

Message from the Dean



Professor Deo Jaganyi.

The year of the World Cup has gone and as a country we are proud to have hosted one of the most successful show pieces in the world. Despite the challenges and the excitement that came with the World Cup, the Faculty remained steadily on course with respect to its vision and mission. Our hard work, from both staff and students, continues to separate us from the rest with some notable special achievements, as highlighted below.

In 2010 the Faculty exceeded the agreed DoHET target of 5495 by registering a total of 5557 students (Pietermaritzburg 2225 and Westville 3332) three years ahead of planned time, as young men and women continued to be attracted to our commitment to cutting-edge teaching, extensive academic support and world-class research. The huge number of undergraduate students posed a challenge to all of us, but as usual we stood the test of time. As a Faculty we introduced for the first time the repeat teaching of MATHS130 and CHEM110 in both semesters as part of our strategy of meeting our enrolment target. This initiative has seen over 280 first-year students who would otherwise not have completed the modules, able to complete and remain in the Faculty. In 2010 the Faculty was also able to raise over R11 million to fund our financially needy students in the Centre for Science Access.

The Faculty officially opened the new premises for the School of Biochemistry, Genetics and Microbiology on the Westville campus, bringing to an end the consolidation of schools due to the merger process and the creation of the science park at the Westville campus.

To strengthen the operations of our teaching and research support units, the Faculty reviewed its Central Academic Workshop, Electronic Workshop and Mechanical Instrument Workshop and implemented the recommendations. This was also true for the two microscopy facilities.

The Faculty Fun Run on September 17, which was a centenary celebration event, was a success with approximately 300 people taking part. In addition we held a centenary lecture on Climate Change given by Professor Mike Meadows from UCT. Also, as part of the centenary celebrations the School of Chemistry in Pietermaritzburg hosted a very successful centenary celebration for its 100th birthday. Around 100 alumni, former staff, and distinguished guests from the chemical industry attended the function.

On the research front the Faculty continued to be a force. The Centre for Quantum Technology and the eThekweni Municipality joined and provided unprecedented communication security to Durban's FIFA World Cup operations. The QuantumStadium Project used quantum cryptography to ensure that all forms of communication between Durban's Moses Mabhida Stadium and its offsite operations centres were ultra-secure. The Vice-Chancellor's Research Award for 2009, the top publisher for 2008, 2009 and the top woman publisher awards were all taken by our Faculty. The Faculty's total productivity unit as determined by the research office grew by 10% in comparison with the previous year. Our researchers also dominated the top 10 University Research list by taking five positions. The Faculty Research Day where our postgraduate students showcase their work took place on September 23 in Pietermaritzburg. The quality of both the oral and poster presentations was commendable.

The Faculty has invested a lot of money in expensive research equipment and facilities. The two Liquid Nitrogen plants for Westville and Pietermaritzburg were completed and commissioned at a cost of R7 million. Two state-of-the-art, high-resolution transmission electron microscopes (HR-TEM) for each of the microscopy facilities have been ordered at a cost of R9.2 million. In addition the NRF, in collaboration with the Research Office, awarded the Faculty a total sum of R7.4 million towards the purchase of a Field Emission Gun Scanning Electron Microscope. This investment should see the facilities at both centres equipped for the next 15 years. The Faculty also invested R2.8 million to fund 20 postdoctoral students in addition to the ones supported by the Research Office, i.e. two in each school.

This year the Faculty has also invested a total of over R11 million in state-of-the-art equipment for teaching and research. This will make the Schools in the Faculty more competitive nationally and internationally.

A number of our students scooped a variety of accolades while many of our staff were appointed to a number of professional bodies. Our Professor Emeritus in the Faculty made us proud: Professor Mario Ariatti received the "Cavaliere dell' Ordine della Stella della Solidarietà Italiana" – a knighthood from the President of the Republic of Italy. I think we should now call him Sir Ariatti. Professor Pat Berjak was recognised for her contributions to seed science research, and was awarded the Living Legend accolade in the category of conservation by the eThekweni Municipality. Professor Hannes van Staden received two highly prestigious awards highlighting his outstanding lifetime achievements, leadership at the highest level and contribution to the advancement of science in South Africa. These include the M.T. Steyn Medal for Natural Sciences and Technical Achievement and the 2010 Gold Medal of the Southern African Association for the Advancement of Science. Professor Manfred Hellberg was appointed by the Minister of Science and Technology to head the DST Astronomy Desk at the Department of Science and Technology. As a faculty we couldn't have asked for anything more.

A number of our staff retired in 2010 and we would like to wish them all the best in their retirement and to thank them most sincerely for their contributions to the growth and success of the Faculty.

In 2011 the Faculty will introduce the discipline of Genetics on the Westville Campus. As a result the Faculty is currently investing approximately R10 million in renovating and equipping the laboratory in preparation. The other project in 2011 will be the renovation of the Rabie Saunders Building in Pietermaritzburg funded by DoHET and the University. The biggest project is fund raising for the construction of a R100 million African Institute of Sustainable Rural Livelihoods building in Pietermaritzburg.

Our achievements in 2010 have been possible because we have worked as a team with a common goal and purpose. The hard work has certainly raised our academic stature and that of UKZN both nationally and internationally. As the Dean of the Faculty, I can only say **thank you** to all of you who have worked tirelessly to make the Faculty of Science and Agriculture pre-eminent. As we move into 2011 I would like to urge all of you to remain positive and to seize the opportunity that the reconfiguration of the College will bring. All the best for 2011.

Centenary fun run fosters camaraderie

Everyone was a winner at the Faculty's centenary fun run held at Ukulinga farm in Pietermaritzburg. Approximately 300 staff and postgraduate students ran or walked the 5 km course and were rewarded with a special centenary medal. Although an annual event on the Faculty's calendar, this year's fun run was dedicated to celebrating 100 years of academic excellence and featured commemorative trophies and medals.

The Centenary Shield for the First Man was won by Dr Timo Van Der Niet and the Centenary Floating Trophy went to Ms Vicky Crookes. The Last Person Home award was claimed by Mr Ashlin Munsamy. The closely contested team awards were won by: the School of Biochemistry, Genetics and Microbiology for the Best Representation, the Faculty of Science and Agriculture for the Best Team Spirit and the discipline of Animal and Poultry Science for the Best Dressed Team.



Postgraduate Research Day spotlights excellence

The Faculty held its annual Research Day on September 23 on the Pietermaritzburg campus. The event was dedicated to highlighting the research activities of the Faculty's Masters and PhD students *via* oral and poster presentations. It was co-ordinated by the Science and Agriculture Postgraduate Society and received sponsorship from the UKZN Research Office and the 10 Schools within the Faculty. Other organisations and units supported the day by sponsoring a table at which they marketed their services – these included: Labotec, the Intellectual Property and Technology Transfer Office, Van Schaik Bookstore and UKZN Innovation.

Throughout the day 36 postgraduate students presented oral presentations which were divided into two streams: Mathematics (M) Stream and Life and Environmental Sciences (LES) Stream. Thirty-five students presented their research in poster format and a poster viewing session was held over the lunch period. First, second and third prizes in the M Stream went to: Mr Patrick Ali, Mr Daniel Uken and Mr Isaac Mwangi. Winners in the LES Stream included: Ms Lorinda Jordaan, Mr Kyle Goetsch and Ms Lorika Beukes. The Best Poster Presentation was won by Ms Alana Eksteen.



Centre for Science Access

Student Counsellors attend conference

Ms Shelley Barnsley, Ms Ntombi Mtwentula, Ms Ishara Maharaj and Ms Candice McCain, attended the 31st annual Southern Africa Association for Counselling and Development in Higher Education (SAACDHE) conference from September 13-16 at the beautiful Spier estate in Stellenbosch. Their attendance was generously funded by the Faculty of Science and Agriculture and TIES.

The theme of the conference was: *Positioning student counselling and development – best practice within a transforming higher education landscape.* Ms Barnsley presented a research paper which was co-written with Mr Nicholas Munro from the Pietermaritzburg Student Counselling and Career Centre titled: *Vulnerability to food insecurity in university students: implications for policy and practice in higher education.* She received the Best Research Paper Award and donated the winnings to the food programme on the Pietermaritzburg campus. Ms Mtwentula's paper was titled: *Exploring factors that cause access students to be academically at risk and the role of counselling in facilitating effective intervention programs,* Ms Maharaj's paper was titled: *Students' evaluations of a life skills and counselling service in a tertiary institution: recommendations for best practice.* Ms McCain presented a poster with the intriguing title of *Why is love full of hurtings?*, which focused on adjusting an existing intervention to better meet the needs of students in the area of relationships, sexuality and HIV/AIDS awareness.

Physics Tutor attends conference in Geneva

CSA Physics tutor, Ms Wendy Dlamini, who is completing her MSc degree, attended the *International Conference on Hyperfine Interactions and International Symposium on Nuclear Quadrupole Interactions* ('HFI/NQI 2010') in Switzerland from 13-17 September. Ms Dlamini said, "This was a highly appropriate conference to attend since there were sessions devoted to resonance techniques such as Mössbauer spectroscopy as well as semiconductors." Ms Dlamini's attendance at the conference was made possible through her supervisor (Professor Krish Bharuth-Ram)'s NRF research grant. A

paper on her work has been submitted to *Applied Physics Letters.*



Ms Wendy Dlamini.

Ex-Science Foundation Programme students studying abroad

In 2003 four learners from disadvantaged school backgrounds, Mr Lindelani Ndlovu, Mr Sifiso Nkosi, Mr Alfred Dimpo Molefe and Mr Scelo Ngcobo enrolled in UKZN's Science Foundation Programme. After completing and passing the one-year bridging programme, they went on to attain their undergraduate and honours degrees. Recently, they received learnerships to pursue Masters degrees in textile technology in the Czech Republic. They left the country on October 1 and will return to KwaZulu-Natal in two years' time. They will then work in the textile industry for another two years to fulfil the obligations of their contracts.



Mr Lindelani Ndlovu.



(from left): Mr Sifiso Nkosi, Mr Alfred Dimpo Molefe and Mr Scelo Ngcobo.

The Electron Microscope Unit

The last two years have been extraordinary for microscopy at UKZN. Last year we hosted a well-attended and successful Microscopy Society of Southern Africa (MSSA) conference on the Westville campus. Even more exciting than that, we commissioned a state-of-the-art Confocal Laser Scanning Microscope and an Environmental Scanning Electron Microscope (ESEM) in the Pietermaritzburg facility, and an Atomic Force Microscope (AFM) on the Westville campus. This year has been equally exciting with a successful NRF- National Nanotechnology Equipment Programme (NNEP) award towards a Field Emission Gun Scanning Electron Microscope (FEGSEM). In addition to superb nanometre-resolution even at low

accelerating voltages, the configuration of this instrument includes elemental and crystallographic analytical facilities (EDX and EBSD) as well as a low temperature (cryo) stage for the observation of frozen-hydrated biological and non-living samples. The Faculty is also investing Department of Higher Education and Training (DoHET) funds in two state-of-the-art, high-resolution transmission electron microscopes (HR-TEM) for each of the microscopy facilities. Both TEMs will have microanalytical systems as well as high-end digital cameras and image analysis capabilities.

These microscopes replace ageing equipment (mostly in excess of 15 years), and their configurations take into account

the growing needs from users across both campuses for imaging and analysis of living, hydrated specimens (ESEM and confocal microscopy in Pietermaritzburg) and high-resolution characterisation of freeze-fractured biological samples, geological samples, carbon nanotubes, nanoparticles and catalysts (FEGSEM, AFM, HR-TEM in Westville). By specialising in each these two areas, duplication across facilities is limited to TEM and the relatively inexpensive light microscopy and sample preparation equipment, all of which are indispensable for day-to-day operation in each centre.



Ms Sharron Eggers explains the workings of the Scanning Electron Microscope to a group of learners.



School of Agricultural Sciences and Agribusiness

Young academic awarded PhD in Consumer Science

During the year Ms Unathi Kolanisi, Academic Co-ordinator and Lecturer in the Food Security programme, received her PhD in Consumer Science from North West University. Her thesis is entitled: *Consumer attitudes towards rural water provision and learning strategies to enhance community participation: a case study of Madibogo, North-West Province*. It focused on the impact of socio-behavioural aspects such as attitudes towards rural water service. Her research resulted in the production of an education and training booklet which was submitted to the Water Research Commission (WRC), as well as a Rural Water Service Model for effective and efficient water provision.



Ms Unathi Kolanisi.

Appointment of technical staff boosts capacity for quality teaching and research

The shortage of suitably qualified and skilled staff in the technical sector is both well-known and documented. In many instances, UKZN technical staff are responsible for maintaining and operating costly and highly-specialised equipment and facilities. The appointment of such staff ensures that the world class laboratories housed in the Rabie Saunders building and at Ukulinga farm operate in line with national and international standards.

During November the School appointed Mr Richard Burgdorf and Mrs Hester Botha as Senior Technicians in the Disciplines of Plant Pathology and Animal and Poultry Science. Mr Burgdorf holds a BSc Honours degree, *cum laude*, in Microbiology and has extensive experience in laboratory services.



Mr Richard Burgdorf.

In addition, he has training in the use of highly-specialised equipment including the Flow Cytometry from Beckman Coulter. Mrs Botha holds a MSc in Poultry Science from UKZN. She previously held a management position in a national company in the private sector and hopes to contribute to Poultry and Animal Science on the University's research farm, Ukulinga.

Ms Nontuthuko Zimu joined the Discipline of Dietetics and Human Nutrition as the Assistant Technician in September. She will be responsible for supporting the smooth running of the discipline's laboratories. Ms Zimu holds a National Diploma in Food and Beverage Management and has experience as an event co-ordinator in the private sector.



Ms Nontuthuko Zimu.

Top UKZN academics secure funding for crop improvement research



Professor H Shimelis (front) at a project planning meeting held at the University of Pretoria with the SADC partner organisations.

nutrition, health and income security in selected bio villages in the Southern African Development Community (SADC). This project will be fully funded for the four-year period from 2011-2014 in partnership with the University of Pretoria, the University of Manitoba (Canada), the University of Malawi, Sokoine University of Tanzania, the University of Botswana, Botswana College of Agriculture, the Zambian Agricultural Research Institute, Lima SA and Market Matters Inc.

Professor Hussein Shimelis and Professor Mark Laing secured a R1, 5 million research grant from the Canadian Development Agency – International Development Research Centre (IDRC) to commence with pioneering research on the improvement and sustainable agricultural production of finger millet, pearl millet and bambara groundnut. The project aims to develop underutilised, indigenous grain crops to increase food,

Professor appointed as Deputy Head of School

Professor Gerald Ortmann, who currently heads up the discipline of Agricultural Economics, was recently appointed Deputy Head of School. Previously he served as Head of School, for a period of five years, and will bring valuable experience to his new portfolio.



Professor Gerald Ortmann.

School of Biochemistry, Genetics and Microbiology

New bioreactor

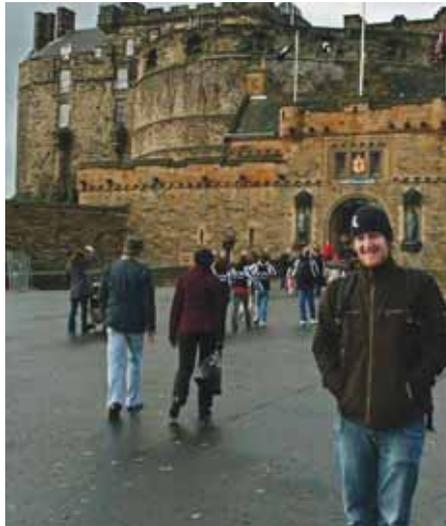
The Redox Systems Biology group (Genetics) has recently taken delivery of a bioreactor/fermentation system that will allow the researchers to precisely control and monitor the growth of microbial cultures. In conjunction with mathematical and computational analyses, this equipment will allow the researchers to fully describe the organisation and regulation of the redox networks within the yeast cell. Apart from basic research, the bioreactor can also be used for biotech applications such as fermentative metabolism and recombinant protein expression. This equipment was purchased using expensive capital equipment monies.

Professor Dean Goldring attends conference in Scotland

Professor Goldring, from Biochemistry in Pietermaritzburg, recently attended the *Parasite to Prevention: Advances in the understanding of malaria* conference held in a wet and cold Edinburgh, Scotland. The conference attracted participants from leading malaria research laboratories from all over the world. A significant development in malaria research, which was one of the key presentations at the conference, is the discovery that a species of malaria, called *Plasmodium knowlesi*, that was thought to be restricted to infecting monkeys, has been found to infect humans. This now means that there are five, rather than four species of malaria that infect man and increases the importance of developing new diagnostic reagents to detect the disease.

Professor Goldring, who works on malaria diagnostics, presented his recent work under the title *Anti-peptide antibodies in the diagnosis of malaria*. His laboratory is already working on diagnostic reagents to detect the new human infection. Malaria parasites are no longer susceptible to many of the current anti-malarial drugs. Mr David Choveaux, who is doing his PhD with Professor Goldring, is looking for novel

targets in the malaria parasite so that they can develop new malaria drugs to replace those that no longer kill the parasite. Mr Choveaux presented his work on malaria copper transport proteins. The title of his presentation was *Recombinant expression, purification and copper-binding characteristics of the amino terminus of a Plasmodium falciparum copper transport protein*. Mr Choveaux thanks the Faculty of Science and Agriculture for providing the funding for him to attend the conference.



Mr David Choveaux in front of Edinburgh Castle.

In the media

Dr Carola Niesler (Biochemistry, Pietermaritzburg) was interviewed by Mr John Maytham on the topic of the first embryonic stem cell clinical trials (for treatment of spinal injuries) which recently got underway in the USA. The interview was broadcast on Radio 702 (Cape Talk) on Sunday, October 24.

Mr Shaun Groenink (PhD student, Biochemistry, Pietermaritzburg) was interviewed by Lotus FM's Mr Ashok Ramsurap regarding African Horse Sickness during the morning show on September 15. Mr Ramsurap became aware of Mr Groenink's work after he received a Top 10 award at the National Innovation Competition in August. The interview concerned the effects that African horse sickness has on the national herd (sport horses and rural and subsistence equines) and the measures that are being taken to combat the situation.

Third year students' brews

Students had a special tasting ceremony in order to appraise the ale and lager they produced during their in Microbial Processing beer practicals. Verdict – another successful batch!



Inoculating beer kegs.

23rd Annual South African Society for Microbiology – KwaZulu-Natal (SASM-KZN) Symposium

The 23rd annual SASM-KZN Symposium was held at the Hotel School, Durban University of Technology (DUT) on October 29. This symposium is a forum where Honours and Bachelor of Technology students from UKZN, the University of Zululand and Durban University of Technology present their research projects. The Symposium was attended by over 170 delegates. Fifty-four students presented on projects ranging from biotechnology, environmental biotechnology and food technology in two parallel sessions. The students represented UKZN with pride and professionalism and were rewarded with five of the seven prizes on offer. In session one, Ms Leticia Mosina, Ms Nontobeko Mvubu and Ms Zamo Zuma (all from Microbiology in Westville) received first, second and third prize awards for their presentations and in session two, Ms Karishta Ganesh and Ms Letrisha Padayachee (both from Microbiology in Pietermaritzburg) received second and third prize awards.



Ms Nonto Mvubu, Dr Olaniran, Ms Zamo Zuma and Ms Leticia Mosina with their awards.



School of Biological and Conservation Sciences

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Staff news and achievements

- We are delighted to welcome new staff members on the Pietermaritzburg campus. Mrs Makuena Lebusa-Molapo was appointed as lecturer in Entomology while Mrs Tracey Grantham was appointed as Receptionist in the School's administration office. In addition, Ms Lorinda Jordaan was appointed as a temporary lecturer in Zoology.
- Congratulations to two technical staff members on the Pietermaritzburg campus, Ms Christina Curry and Mr Mark Brown, who were recently awarded their PhD degrees.
- Professor Richard Beckett delivered his inaugural lecture entitled *A lifetime of liking lichens* in Pietermaritzburg, which was well attended by staff and postgraduates from both campuses.
- Dr Adrian Shrader and Renny Noble are congratulated on their recent marriages.
- Dr Corrie Schoemann was one of four authors of a new book entitled *Bats of Southern and Central Africa: A Biogeographic and Taxonomic Synthesis*, which was officially launched at the Durban Natural Science Museum on September 15.
- Emeritus Professor Pat Berjak, one of our School's two A-rated scientists, recently received the highly prestigious "Living Legends" Award from the eThekweni Municipality in recognition of her contribution towards the use of cryo-preserved germplasm to conserve endangered plants.
- Emeritus Professor Johannes van Staden received two highly prestigious awards highlighting his outstanding lifetime achievements and contribution to the advancement of science in South Africa. These include the M.T. Steyn Medal for Natural Sciences and Technical Achievement and the 2010 Gold Medal of the Southern African

Association for the Advancement of Science.

Research highlights

- At the 31st triennial conference of the International Limnological Society held in Cape Town, Professor Renzo Perissinotto and Emeritus Professor Rob Hart delivered two of the six plenary lectures.
- The Amarula Elephant Research Project, directed by Professor Rob Slotow, received substantial funding from the Amarula Trust for research on issues affecting the conservation and management of African elephants.
- The Global Environmental Facility provided funding for research on the hydrology and ecosystem function of the Lake St Lucia system. Professor Renzo Perissinotto and Dr Ursula Scharler, who have worked on this system, will benefit from these funds.
- Staff and postgraduate students participated in the Faculty Research Day held in Pietermaritzburg on September 23. Professor Steve Johnson, the second of our A-rated scientists, delivered the keynote address, while Ms Lorinda Jordaan received the award for the Best Oral presentation in the Life & Environmental Sciences stream.

Outreach activities

- During the July vacation, several staff and postgraduates on the Pietermaritzburg campus participated in the *Be a Scientist for a Week* initiative, a Faculty recruitment plan aimed at attracting learners from top KZN schools to pursue further studies in science.
- Professor Dave Ward and Drs Terry Everson, Terry Olckers and Adrian Shrader presented talks aimed at refining various research skills at a

workshop organised by the Grassland Society of Southern Africa in Middelburg.

- Several staff members, including Professor Steve Johnson and Drs Angela Beaumont, Christina Curry and Terry Olckers presented talks on various aspects pertaining to invasive plants at a recent workshop on biological invasions organised by the DST-NRF Centre for Invasion Biology.
- Dr Terry Everson participated in a workshop on communal rangeland management in the uKhahlamba-Drakensberg which included researchers from the University as well as other local and international research institutes.
- Alison Young hosted two tours of the Faculty's Botanical Garden in Pietermaritzburg, including one for UKZN alumni and another for the UKZN Executive's personal assistants.
- The Ward Herbarium, which is hosted by our School's Westville campus, has been contributing to awareness of invasive aquatic weeds, largely through the efforts of PhD student Ms René Glen. In particular, there has been a focus on the risks posed by the newly discovered weed *Hydrilla verticillata* which is currently confined to Jozini Dam.

Fun Events

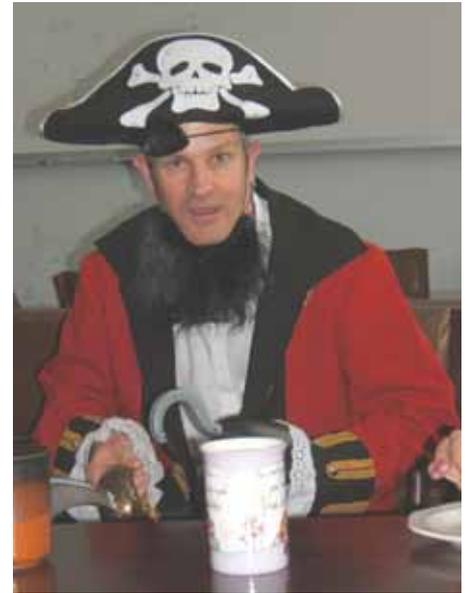
- The Faculty Fun Run, hosted at Ukulinga Research Farm on September 17, was well supported by staff and students from both campuses. Our School scooped two of the six prizes on offer, namely the Centenary Shield for the First Man Home (Dr Timo van der Niet) and the award for the Last Person Home (Ashlin Munsamy).
- Besides the "Football Fridays" which were a regular feature on both campuses, prior to and during the Soccer World Cup, Pietermaritzburg staff and

students participated in Casual Day on September 3. Adopting the “Dress for

Laughs” theme, amusing costumes were the order of the day.



Newly weds: Dr Adrian Shrader and Dr Nicole Haganah.



Dressing for laughs, Mr Renny Noble celebrates Casual Day.



Members of the Admin Office celebrating one of the many Football Fridays.



Award winners: Front row (left-right): Ms Ellen Thipe (best 2nd year student in 2009), Mr Tahir Jasat and Mr Prashen Jugdawooh (best final year design project), Mr Solomon Mashishi (best workshop student), Mr Lefuno Nemakhavani (best 3rd year student 2009), and Mr Gordon Boote (best 4th year student 2009). Back row (left-right): Mr Alan Hill, Chief Technician, BEEH Workshop; Mr Mark Zartmann, sponsor from MBB Consulting Engineers; Professor Jeff Smithers, Head of School and Mr Brian Rees.

The School held its Final Year Engineering Student Project Open Evening on Wednesday October 27. The event was attended by nearly 100 people and coincided with the Institute of Agricultural Engineering in South Africa (SAIAE), KwaZulu-Natal branch meeting and AGM, ensuring good exposure of the students to the industry. Each of the six project teams presented their projects and results, followed by a question and answer session.

The six projects were:

- The redesign and evaluation of a gel grass seed planter
- The design of a small-scale self-calibrating herbicide applicator
- The design of a sub-surface sludge applicator
- The design of a small-scale precision planter
- The design of water cooling systems for buildings and greenhouses
- The design of a humidity control system for wine storage

UKZN credited for conducting strategic sugarcane transport research

An article in the June edition of the *Southern African Sugar Journal* acknowledged UKZN's, and in particular, BEEH researchers', significant contribution to South Africa's sugarcane transport industry. For over a decade, researchers from UKZN have been contributing towards research and driving skills development in the industry. Most active in this area is Carel Bezuidenhout, an associate professor in the School who is employed as a Senior Research Fellow, supported by the South African Sugarcane Research Institute. The majority of his research pertains to trans-



Professor Carel Bezuidenhout.

disciplinary integrated sugarcane production and processing systems.

Agriculture and Climate Change

Professor Emeritus, Roland Schulze recently completed a 400-page report for the Department of Agriculture, Forestry and Fisheries (DAFF) on projected climate change impacts on agriculture. He spoke to Ms Robyn Joubert from the *Farmers Weekly* about what we can expect.

Excerpts from the interview:

How will climate change affect agriculture?

No one knows exactly how the global climate will develop and what the consequences will be, but impacts could be considerable. Different regions are likely to be affected in many different ways with numerous knock-on effects. Appropriate educational and mentoring programmes need to be promoted to increase awareness of climate change for all citizens. If poor farmers do not have the means to prioritise actions that promote sustainable environment conditions, they will continue to make only short term decisions. We need to respond to the threat of climate change now and look at scenarios to manage risk.

What about rainfall changes?

Most of the latest climate models point to more rain of varying intensity and distribution, particularly in the east. This is likely to benefit agriculture, but could be detrimental in the long term with flood damage and erosion. The major problem

area seems to be the Western Cape. All the climate models project less rainfall here, and the area is already having problems with water. Combined with increases in temperature, repercussions for agricultural production, irrigation demand and water resources could be severe.

Will farmers have to grow different crops in the future?

Yes, it won't be possible to grow certain crops in certain areas. A change to more heat-and disease-tolerant crops might be needed. Farmers may need to procure 'climate specific' farms if they wish to continue growing a specific crop, as well as look to other African countries to produce their crop. They can also consider growing indigenous varieties that are suitable for local conditions, and harvesting less often in drier regions to prevent nutrient depletion.



Professor Roland Schulze.

Annual Bayles Lecture

On September 29, Dr Sven Godorr, the Manager of Research and Development at Sasol Technology in South Africa, gave the prestigious, annual Ayles Lecture in the Senate Chambers on the Westville campus. The well-attended talk: *Comonomers Technology : Clever Catalysis keeps a Business Growing*, outlined how Sasol entered the 1-Hexene and 1-Octene comonomer business as an on-purpose producer, initially by extracting and purifying these compounds from the mix of compounds produced in the high temperature Fischer Tropsch Process that is used at the Secunda facilities. Dr Godorr then outlined how, in response to continued, strong demand for 1-octene, a number of alternative routes for producing this comonomer were explored and commercialised.

Commemorating 100 years of Chemistry

Sir Isaac Newton, one of the most influential people in the history of Science, said, "If I see further than most, it is because I stand on the shoulders of giants." In celebrating 100 years of academic excellence, the School of Chemistry paid tribute to its "giants" – dedicated teachers, technicians and students – who, over the years, have contributed to the success of the discipline.

As one of the founding disciplines of the former Natal University College in Pietermaritzburg, the School of Chemistry commemorated this significant milestone by holding a special function on September 17. Aimed at past postgraduates and friends of the School, the day's event attracted 120 delegates.

Visitors were treated to a review of the history of the School, presentations by current and past students on their research activities and experiences, tours of the School's facilities and a poster session by current postgraduate students. Current and past laboratory technicians also had the

opportunity to present their experiences and insights. The day culminated in a formal dinner which included a keynote address by Professor Wog Hawksworth, former chemistry student and lecturer.



Attendees at Chemistry's centenary function on the Pietermaritzburg campus outside the Chemistry building.

Experimental design in chemistry

The school hosted Professor Brynn Hibbert from the University of New South Wales on November 11 and 12. He presented a talk on the statistical design of experiments (DOE), which is an efficient procedure for planning experiments so that the data obtained can be analysed to yield valid and objective conclusions. DOE economically maximises information. During his three-day stay, Professor Hibbert interacted with both academic staff and students, assisting them with data evaluation and queries on experimental design.

Staff News:

- Professor Munro participated in the 5th International Symposium on Bio-organometallic Chemistry held in the first week of July in Bochum, Germany. He presented a paper entitled: *New Topoisomerase II Poisons*.
- On September 28, Professor Fanie van Heerden was inducted as a Fellow of the Royal Society of South Africa.
- Professor Ross Robinson participated in the Emory – South Africa Drug Discovery Program and spent two weeks at Emory University in Atlanta, Georgia.
- Professor Holger Freidreich and Professor Deo Jaganyi delivered their inaugural talks during the year.

- Professor Sreekantha Jonnalagadda was among the top 15 researchers of UKZN, based on 2009 SAPSE productivity ratings.
- In November, Professor Sreekantha Jonnalagadda and Dr Vincent Nyamori presented papers at the International Conference on Green Chemistry, *The 1st PACN Green Chemistry Congress* at the Africa Hall, Addis Ababa, Ethiopia.
- Dr Muhammed Bala participated in the following conferences: International Conference on Organometallic Chemistry (ICOMC XXIV), Taiwan. July 18-22; Catalysis South Africa Conference 2010, Bloemfontein. November 7-10; C* Change Symposium 2010, November 5-6; International Symposium on Organometallic Chemistry, Chinese University of Hong Kong, July 14-16.
- Professor Holger Freidrich gave the 26th PD Hahn Lecture hosted by the Royal Society of Chemistry at UCT in October. He also attended various conferences: Bruker NMR User's Meeting, Hermanus; *CATSA 2010*, Bloemfontein; Bruker XRD Meeting, Pretoria.
- Dr Catherine Ngila attended the Chemical and Biosorbents for Removal of Metals International Conference for Pure and Applied Chemistry in Mauritius from July 25-30.
- The following new staff joined the Westville campus: Dr Patrick Ndungu – Lecturer in Physical Chemistry, Mr Neil Broomhead and Mr Raj Somaru – Senior Technicians and Mr Brian Ndlovu – Technician at Howard campus chemistry labs.
- New lecturers on the Pietermaritzburg campus include: Dr Allen Mambanda (Analytical Chemistry), Dr Irvin Booysen (Inorganic Chemistry), and Mr Matthew Akerman (Inorganic Chemistry). New technical personnel include: Ms Prudence Lubanyana – Senior Technician: Physical Chemistry, and Mr Mvuselela Gumede – Technician.



Fun with Robots

The School recently acquired a few Lego Mindstorm NXT Robots and, in order to showcase them, it ran some demonstrations and robotic programming competitions.

During UKZN's Open Days, both in Pietermaritzburg and Westville, the School demonstrated the soccer bots, where a striker-bot was pitted against a keeper-bot. While the bots were competing against each

other, learners were shown how easily these could be built up and programmed.

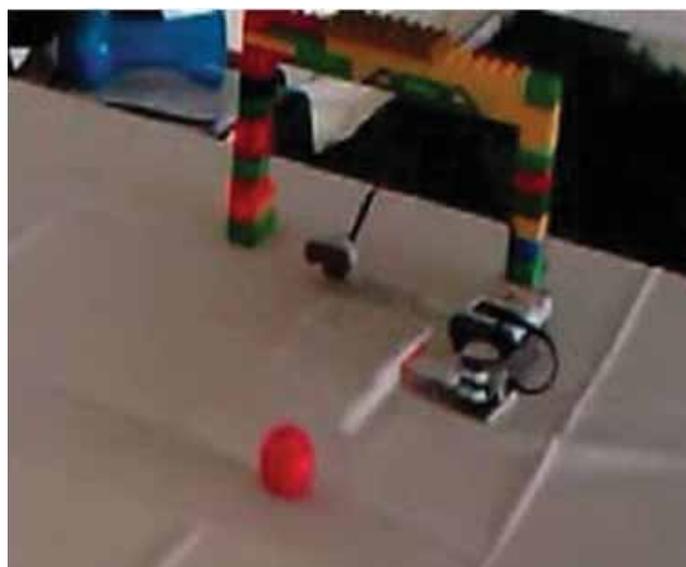
As part of the "Become a Scientist for a week" and the "National Science Week", the School of Computer Science hosted a Lego Mindstorm NXT Robot programming competition. Top pupils from Schools around KZN attending the programmes on the Pietermaritzburg and Westville campuses learnt how to write programmes and use the Lego Mindstorm NXT Robot.

Pupils were then put into groups and asked to programme the robot to navigate through a given maze. After much excitement, the teams had to finally demonstrate their programmes by competing in the maze. The best team walked away with USB flash drives.

Video clips of some of these can be viewed on the School's webpage.



Striker-bot ready to strike.



Keeper-bot making a great save.



A team preparing to send their robot on its way.



School of Environmental Sciences

Training in Water Conflict Management

Dr Mark Dent was selected to attend UNESCO's Training of Trainers in Water Conflict Management for English-speaking African countries from September 20-24 in Italy. The training was organised by the UN World Water Assessment Programme (WWAP) and the Potential Conflict to Co-operation Potential (PCCP) Programme which facilitates multilevel, interdisciplinary dialogues in order to foster peace, co-operation and development in the management of transboundary water resources. Through research and capacity building/enhancement activities, the programme brings together players engaged in transboundary water management and helps them increase their opportunities for cooperation and development.

Mr Paul Jorgensen wins "Green Talents" Award

Geography Masters student, Mr Paul Jorgensen was one of 20 "Green Talents" selected as winners in an international competition sponsored by the German Federal Ministry of Education and Research (BMBF). The "Green Talents" Award is granted to young scientists from around the world who have conducted innovative research in the fields of climate protection, sustainable use of resources and land and energy efficiency.

A total of 234 young scientists from 57 countries applied to become one of the "Green Talents". There were 25 applicants from Africa; 18 emanating from South Africa. The 20 winners were selected by a panel of German experts from science and industry who looked at the extent to which the scientists' research addressed global challenges and sustainability. Mr Jorgensen was one of 3 Africans who won awards. He was able to convince the judges that his research in Ecosystem Goods and Services and Resource Economics showed outstanding potential in the field of sustainable development and sustainable land-use management.

As part of their reward, the "Green Talents" winners were treated to a 10-day trip through Germany, visiting leading universities, research institutions and companies active in the field of sustainable development. They also participated in the BMBF forum *Research for Sustainable Development*.

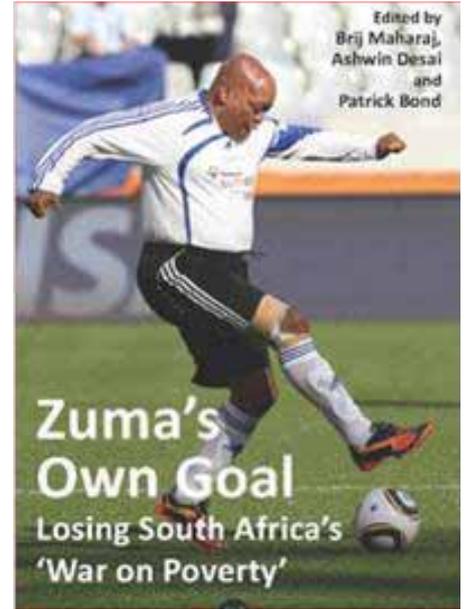


Mr Paul Jorgensen receives his award from the German Federal Minister of Education and Research, Dr Annette Schavan.

Zuma's Own Goal – launched September 3

This collection of original essays, edited by Professor Brij Maharaj, Dr Ashwin Desai and Professor Patrick Bond and published by African World Press in the USA, provides an in-depth look at how South Africa's government is tackling profound challenges – including economic policy, AIDS, social security, housing, basic services and education – and how society reacts. Leading analysts show how missed opportunities during Thabo Mbeki's 1999-2008 administration can be addressed by Jacob Zuma's. The book provides not only trenchant critiques of inherited poverty-fighting strategies imposed through neoliberal orthodoxy, including the 'two economies' narrative and claims of a 'developmental state' in the making. It also suggests new approaches that make more sense. In the wake of a political leadership substitution – albeit a 'feint left, pass right' (as did Zuma, the great midfield general, during Robben Island soccer games) – there is once again a vibrant debate regarding alternatives.

Based in Durban, Professors Brij Maharaj and Patrick Bond are senior professors in Geography and Development Studies, and Dr Ashwin Desai is a former Senior Researcher at the University of Johannesburg's Centre for Sociological Research.



National Geography Students' Conference

Seven Honours students from the School of Environmental Sciences represented UKZN at the annual National Geography Students' Conference, held at Rhodes University in August. The themes of the students' papers covered a range of topics related to: water demand management, crime and 2010, infrastructure development and 2010, the Warwick market debate, natural resource management, and air pollution. The conference allowed the participants to associate with students and academics from other universities in South Africa and abroad. Ms Bathandwa Ncube of UKZN won the Best Honours Presentation in the Human Geography category. Her research focused on Urban Renewal in Durban, and was supervised by Professor Brij Maharaj.



(from left): Ms Ntombezinhle Nzama, Ms Amisha Chunderduth, Mr Hasheel Tularam, Ms Bathandwa Ncube (award winner), Ms Vyasha Harilal, Mr Yashveer Neerachand.

Using coral to track climate change

As part of the African Coelacanth Ecosystem Programme (ACEP), a new research project was initiated to investigate the palaeoclimate record preserved in corals from Sodwana Bay, KwaZulu-Natal. Using a specially designed hydraulic drill and a team of enthusiastic SCUBA divers, coral cores were collected from a large porites coral dome on 2-Mile Reef at Sodwana Bay.

Corals grow at an average rate of about 1cm per year leaving a series of growth layers preserved in the delicate carbonate shell.

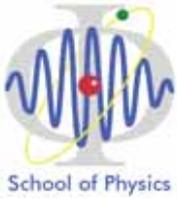
Judging from the length of core collected, it can represent an unbroken history of about 150 years. Careful millimetre by millimetre analyses of the core using a combination of spectral luminescence, X-ray analysis, stable isotope chemistry, and Sr/Ca chemistry provides a very detailed coral growth and record of environmental history such as sea surface temperature, river runoff and flood events.

This study will be conducted in collaboration with the Royal Netherlands Institute for Sea Research as part of a multi-

disciplinary project on the western Indian Ocean involving environmental geochemists, climate scientists, environmental modellers and ecologists to improve sustainable management of the coastal environment.

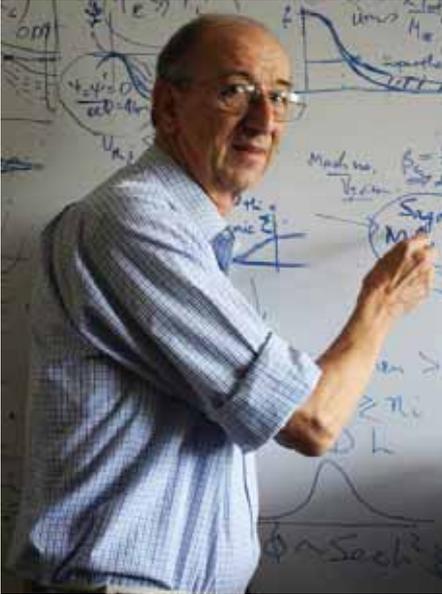


Divers at a depth of 12 metres drilling a porites dome on 2-Mile reef, Sodwana Bay.



School of Physics

Professor Hellberg heads national Astronomy Desk



Professor Manfred Hellberg.

Emeritus Professor of Physics and Senior Research Associate, Manfred Hellberg, has been appointed by the Minister of Science and Technology, Mrs Naledi Pandor, as Head of the Astronomy Desk at the Department of Science and Technology. Appointed to the position for six months, Professor Hellberg started his term of office on October 1.

The Astronomy Desk is a new creation designed to advise the Minister on substantive policy and strategic matters regarding the development of astronomy and related sciences, as well as on important matters relating to South Africa's bid to host the Square Kilometre Array (SKA) radio telescope.

Professor Hellberg will enjoy the support of a team of senior scientists who will provide him with technical and expert advice. Professor Sunil Maharaj, UKZN Lecturer in Maths and NRF Research Chair in Gravitating Systems, will form part of this team.

In an interview with Ms Liz Clarke of the *Sunday Tribune*, Professor Hellberg said: "You couldn't have given me a more interesting job, albeit challenging job. It's a very exciting prospect, not only for me, but the group of leading South African and international scientists I will be working with over the next few months."

Peter Barrett continues his involvement with Physics

Since his retirement as an associate professor in 1994, Professor Peter Barrett has remained in the School of Physics as an honorary or Senior Research Associate, working in the interdisciplinary field of science-and-theology (largely Christian theology), co-organising the annual conferences of the South African Science and Religion Forum, and participating in sixteen similar conferences in the UK and Europe. His major project was the writing of a book, *Science & Theology since Copernicus* (Unisa, 2000/ T&T Clark, 2004). This laid the foundation for papers published in various South African theological journals and a recently written 5500 word entry on the sub-discipline of Natural Theology for the planned *Encyclopedia of the Sciences and the Religions* (Springer, 2011). Professor Barrett will continue his work as an



Professor Peter Barrett.

honorary professor in the School of Religion and Theology.

Best Student Paper Award

Mr Thomas Baluku, a PhD student in the Space Plasma Physics group, received the award for the Best Student Poster in theoretical plasma physics at the International Congress on Plasma Physics, held in Santiago, Chile in August. His poster was entitled *Electron Acoustic Waves in Bi-kappa Plasmas: An Application to Saturn's Magnetosphere* and represented a theoretical-numerical study of a type of wave that he predicts should be observable in Saturn's magnetosphere. His work was supervised by Professor Manfred Hellberg and Professor Richard Mace. Having submitted his thesis in early August, Thomas has since returned to his home institution, Mbarara University of Science and Technology in Uganda.



The School of Statistics and Actuarial Science
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School of Statistics & Actuarial Science

South African Statistical Association Conference

The SA Statistical Association annual conference was held from November 8-12 at North-West University in Potchefstroom. Two days' of workshops followed the

conference. Staff members and post-graduate students participated actively in the conference and presented the following talks:

Presenter	Topic
Professor Delia North & Professor Temesgen Zewotir	Demographic and academic factors affecting research productivity at UKZN
Ms Gill Hendry	The effect of missing data on Multiple Correspondence Analysis
Professor Glenda Matthews	Maximum Likelihood Estimation in Models for Binary Cross-over Studies
Dr Henri Moolman	Is there a significant relationship between the death penalty and the murder rate?
Mr Karl Huang	On Exchangeability and Hausdorff Moment Problem Over Several k-Dimensional Simplexes.
Ms Oliver Bodhlyera	Fitting a Mixed Effects Model for Data from a Pulping Process

Accolades for Natalie Mackenzie

Ms Natalie Mackenzie received the prestigious S2A3 Medal from the South African Association for the Advancement of Science. The medal was presented to Ms Mackenzie at UKZN's Scholarship Awards Ceremony. It is a University-wide award given to the student submitting the best Master's dissertation or PhD thesis.

Ms Mackenzie received her Bachelors degree *summa cum laude* in Financial Maths in 2005 and her Honours degree in Financial Mathematics in 2006. She completed her Masters in December 2009 in Financial Mathematics under the supervision of Professor John Gerald O'Hara and graduated *summa cum laude*. The School wishes Ms Mackenzie a prosperous career.

Women dominate national statistics awards

The School upheld its tradition of excellence when two of its Masters students won prizes in the 2010 South African Statistics Association (SASA) Postgraduate Student Paper Competition. Ms Lise Werner and Ms Nonhlanhla Yende were placed first and third in the competition for their papers which focused on HIV/Aids research. They join previous UKZN winners of national statistics prizes – students from UKZN's School of Statistics and Actuarial Science regularly win national Honours project prizes and last year the prize for the best PhD paper in statistics went to a UKZN student in Financial Mathematics.

Ms Werner's topic was *Modelling acute HIV infection using longitudinally measured biomarker data including informative dropout* and Ms Yende's topic was *Modelling CD4 count data over time in HIV positive patients initiated on HAART in South Africa using linear mixed models*.

Both supervised by Dr Henry Mwambi from the Pietermaritzburg campus, Ms



from left: Ms Werner and Ms Yende.

Werner and Ms Yende are currently employed as statisticians by the Centre for the Aids Programme for Research in South Africa (CAPRISA), based at the Nelson R Mandela School of Medicine in Durban. An ecstatic Head of School, Professor Delia North, said: "It is amazing that two out of three prizes came from our School

and even better, from the same supervisor... it is a good reflection on the type of supervision that is being conducted by Henry, as well as an indication of the standard of statistics training these students received in their undergraduate and honours years."



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