our efficient PR department.

I wish you all the best for the remainder of the year.

Albert

COLLEGE NEWS

Leading Scientists Unite in a March for Science in Durban

Leading KwaZulu-Natal scientists and academics came together with civil societies and concerned citizens to participate in a "March for Science" in Durban's city centre. Scientists from a range off disciplines joined forces to highlight the critical importance of sustained and strategic support by governments and funding agencies to advance and promote scientific research and innovation.

The march in Durban formed part of a global March for Science aimed at increasing public awareness on the importance of science in addressing challenges like climate change, food security, opportunistic diseases, life threatening epidemics and the biomedical and basic sciences. Marches took place in over 500 cities worldwide, including Seoul in Korea, Cambridge in the UK, Mexico City in Mexico, and Washington DC in the US.

Globally the event was celebrated on Saturday 22 April to coincide with Earth Day. 'The marches that happened worldwide not only made a powerful statement regarding the value of scientists and scientific research, but also provided an opportunity to unite researchers globally in promoting the intrinsic value of evidence based policy making and decision making to improve the lives of all people,' said Dr Albert van Jaarsveld, Vice-Chancellor and Principal of UKZN.

The march began in front of the Durban City Hall before proceeding with much fun, enthusiasm and public engagement to the Gugu Dlamini Park where scientists assembled to display interactive exhibits from the various scientific disciplines. UKZN Science Centre's Dr Tanja Reinhardt (aka Dr T) was on hand to woo both the young and old with her popular science show highlighting the wonders of science.

UKZN Scientists joined Durban's March for Science, where UKZN Science Centre Co-ordinator Dr Tanja Reinhardt wowed the crowds with her pyrotechnic display.

Top Students Acknowledged at College Awards Functions

Top achievers in the College of Agriculture, Engineering and Science were recently recognised at two awards ceremonies held on the Pietermaritzburg and Westville campuses over the graduation period. About 400 staff, students, proud parents and industry sponsors attended the campus celebrations to witness deserving students receive recognition for their hard work and achievement.

The awards – including cash, book vouchers and floating trophies – were made in the various disciplines across four Schools in the fields of Agricultural, Earth and Environmental Sciences; Chemistry and Physics; Life Sciences; and Mathematics, Statistics and Computer Science.

Master of Ceremonies, Acting DVC for Teaching and Learning Professor Bala Pillay, welcomed guests and emphasised the importance of recognising high performing students; whilst Dean of Research for CAES, Professor Kevin Kirkman, announced the names of the winners and acknowledged the many sponsors, including individual donors, external companies as well as Schools within the College.

One new sponsor onboard this year was Statistics SA, who sponsored monetary awards for the top Statistics student in each year of study up to Honours level.

'These students are the pool from which we draw our future PhD candidates,' said Kirkman. 'We thank their lecturers and parents for the support that they give them, we celebrate their success and we encourage them to continue with their studies.'

Top students within the College (Pietermaritzburg and Westville) were recognised for their academic achievement.

STEM Careers Symposium Woos Future Students

More than 4 000 grade 11 and 12 pupils from schools in the eThekwini Metro attended the Science, Technology, Engineering and Mathematics (STEM) Careers Symposium held on the Edgewood campus.

The symposium was organised by the Human Settlements, Engineering and Ethekwini Transport Authority and Trading Cluster: Support Services in collaboration with UKZN's College of Agriculture, Engineering and Science (CAES).

The cluster was created to groom future Engineers by identifying and managing the various STEM programmes for disadvantaged schools in the eThekwini Municipality region.

Learners from a wide spectrum of schools were transported to Edgewood to be at the official opening, which featured speakers from the eThekwini Municipality, the Department of Education (DOE) and UKZN. The speakers gave an outline of the background, purpose and vision of the Careers' week.

AES MSc alumnus, Ms Sinenhlanhla Sikhosana captivated learners with her experiences at UKZN; whilst UKZN's science "magicians", Mr Ajay Bissesur and Professor Thomas Konrad, along with postgraduate chemistry and physics students thrilled the audience with their respective science shows.

Said Bissesur: 'I was glad to see the emphasis placed on the importance of Mathematics and Science as career choices. The positive response to the science demonstrations by the learners, educators and officials clearly indicates that science can be cool, fun and intellectually stimulating.'

The annual eThekwini/UKZN STEM Career Week encourages learners to study Mathematics and Science.

After the formal programme learners were given time to visit the exhibits and interact with UKZN staff and students, drawn from the various Schools within the College of Agriculture, Engineering and Science. College Access staff member, Ms Gill Dawson said that she was pleasantly surprised to meet some of her former Access students who were now teachers at the event.

Oops!... We did it Again

Britney Spears must have had UKZN specifically in mind when she penned the lyrics for her famous song, "Oops! I did it again" - for once again AES has pulled the proverbial rabbit out of the hat, winning gold and the trophy for the best individual stand at the 2017 Royal Show.

'UKZN rated highly in all categories, and we were particularly impressed by the enthusiasm and extra effort put in by the students and staff who manned the UKZN stand,' said Royal Agricultural Show Manager, Terry Strachan.

'Our win was undoubtedly owing to the passion and the impressive knowledge of our staff and students at the stand who went out of their way to share their expertise with the general public,' said mastermind behind the project, College Public Relations Officer Ms Swasti Maney.

The stand showcased research done within the School of Agricultural, Earth and Environmental Sciences in the fields of climate change and food security. Attractions included an innovative project being undertaken by UKZN Enactus students involving vertical farming and food security for university students; an interactive climate change model showing drought and flooding scenarios; work done by UKZN's Farmer Support Group with small-scale farmers; and specially designed "khukhu khayas" (chicken homes) for easy access to protein supplies. To add a bit of spice and crowd attraction, the School of Life Sciences had an impressive collection of creepy crawlies on hand, including tenrecs and hissing cockroaches from Madagascar, tarantulas, and an array of boa constrictors both thick and thin.

With STEC@UKZN's "Dr T" wowing both young and old with her magical science show, there was always a fascinated crowd on hand to learn more about what UKZN and the College have to offer.

UKZN's College of AES once again won gold and the trophy for the best individual stand at the 2017 Royal Show.

Second Ukulinga Howard Davis Memorial Symposium Explores Food Security

The second annual Ukulinga Howard Davis Memorial Symposium was recently held at the Ukulinga Research Farm outside Pietermaritzburg. The Symposium brought together stakeholders from across the agricultural industry in KZN and the wider South African agricultural community, to showcase research carried out at Ukulinga. The more than 200 attendees included students, academics, scientists, small-scale and commercial farmers, NGO representatives and more.

Keynote speakers at the event were Dr Dickson Despommier, Emeritus Professor at Columbia University, and Professor Ben Cousins, South African Research Chair (SARChI) in Poverty, Land and Agrarian Studies at the University of the Western Cape.

Despommier is renowned for his contributions to urban agriculture and the concept of the vertical farm to combat food insecurity issues becoming more prevalent owing to urbanisation, population growth and climate change. He advocated for the creation of sustainable eco-cities to provide food security, recommending that urban agriculture be taught at agricultural institutions.

Cousins spoke about smallholder farmers and land reform in South Africa. He offered a definition of a smallholder farmer, and gave examples based on his extensive work in KwaZulu-Natal, making recommendations on how agrarian reform for 'accumulation from below' could be applied.

The Symposium explored more than just food in the theme of Food Security. It comprised presentations on a wide range of topics, including food, water and energy availability under climate change, uses of biomass, indigenous crops, vulnerability of households to food insecurity, usage of aquaponics systems, biocontrol, the development of low-cost technologies for small-scale farmers, agripreneurship, food safety for market access, and gender equality in land access.

Professor Steve Worth, Dr Dickson Despommier, Mr Dirk Esterhuizen, Mr Emerson Wohlenberg, Dr Francisco Aragao, US Consul General Frances Chisholm, Professor Deresh Ramjugernath and Mr Rod Stevens (Howard Davis Farm Trust) at the Symposium.

The event also included discussion panels each day, allowing delegates to engage with presenters; as well as exhibitions, poster displays and farm tours and demonstrations. The Friends of UKZN Agriculture annual Networking Function was also held as an ancillary gala event on the first night of the Symposium.

Bumper Crop of PhDs Promise African Food Security for the Future

UKZN's African Centre for Crop Improvement (ACCI) produced a bumper crop of doctoral candidates at this year's Graduation ceremony, with 14 students from nine different African countries receiving PhDs for their Plant Breeding research.

Students came from Mozambique, Kenya, Malawi, Ethiopia, Tanzania, Rwanda, Zimbabwe, Namibia and South Africa.

Each of the students who graduated focused on developing new varieties of the crops they studied, and through the ACCI's PhD training programme, were equipped with the skills they needed to investigate their crops and improve on their resilience in their home countries. This focus of the ACCI allows students to improve crops for an African environment in order to contribute towards improved food security back home.

Crops, and their related diseases that were studied included rice, cassava, maize, beans, tef, pigeonpea, wheat and bottle gourd.

The graduates all spoke highly of the ACCI training programme, describing how the initial coursework element, undertaken at UKZN before they began fieldwork in their home countries, enabled them to approach their research with the necessary tools to complete their PhDs successfully.

Nine of the 14 were funded by a Green Revolution for Africa (AGRA). Of this cohort, four hailed from Rwanda. 'This is a special contribution by UKZN's ACCI to improve Rwanda's agricultural research and development,' said ACCI's Professor Hussein Shimelis.

UKZN's African Centre for Crop Improvement (ACCI) had 14 students receive their PhDs for research into Plant Breeding.

Centre for Water Resources Research Hosts High Powered Sudanese Study Group

UKZN's Centre for Water Resources Research (CWRR) and its collaborators recently hosted a delegation of North Sudanese water resources managers and decision makers as part of a United Nations Environment Programme (UNEP) small project agreement.

Sudanese delegates with CWRR staff at UKZN's Pietermaritzburg campus.

The visit was aimed at contributing to the strengthened capacity of North Darfur institutions to support, scale up and replicate successful approaches to catchment management, specifically for the Wadi El Ku Catchment in North Darfur.

The gathering benefitted from UKZN's expertise and experience in Integrated Water Resources Management (IWRM), as well as its ability to facilitate training in this field. CWRR's range of expertise is in areas such as climate change, water quality monitoring, waste management, water governance, and hydrologic modelling.

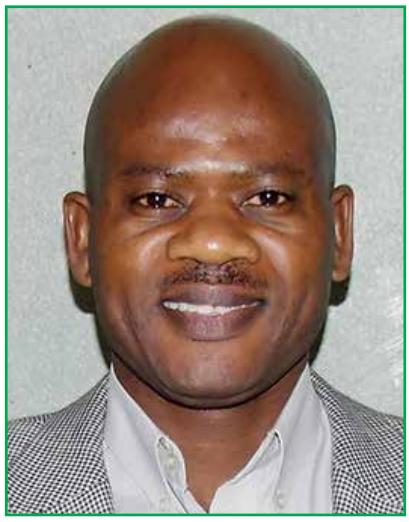
In attendance were UKZN representatives from various disciplines within the Schools of Agricultural, Earth and Environmental Sciences, Engineering, and Built Environment and Development Studies.

Delegates comprised technical staff and managers as well as high-level decision-makers hoping to learn from South Africa's two decades of experience in implementing IWRM.

Delegates participated in a series of lectures facilitated by CWRR. They visited several sites and saw aspects of IWRM in action, including the Pollution Research Group (PRG) Newlands-Mashu site, where Decentralised Wastewater Treatment Systems (DEWATS) are used for research.

A second Sudanese delegation, which visited the Western Cape, focused on organisational and governance structures and also included site visits. 'The CWRR was very happy to host the study tours and to share its collective skills and experiences gained in southern Africa with others on the continent,' said CWRR Director, Professor Graham Jewitt.

Professor Albert Modi Receives International Alumni Award



Professor Albert T Modi.

Professor Albert Thembinkosi Modi, SAEES academic and Acting DVC for UKZN's College of Agriculture, Engineering and Science, received the International Alumni Award from the College of Food, Agricultural and Environmental Sciences at the Ohio State University in the United States.

This award is presented annually to outstanding international agriculture alumni representing, supporting and promoting the College and the Ohio State University around the globe.

A crop scientist, Modi champions sustainable agriculture and the value of indigenous knowledge in informing scientific research. A graduate of the University of Fort Hare, he received his Master's degree from the former University of Natal before going on to study at Ohio State University (OSU) for his PhD in 1999 under a US Government Fulbright scholarship.

'OSU is a great university. I am proud to say that in me it produced an academic to serve the University of KwaZulu-Natal, South Africa, Africa and the world,' said Modi.

Modi was recognised for his significant contributions to food security in sub-Saharan Africa, particularly in South Africa, much of which took place while he was Dean and Head of the School of Agricultural, Earth and Environmental Sciences (SAEES) from 2011.

Modi has dedicated his career to improving the lives of rural South Africans. He served as founding Chief Executive Officer of the Moses Kotane Institute, and was chairperson of the South African Agriculture and Life Sciences Deans' Association (SAALSDA).

He was also an associate editor of the *South African Journal of Plant and Soil* (SAJPS), and has served in various leadership roles in the South African Society of Crop Production (SASCP), including being President from 2007-2008.

His principal research has been focused on indigenous-traditional crops as they relate to science and technology, crop physiology, agronomy and sustainable agriculture. He has published more than 90 peer-reviewed science articles in these areas and served as principal supervisor or co-supervisor for 28 MSc students and 13 PhD students.

SCHOOL OF CHEMISTRY AND PHYSICS

Top Drawer Physics Student to Further Studies in Massachusetts

Ms Zahra Essack was last year recognised as UKZN's best undergraduate candidate continuing to Honours studies – today she is still out in front, graduating with a BSc Honours degree in Physics *summa cum laude*.

Essack's Honours project explored exoplanets, which are planets outside our solar system orbiting stars other than the sun. Her research project involved calculating the period of transiting exoplanets using Kepler, a space telescope that searches for exoplanets using the transit method. Essack found there was a small handful of potentially habitable exoplanets and is looking forward to doing more research to ascertain fully the habitability of these exoplanets.

Essack said the main goal in the field of exoplanets was to find an earth-analog. 'I want to be part of answering the question of, Are we alone in our Universe?' she said.

Currently, Essack is enrolled for a Master's degree at UKZN with her thesis titled: "Calculating the Fraction of Potentially Habitable Earth-Sized Exoplanets Using the Transit Method". She is now set to begin her PhD in Planetary Science at the renowned Massachusetts Institute of Technology (MIT) in the United States.

Professor Mark Tame of the School of Chemistry and Physics said: 'It is really great to hear that Zahra has been accepted to study at MIT and very well deserved. We are delighted to have one of our students going on to MIT for PhD studies.'

Summa cum laude Physics graduate Ms Zahra Essack, seen here with proud parents Sabiha and Mohammed, will attend the prestigious Massachusetts Institute of Technology to further her studies.

Essack's fascination with planets started at a young age after seeing the television series, The Universe, which explored planets in the solar system. Coupled with this was a keen interest in Chemistry and Physics. 'The education I have received at UKZN has allowed me to be up to international standards and I am grateful for the opportunities it has afforded me,' said Essack.

High School Pupils at UKZN for Introduction to Chemistry Course

As part of an initiative to promote the study of Chemistry among high school learners, the discipline of Chemistry on the Pietermaritzburg campus hosted 74 young pupils and their teachers. The youngsters, from Msinga's Mawele High School, accompanied by their science teachers, took part in an introduction to chemistry course which included laboratory work and a "magic" show.

The visit, organised by Dr Vineet Jeena and colleagues, was one of many supported by the Royal Society of Chemistry (RSC). 'The School of Chemistry and Physics and the RSC have a common vision of connecting with our community and inviting the next generation to experience and enjoy the beauty of Chemistry - regardless of their financial background,' said Jeena.

'As UKZN Chemistry academics we have a responsibility to promote the science within our province. To achieve this, we aim to host all schools from the Msunduzi region for departmental visits. Through a generous donation from the RSC, we have initiated this endeavour with a visit from Mawele students. We hope to make this a bi-annual event and, in the coming years, invite as many learners as possible.'

The visiting pupils were in Grades 10, 11 and 12. Triple science – Geography, Physical Sciences and Life Sciences – is a popular subject choice at the quintile one school which is poorly equipped in laboratory resources. It was the first time the youngsters had been in a laboratory where they worked under the guidance of Mrs Kristy-Lyn Barry and postgraduate demonstrators.

Mawele High School learners, teachers and staff at the Chemistry department on UKZN's Pietermaritzburg campus.

After lunch provided by the SCP, learners were treated to a "magic" show organised by Dr Desigan Reddy, which featured various visually appealing experiments such as making "elephant toothpaste". The show ended with a bang as demonstrators lit hydrogen balloons to the delight of the group.

UKZN, which will continue to interact with the school, has been able to donate laboratory supplies as part of outreach efforts in promoting Chemistry.

Chemistry Lecturer Attends Lindau Nobel Laureate Meeting

A lecturer in the School of Chemistry and Physics, Dr Nolwazi Nombona, was fortunate enough to attend the 67th Lindau Nobel Laureate Meeting in Germany in June.

Nombona, selected for the trip by the African Academy of Science (AAS), joined fellow UKZN representative from the discipine of Chemical Engineering, Dr Mark Williams-Wynn, who was sent by the Academy of Science of South Africa (ASSAf).

Dr Nolwazi Nombona.

The annual Lindau meeting – this year dedicated to the field of Chemistry – is a forum where some 30 Nobel Laureates meet the next generation of leading scientists, comprising close to 500 undergraduates, PhD candidates and post-doctoral researchers from all over the world. The meetings foster interaction among scientists of different generations, cultures and disciplines.

More than 200 renowned science and research institutions worldwide identify the participants.

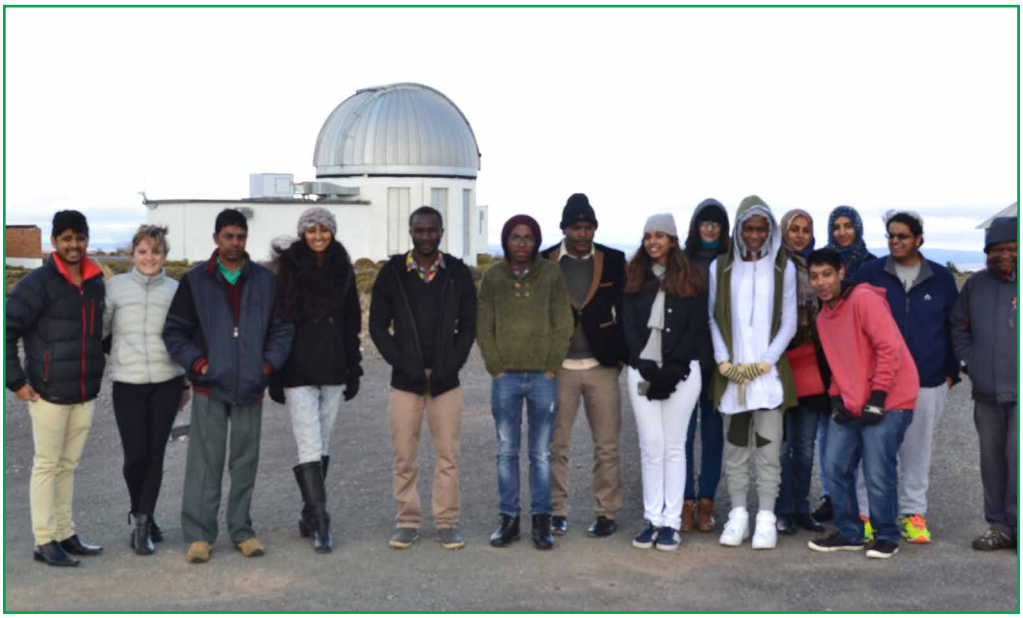
Nombona, who received her PhD from Rhodes University in Grahamstown, has been at UKZN since 2014 and is involved in research concerning the integration of inorganic molecules with nanomaterials for the development of electrochemical sensors which detect pathogens and carcinogens in the environment.

Nombona's interest in the field was sparked by the realisation that scientists can use relatively cheap materials for the development of sensors that could radically improve people's lives. She hopes to contribute to the generation of new knowledge that will support the fabrication of efficient on-site sensor devices.

Excited by this once-in-a-lifetime opportunity to travel to Lindau and meet the Laureates, Nombona anticipates future collaborations to arise after meeting with other young scientists as well as being exposed to networks unlike any she has encountered at other conferences she has attended.

UKZN Students Tour SA's Astrophysical and Space Science Research Facilities

UKZN Honours and Masters students were updated about South Africa's advances in Astrophysics and Space Science during a four-day tour of research facilities in the Western and Northern Cape provinces.



UKZN students at the Southern African Large Telescope (SALT) facilities in Sutherland.

The tour was organised by the UKZN node of the National Astrophysics and Space Science Programme (NASSP) which is a multi-institutional postgraduate programme, funded by the Department of Science and Technology (DST) through the National Research Foundation (NRF).

Based in the School of Chemistry and Physics, the programme aims to train graduates in Astronomy, Astrophysics and Space Science who come from various institutions across the country and as far afield as Malawi, Ethiopia and Kenya.

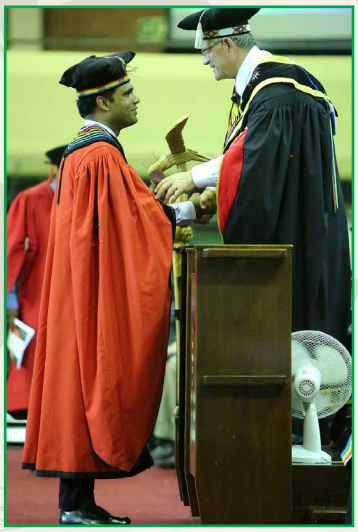
According to Academic Leader of the UKZN NASSP node, Professor Sivakumar Venkataraman, the programme will contribute to strengthening UKZN's Space Science and Astrophysics teaching and research as well as build capacity in the field in South Africa.

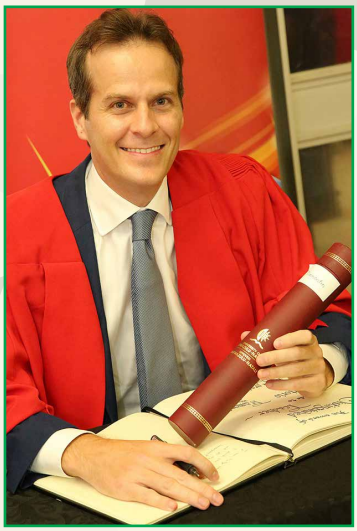
The tour was attended by 14 students. The group visited the University of Cape Town NASSP node as well as the South African National Space Agency (SANSA) and the Houwteq Space Centre, a subsidiary of Denel Spaceteq. Then it was on to Sutherland, where the students went on a night tour of the astronomical facility to view stars and planets through telescopes and visited the Southern African Large Telescope (SALT), the largest optical telescope in the southern hemisphere, which is breaking ground in terms of scientific and astrophysical research advancement.

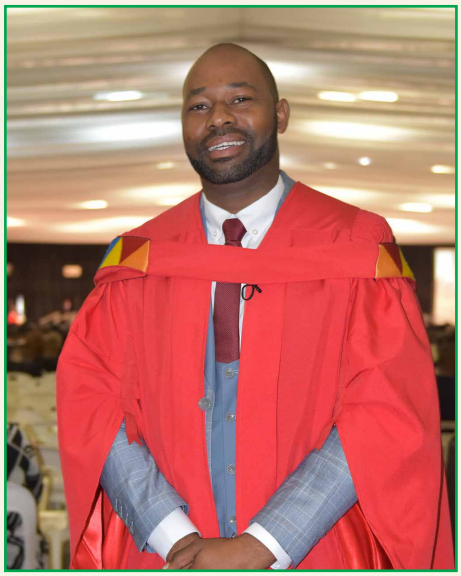
Students on the tour said the experience had been invaluable in exposing the infrastructure and potential available to South Africans and Africans through NASSP. The group thanked everyone involved in making the trip successful.

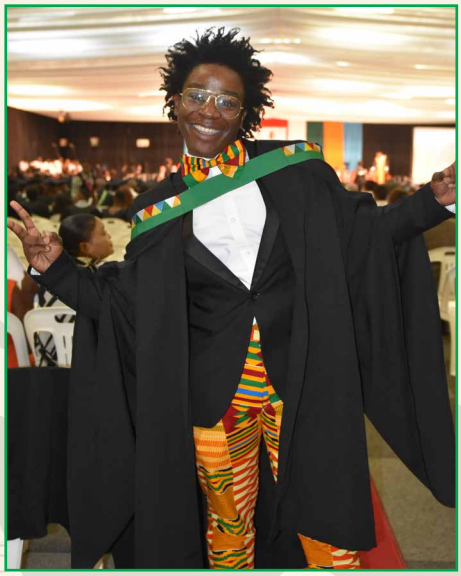
2017 GRADUATION

Congratulations to all our graduands. At the 2017 ceremonies, the College of Agriculture, Engineering and Science conferred 2 042 degrees and diplomas out of a university total of 10 148. This included 128 PhDs, 299 Masters, 333 Honours and 1 240 Bachelors degrees, as well as 42 Postgraduate diplomas.

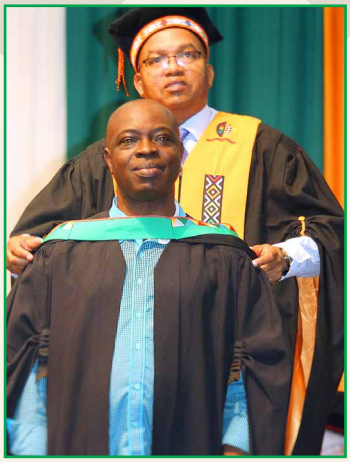


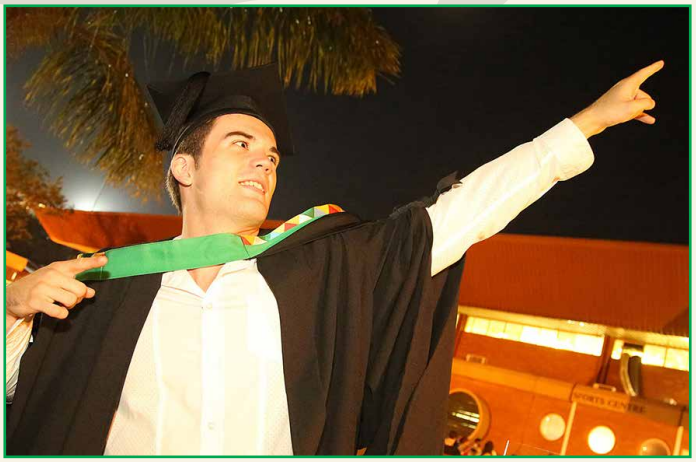


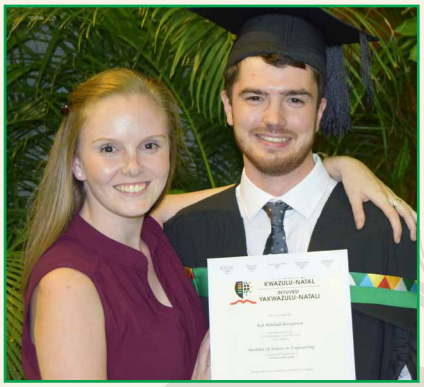


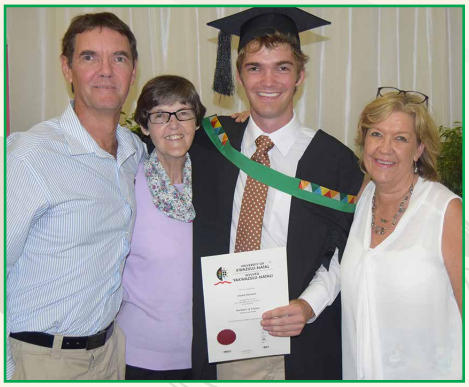


2017 GRADUATION





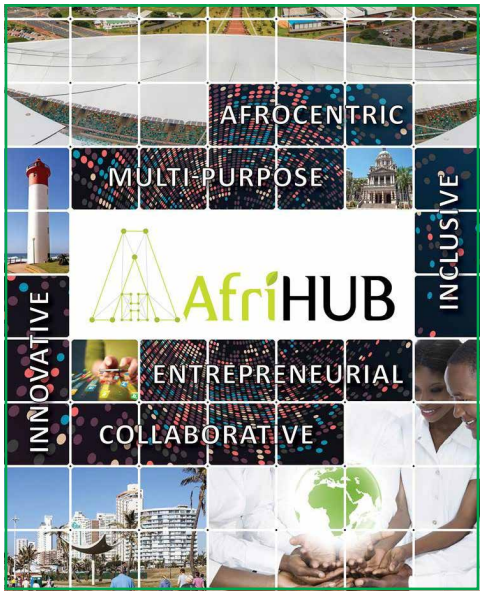
SCHOOL OF ENGINEERING

"AfriHub"- Re-imagining Smart and Sustainable Cities for Africa

'Unlocking value in the engineering education value chain lies at the heart of the Hub for the African City of the Future (AfriHub) initiative,' says Dr Rudi Kimmie, the newly appointed Manager of AfriHub.

Kimmie, with extensive experience in engineering education, philanthropic engagement, entrepreneurship and project management, is committed to repositioning UKZN's School of Engineering so that it draws on multi-disciplinary synergies and aligns more closely with societal and industry needs.

AfriHub, located within the School of Engineering, taps into emerging Afro-optimism on a continent which has met most of its Millennium Development Goals. By leveraging the potential of highly skilled researchers and scholars at the Premier University of African Scholarship, the AfriHub project aims to pursue projects which are entrepreneurial, innovative and growth oriented.



UKZN's School of Engineering has established the AfriHub to act as a trans-disciplinary centre for research into smart and sustainable cities.

With a strong symbiotic link to the engineering and business sectors, AfriHub will actively pursue critically needed investment to enable skills development and economically relevant research with high social impact.

AfriHub elicited excitement after its presentation at the Science Forum South as well as exposure it got on Touch Radio earlier this year. To date, AfriHub has engaged with numerous prospective corporate partners, is revisiting the School's Memorandum of Understanding with eThekweni Municipality and has already attracted bursary pledges of over R1 million. 'AfriHub presents a fresh new vision through which we intend to train engineers for the African City of the Future', said Dean and Head of the School of Engineering, Professor Cristina Trois. 'It's Mission is to facilitate multidisciplinary engagement that will result in innovative and sustainable solutions for African problems.'

UKZN Selected for Seeding Labs 2017 Instrumental Access Programme

UKZN is one of 15 global institutions awarded equipment to advance scientific research and teaching through the Seeding Labs 2017 Instrumental Access programme.

Seeding Labs is a United States-based non-profit organisation working to accelerate solutions to the world's most pressing problems by catalysing the power of scientists. Its flagship programme, Instrumental Access, makes high-quality laboratory equipment and supplies available to university departments and research institutes in developing countries.

After a rigorous screening process, UKZN was one of 15 institutions chosen for Instrumental Access 2017 from a pool of 65 applications from 24 countries. The application for instrumental access was made by Professor Annegret Stark of UKZN's School of Engineering (Chemical Engineering). Stark holds the Sugar Milling Research Institute Chair in Biorefinery.

In her application, Stark outlined the ways that an infusion of scientific equipment would remove barriers to STEM education and research at UKZN, pave the way for new avenues of scientific inquiry and expand hands-on opportunities for students.

The equipment will be used by Stark's Bioeconomy Research Group, in the Department of Chemical Engineering. This interdisciplinary group is investigating opportunities to convert local biomass into chemicals and materials, and implement the biorefinery concept in industry. The group takes a holistic approach, covering fundamental investigations

A successful bid by Professor Annegret Stark led to UKZN being awarded equipment to advance scientific research and teaching through the Seeding Labs 2017 Instrumental Access programme.

of biomass composition and properties, resource and market analysis, chemical and catalytic conversion and separation, as well as process development.

'Equipment provides a foundation for other critical resources that allow scientists to generate new knowledge, leverage sustainable funding and better prepare university students for the scientific workforce and innovation economy,' said Stark. 'We are extremely grateful for this award of laboratory equipment from Seeding Labs.'

To date, Seeding Labs has shipped 137 tons of equipment to 47 institutions in 27 countries.

UKZN Vehicles Steal the Show at Cars in the Park Exhibition

All six vehicles that UKZN Mechanical Engineering students and staff exhibited at the 2017 Cars in the Park event in Pietermaritzburg were massive crowd pullers!

The innovative vehicles – which stood out at the annual exhibition of vintage and classic cars, trucks, vans and motorbikes – are among the School's most prized design-projects.

Students and staff from the discipline of Mechanical Engineering exhibit their projects at Cars in the Park.

UKZN vehicles on display were the Wing-In-Ground Effect (WIG) Flying Hovercraft; the Hulamin Solar Car; the Mamba Electric Vehicle; the Human Operated Recumbent - Electric Trike (THOR-ET); the Smart Technology Pedal Bus; and the much admired 1926 Model T Ford, named Tin Lizzie. They are all ongoing projects developed over the years with the help of industry contributions.

Academic Leader for Mechanical Engineering, Professor Glen Bright, said the vehicles told a story of the evolution of engineering design and transportation.

'With the exception of the Model T Ford, which was refurbished, these amazing transport innovations were designed and developed from scratch by students, both at undergraduate and postgraduate level,' said Bright. 'We are proud to showcase this exceptional work to the public.'

Crowds were entertained with demonstrations of both the WIG Flying Hovercraft and the Mamba Electric Vehicle. And those folks who wanted to experience the vehicles in motion were treated to a test drive of both the Pedal Bus and the THOR-ET.

To learn more about the Cars in the Park event visit http://www.vscc.co.za/Cars_in_the_Park.html.

Pollution Research Group Hosts BMGF Launch Visit

The Pollution Research Group (PRG) in UKZN's School of Engineering recently hosted a delegation of Bill & Melinda Gates Foundation (BMGF) representatives and a select number of their grantees for a visit to kick-start a programme initiated in 2016, which involves the engineering field testing of "Reinvented Toilet" prototypes in Durban.

UKZN's Pollution Research Group (PRG) recently hosted a delegation of Bill & Melinda Gates Foundation (BMGF) representatives and grantees, for a visit linked to the ongoing "Reinvent the Toilet" project.

The trip involved site visits to the areas earmarked for the proposed tests in eThekwini, status updates from the various partners, a workshop to discuss site selection, grantee needs, local resources and community engagement, as well as visits to local fabricators who could be used to build the systems or components of the systems.

The PRG works closely with eThekwini's Water and Sanitation unit (EWS) in the implementation of research that can improve the water and sanitation services both to the local community and on a global scale. International research partners involved are from Cranfield University in the UK, the Research Triangle Institute (RTI), the University of South Florida, and Janicki Industries, all in the USA.

This programme arose from the global recognition of the PRG's expertise as sanitation practitioners working in the field of faecal sludge management, particularly through the work of its Head, Professor Chris Buckley, who was one of three experts consulted by the BMGF, engaging in direct discussions with Bill Gates, in 2009 about the advancement of sanitation solutions for developing countries. Recognising this advancement would require technological step-changes in sanitation, the Reinvent the Toilet Challenge was launched to accelerate new innovations that could ultimately improve access to sustainable sanitation infrastructure and public services in developing nations.

BMGF Senior Programme Officer, Dr Carl Hensman, spoke about the selection of Durban as a site to test these prototypes as being in line with its reputation as a city of excellence in sanitation. The hope is that the innovative technologies being piloted could trigger the development of novel business models in dealing with sanitation challenges.

Top UKZN Academic and Researcher Wins NSTF 'Science Oscar'

Professor Colleen Downs

The South African Research Chair (SARChI) in Ecosystem Health and Biodiversity in KwaZulu-Natal and the Eastern Cape, Professor Colleen Downs, was announced the winner of one of the 13 highly acclaimed National Science and Technology Forum (NSTF)-South32 Awards at a gala dinner in Gauteng on 29 June. Downs received the award for Research Capacity Development other than Engineering by individuals over the last 5-10 years.

'This is wonderful news that we celebrate across UKZN,' said Vice-Chancellor Dr Albert van Jaarsveld. 'Professor Downs has set the pace at the university in terms of her research productivity over numerous years and this is well deserved national recognition of her pivotal role in training the next generation of young researchers.'

Downs dedicated her Award to, 'all those who make a difference every day in science and technology, but never get recognition for it – from grade 1 teachers up.'

Initiated in 1998, the NSTF-South32 Awards – dubbed the Science Oscars of South Africa – recognise outstanding contributions to science, engineering and technology (SET) and innovation in South Africa for researchers and other SET-related professionals.

In addition to receiving the Research Capacity Development Award, Downs was a finalist in two other categories: the Lifetime Award (in recognition of an individual's achievements over a period of 15 years or more); and the NSTF-GreenMatter Award (for contributions to biodiversity, conservation, environmental sustainability and a greener economy).

Selection as a finalist in three categories was a considerable achievement given the growing profile of the awards, the quality of nominations and the competition the nominees faced.

Downs has been recognised nationally and globally for her work in biology, particularly in terrestrial vertebrate ecology, having conducted research on animals from Nile crocodiles to hadedas. Her more than 200 publications reach a wide audience, helping her meet her goal of furthering and communicating science. She has also been featured on popular platforms such as BBC Earth.

Downs is consistently named the top-published female academic at UKZN, and has supervised more than 60 post-graduate students.

Bews Herbarium Curator Networks for Shared Plant Information

The curator of the Bews Herbarium (NU) at the School of Life Sciences on the Pietermaritzburg campus, Dr Benny Bytebier, attended the Association for the Taxonomic Study of the Flora of Tropical Africa (AETFAT) Conference in Nairobi where he trained herbaria curators on imaging and digitisation of preserved herbarium specimens using the Botanical Research and Herbarium Management System (BRAHMS).

Trainees included curators from herbaria in the Western Indian Ocean area – a biodiversity hotspot rich in endemic plants threatened by anthropogenic activity. Creating an inventory of these species is vital in ensuring their conservation; and imaging and digitisation using BRAHMS ensures that important information about the local flora is collated, conserved and shared.

Bytebier has curated UKZN's collection of an estimated 150 000 specimens of plants since 2008, in a herbarium begun in 1910 with specimens dating back to the 1860s. The Bews Herbarium is one of six major herbaria in South Africa, which together store 85% of South Africa's botanical specimens. UKZN has the largest one in KwaZulu-Natal.

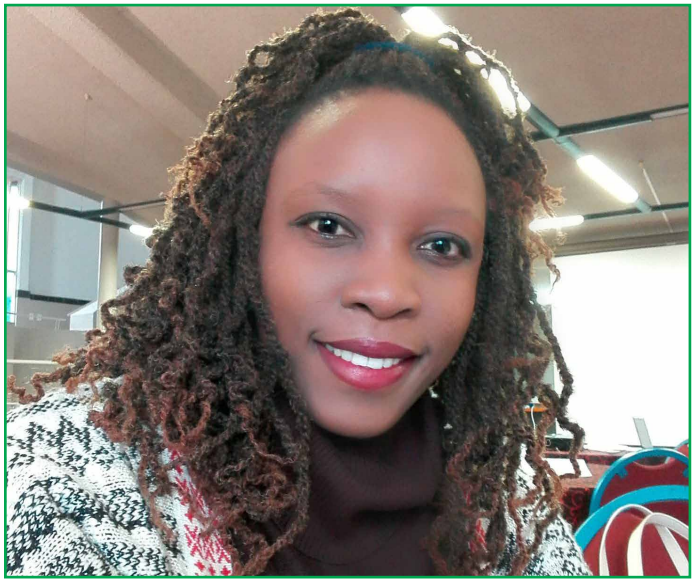
Bytebier supported digitising this important collection of plant specimens onto the BRAHMS system, and has seen the system adopted by the South African National Botanical Institute (SANBI). So far, about 30% of the specimens in the Bews Herbarium have been digitised. They are available to scientists and the general public online via http://bewsherbarium.ukzn.ac.za. Bytebier has previously presented training on this system together with colleagues from the University of Oxford.

Dr Benny Bytebier (right) at the East African Herbarium (EA) in Nairobi.

'This is an incredible resource to learn about plants in this area – there are many but little is known about them,' said Bytebier.

Bytebier added that the long-term aim was to integrate these databases into one single resource of all locally available plant information.

First Talent Excellence and Equity Acceleration Scholarship Candidate Appointed as Lecturer



Dr Nontobeko Mvubu.

Twenty-seven-year-old Dr Nontobeko Mvubu, who holds a PhD in Microbiology from the University of KwaZulu-Natal, has become the first Talent Excellence and Equity Acceleration Scholarship candidate to be appointed as a lecturer at the University.

Mvubu's dream to become a lecturer was realised thanks to the University's drive to appoint academically excellent Black students as lecturers. 'I wanted to be a lecturer because of the love I have for research as well as for teaching,' said Mvubu.

Mvubu has consistently shone academically throughout her time at the University, receiving numerous accolades, scholarships and bursaries including a TATA Scholarship, awarded at the 2013 Women in Science awards ceremony, an initiative of the Department of Science and Technology (DST).

She plans to be a well-recognised and established researcher in Tuberculosis and Bioinformatics. 'In addition, I want to be integrally involved in student training from undergraduate teaching of different levels offered in my discipline,' she said.

Mvubu is originally from Mandeni in KwaZulu-Natal. 'With the current challenges in South Africa's and Africa as a whole, I believe in what Tata Madiba said: "Education is the most powerful weapon which you can use to change the world",' said Mvubu.

The Talent Excellence and Equity Acceleration Scholarship, which supports the Graduate Development Programme (GDP), seeks to contribute to the development of the future academic pipeline at the University. There are currently 34 students on the programme across UKZN, who are on track to becoming future academics; and ten are currently registered for PhDs.

UKZN Celebrates World Oceans Day

UKZN staff, students and school learners at the World Oceans Day held at the Bayhead Natural Heritage Site.

'If there were no oceans, there would be no life on earth. All of our rain comes from the ocean – no oceans, no rain. No rain, no forests, no crops, no anything …'

These were the words of UKZN Marine Biologist, Dr David Glassom, who was speaking at a World Oceans Day event arranged by Marine PhD candidate and founder of the Refilwe Matlotlo environmental organisation, Ms Refilwe Mofokeng.

'We depend on the ocean for about 50 percent of the oxygen that we breathe,' said Glassom. 'Half a billion people depend directly for their food or their livelihoods on coral reefs – that's one in every 14 people on earth. So when people tell you about climate change – don't think about the polar bears. Think about the people who will suffer. We are changing the climate faster than it has ever changed in more than 200 million years.'

Mofokeng, who specialises in pollution, said the event, attended by Grade 11 learners, was hosted in conjunction with 20 other universities who marked World Oceans Day by taking action. She emphasised the importance of teaching others with the day's events including a harbour clean up and demonstrations on how scientists test the waters in Durban for pollution and toxicity levels.

UKZN doctoral candidate Mrs Christine Onyango spoke on coral and its role in the ecosystem, while Dr Tshoanelo Miya, who holds a PhD in Ichthyology, examined the various aquatic environments and the importance of balancing ecosystems.

Durban Youth Council members comprising Grade 11 learners posed questions, including the impact of the United States pulling out of the Paris Climate Agreement. The Mayor of the Durban Youth Council, Ms Ruth Thumbi, a Grade 11 learner at Durban Girls' College, emphasised the importance of the youth getting on board with climate change.

Mofokeng hosts a monthly clean up at the Durban harbour. The initiative is supported by UKZN, John Dory at Wilson's Wharf, the Bat Centre, the Natal Royal Yacht Club and Spur. Those wanting to get involved or learn more about how to make a difference should visit the Facebook page: https://www.facebook.com/www.GetInvolved.net.

SCHOOL OF MATHEMATICS, STATISTICS AND COMPUTER SCIENCE

SMSCS Launches Fresh Cohort of Scarce Skill Professionals

Masters and PhD graduates from the School of Mathematics, Statistics and Computer Science are ready to offer their professional services in scarce skill areas.

UKZN's School of Mathematics, Statistics and Computer Science has launched a fresh cohort of urgently needed scarce skill professionals into the marketplace.

In total the School graduated 16 PhD and 39 MSc students in the disciplines of Mathematics, Statistics and Computer Science across the two campuses during UKZN's 2017 graduation ceremonies. Pietermaritzburg accounted for six PhD and 12 MSc graduates; whilst Westville produced ten PhD and 27 MSc graduates respectively.

'Our School consists of three key disciplines which are all recognised scarce skills. As such, our graduating students are in high demand in both industry and academia,' said Academic Leader for Research within the School, Professor Henry Mwambi.

'The specific research projects covered a wide range of topics rich in both methodology and application components with direct relevance to solving real life problems affecting mankind,' he said.

For example, Dr Nageeb Haroun, who was supervised by Professor Precious Sibanda, earned his PhD in Applied Mathematics for research he conducted into convective heat and mass transfer in boundary layer flow through porous media saturated with nanofluids.

In the discipline of Statistics, Ms Sithobile Prudence Zungu gained her MSc for work done on time-to-event analysis models including frailty effects in understanding infant and child mortality in Lesotho. She was supervised by Mwambi and Professor Shaun Ramroop.

Finally, computer guru Mr Christopher Rae was capped with an MSc in Computer Science for the study he conducted on evolutionary perturbative hyper-heuristics for the problem of nurse rostering. He was supervised by Professor Nelishia Pillay.

'It gives us great pleasure to witness these young men and women attain such high levels of qualification in disciplines like ours,' said Mwambi. 'I take this opportunity to wish all of them the very best in their future academic and career plans.'

UKZN Astronomer Gets Award for Research Excellence

Dr Matt Hilton of the Astrophysics and Cosmology Research Unit (ACRU) and the discipline of Mathematics has received the 2016 Vice-Chancellor's Award for Research Excellence. The award is presented in recognition of outstanding research achievements and the earning of international reputation in the researcher's discipline.

Hilton has nurtured a lifelong passion for science, particularly astronomy, cutting his teeth on astronomy books, magazines, documentaries and science fiction novels. He received his degree in Physics and Astronomy from the University of Sheffield in England and then completed his PhD at the Astrophysics Research Institute at John Moores University in Liverpool.

Hilton conducted post-doctoral studies at UKZN's ACRU from 2007-2010 before joining UKZN as a lecturer in August 2012.

Working in observational cosmology, Hilton is now studying galaxy clusters. 'These are the most massive gravitationally-bound objects in the Universe – they are 100-1000 trillion times bigger than the Sun,' explained Hilton.

In his work, the "ingredients" comprising the Universe can be explored by measuring the growth of galaxy clusters over cosmic time. This includes assessing the amounts of ordinary

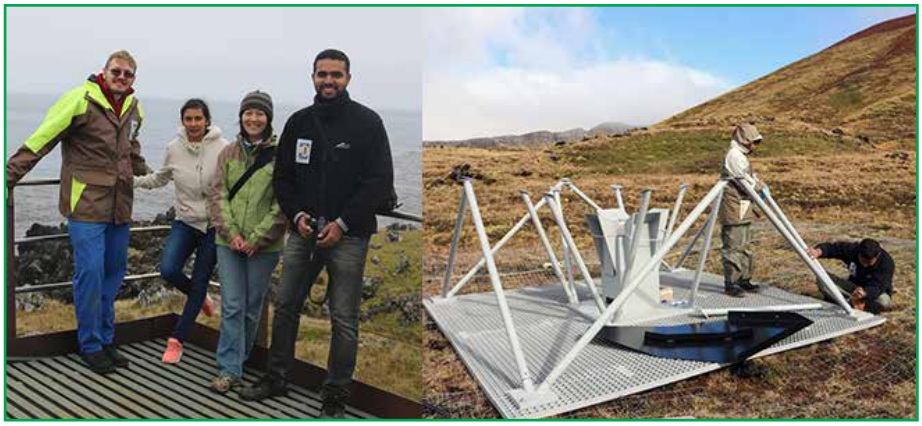
Dr Matt Hilton.

matter, mysterious dark matter and dark energy, and even the sum of the neutrino masses.

Hilton is currently searching for galaxy clusters with the Atacama Cosmology Telescope (ACT) and doing follow-up observations of some of them with X-ray telescopes (Chandra, XMM-Newton) and with the Southern African Large Telescope (SALT), in order to measure their masses.

'We also hope to observe a large sample of ACT clusters with the South African MeerKAT radio telescope,' said Hilton. 'This will tell us about non-thermal emission associated with the intracluster gas.'

Exploring the Cosmic Dawn



UKZN research team members (from left) Mr Heiko Heilgendorff, Ms Ridhima Nunhokee, Dr Cynthia Chiang and Mr Liju Philip. (Right) the team assembling the 70MHz antennae.

A UKZN research team has returned from a trip to Marion Island in the sub-Antarctic Indian Ocean where they conducted work on probing radio intensity at high-Z from the Marion (PRIZM) telescope. The team comprised senior lecturer at the Astrophysics and Cosmology Research Unit (ACRU), Dr Cynthia Chiang, and Astrophysics PhD students Mr Liju Philip, Ms Ridhima Nunhokee and Mr Heiko Heilgendorff.

PRIZM is a low-frequency radio telescope which collects information about the universe during the Cosmic Dawn – the period a few hundred million years after the Big Bang when the first stars in the universe formed. The light from these first stars is too dim for optical telescopes to see thus they have never been measured directly. PRIZM is designed to make this measurement and data received could help in determining when the first stars and galaxies formed.

In their quest to capture uncontaminated data, the astronomy team selected Marion Island as the location for the telescope as it is separated from the nearest continental landmasses by 2 000 km and is one of the most radio silent locations in the world. The team had only three weeks to get everything up and running. In spite of high winds and rain they succeeded in deploying two new antennas on the PRIZM telescope observing at 70 and 100 MHz.

'Marion Island is a fantastic new location for radio astronomy, and we're very excited to see the data from our year of observations,' said Chiang. 'The telescope worked beautifully thanks to hard work from the whole team, especially the students who participated in the voyage and who relentlessly braved the long hikes and harsh weather to get the science done!'

Exploring Marion Island as a new place for low frequency astronomy is exciting as the island may actually provide the best place to observe ultra-low frequencies (10 MHz). If researchers can get to those low frequencies, it would be possible to start looking back to an earlier time in history, such as the Dark Ages – the period before the Cosmic Dawn.

2017 Siyanqoba Maths Programme Sharpens Young Minds

The UKZN chapter of the Siyanqoba Maths Training Programme got off to a great start for 2017 when 153 learners from 27 schools competed for selection into the programme. There was a separate test for competitors in Grades 7-9 and for those in Grades 10-11.

The programme forms part of the Department of Science and Technology (DST)-funded initiative in collaboration with the South African Mathematics Foundation (SAMF).

Emeritus Professor Poobhalan Pillay addresses the new crop of Siyanqoba Maths Olympiad Training Programme pupils.

The Siyanqoba Maths Olympiad training programme is an outreach project for high school students throughout the country who show particular ability and interest in mathematics. It covers enrichment material which is not found in the school curriculum and aims to improve South Africa's international competitiveness in Science, Technology, Engineering and Mathematics.

Dean and Head of UKZN's School of Mathematics, Statistics and Computer Science, Professor Delia North, encouraged the learners to take advantage of every opportunity that came their way during the course of their studies. She also thanked members of the School who helped to administer the important outreach project.

Professor Poobhalan Pillay, Emeritus Professor of Mathematics in the School and local co-ordinator of the programme, said that the brightest of the young mathematical minds were trained for the first round of the South African Mathematics Olympiad (SAMO) which was held in March; and for those who qualified, the second round held in May.

He said that since 2011, UKZN had been one of eight South African tertiary institutions which was part of this national initiative. During this period, six learners who trained at UKZN reached the top 10 in the country – a laudable achievement as more than 80 000 learners participate each year in the SAMO Round 1.

Up Coming CAES Events

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THE GREAT UKZN SCIENCE SHOW-OFF

In celebration of National Science Week

A fun and entertaining show for the whole family.

Featuring some of UKZN's top scientists:

Dr T aka Tanja Reinhardt & **Colleagues**

Date: Monday 7 August 2017
Venue: DSLT, Pietermaritzburg Campus, UKZN

Date: Tuesday 8 August 2017
Venue: T7 lecture theatre, Westville Campus, UKZN

Time: 5:30 for 6:00 pm

National Science Week

ENQUIRIES: Dr Tanja Reinhardt on 031 260 2524 or **e-mail** stec@ukzn.ac.za **Website:** www.stec.ukzn.ac.za

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Sally Frost (Frosts@ukzn.ac.za) or **Leena Rajpal** (Rajpall@ukzn.ac.za)
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Cost: R40 per person (includes breakfast)

Prizes will be awarded to:
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Best Representation

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