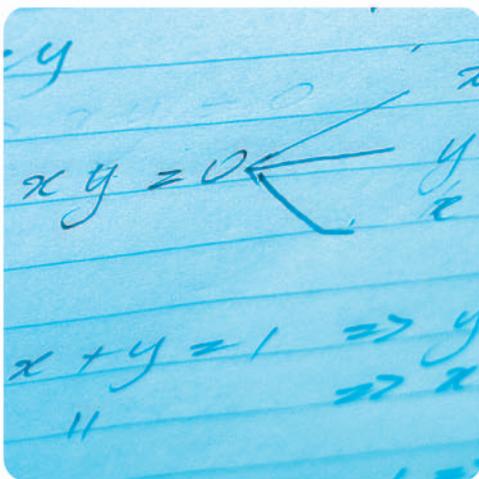


Faculty of Natural and Agricultural Sciences

Report 2008



Faculty of

**Natural and
Agricultural Sciences**

Report 2008

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Preface

From the Dean's Office

In 2008 the Faculty of Natural and Agricultural Sciences once again lived up to its vision to be acknowledged as a faculty that is at the forefront of the practice of natural and agricultural science where the highest levels of quality and credibility are reflected.

During the year the faculty not only remained one of the leaders in training and career development in the natural and agricultural sciences, but it also made a concerted effort to enlarge its international footprint and to establish itself internationally. This is evident in the visits of staff from the faculty to universities such as the USA-based University of Minnesota and Virginia Polytechnic Institute and State University (Virginia Tech) and the extension of international agreements between the University of the Free State (UFS) and these institutions. The faculty also had the privilege of hosting a high-level delegation from the University of Minnesota on the Main Campus in Bloemfontein in August 2008.

The turmoil in the international markets firstly led to very high oil prices, which spilt over to the grain markets and high food prices. This, in turn, led to high inflation levels and therefore high interest rates. Eventually the exchange rate also deteriorated against the major currencies. In the latter part of the year the whole situation was turned upside down with the collapse of the financial markets. The faculty did not escape this and the price of equipment for which orders were placed sky rocketed. Innovative skills had to be applied to remain on track with our equipment strategy.

Although 2008 was an exceptionally difficult year for the UFS and the institution had to bear the brunt of the Reitz video and the reaction of the national and international community, the faculty still managed to perform and expand its core business.

The faculty offers multi-disciplinary and holistic courses to send skilled and capable students into the South African workplace and to empower the labour force. Our general and extended programmes are continuously assessed and improved in order to improve our throughput rates and quality of teaching.

The staff at the faculty worked tirelessly this year to broaden our product offering and to provide our students with the best quality teaching in the country. I applaud their efforts of expanding capacity, developing programmes and strengthening re-



Prof. Herman van Schalkwyk.

lationships both within and outside the faculty and the university.

I also want to applaud the staff and students of the faculty with their achievements this year – whether it is on a personal level, in their capacity as staff member of their respective department/centre or for the faculty. To mention a few:

- Ms Estelle Heideman HIV/Aids coordinator of the Lengau Agricultural Development Centre, received a bursary to participate in a leadership programme in the United States of America (USA), which trains female leaders in South Africa who contribute to the prevention of HIV at a local, regional and national level;
- In the Department of Agricultural Economics, Prof. Johan Willemse, known for his contribution towards agriculture, was appointed on the non-executive board of Absa;

Staff in the dean's office



The staff working in the dean's office are, from the left, front: Ms Stefanie Naborn, Manager: Marketing and Liaison, Ms René Bloem, Secretary, Prof. Neil Heideman, Vice-Dean: Faculty of Natural and Agricultural Sciences; back: Mr Clasia Claassen, Assistant Administrative Officer, Mr Johan Kruger, Faculty Manager, Ms Lorinda Rust, Secretary, and Ms Mitzie Cloete, Typist/Clerical Assistant.

- Prof. James du Preez, Departmental Chair of the Department Microbial, Biochemical and Food Biotechnology, received the silver medal for exceptional published research awarded at the biennial conference of the South African Society for Microbiology hosted in Graham's Town. It was only the seventh time since 1986 that the medal was awarded;
- A study of the UFS about how the change in the packaging of DNA with cellular development is influenced by the expression of genes, in which Prof. Hugh Patterson played a leading role, was published in a leading peer-reviewed scientific journal *Proceeding of the National Academy of Sciences* of the USA (PNAS). The PNAS journal has an impact factor of 10, which means that studies published in this journal are referred to by ten other scientific studies within the scope of two years;
- Prof. Riaan Luyt, professor in Chemistry and head of the Natural Sciences Programme at the Qwaqwa Campus, received an honorary medal from the Polymer Institute of the Slovak Academy of Sciences during a conference hosted in the High Tatras mountains of Slovakia;
- Prof. Maryke Labuschagne from the Department of Plant Sciences was the recipient of the National Science and Technology Forum's (NSTF) research capacity-development award. A team consisting of Prof. Jan van der Westhuizen and Dr Susan Bonnet from the Department of Chemistry, Prof. Kenneth Swart and Prof. Thinus van der Merwe from FARMOVS-PAREXEL also

received the innovation award for an outstanding contribution to science, engineering and technology by either an individual or a team over the last ten years from the NSTF;

- Prof. Maryke Labuschagne received a second prestigious national award for her research when the 2008 Cereal Science and Technology - SA's (CST-SA) Award for research and development was awarded to her; and
- Prof. Ivan Horak, extraordinary professor at the university's Department of Zoology and Entomology, became the third person in the history of the UFS to receive the D.Sc. degree.

In closing I would like to thank the faculty's lecturing staff for their support and enthusiasm during the past year. However, none of these achievements would have been possible without the interest and hard work of the administrative staff.

During 2008 we have all worked together to live up to the faculty's motto: "There is no substitute for excellence!" This report covers the activities of the faculty in 2008. It is a reflection of a year's commitment from a team of highly skilled academic and support staff.

Prof. Herman van Schalkwyk
Dean: Faculty of Natural and Agricultural Sciences
University of the Free State

Faculty news

Successful visit from delegation of the University of Minnesota

A senior delegation from the University of Minnesota in the United States of America (USA) paid a very successful visit to the University of the Free State (UFS) in May 2008 to explore ways of strengthening already existing ties between the two institutions.

Teacher training, capacity building in health sciences and student preparedness were among the areas of cooperation that were investigated, within the context of the Strategic Academic Cluster initiative of the UFS. Poverty reduction strategies were also a strong focus area.

The Faculty of Natural and Agricultural Sciences has had a cooperation agreement with the University of Minnesota's Department of Applied Economics since 2002 and the exchange of staff



During the visit are, from the left: Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS, Prof. Robert Jones, Senior Vice-President: System Academic Administration at the University of Minnesota, Dr Meredith Quiad, Associate Vice-President and Dean: International Programmes, University of Minnesota, Prof. Teuns Verschoor, Acting Rector of the UFS and Prof. Ezekiel Moraka, Vice-Rector: Student Affairs at the UFS.

has been taking place on a regular basis. This agreement will be expanded and both institutions are now exploring the possibility of

applying it across faculties. Both institutions have committed seed funding to formalise the cooperation agreement.

50 years of Agriculture celebrated



The faculty celebrated 50 years of the teaching of agriculture at the UFS in November 2008. Part of the celebrations was a seminar with the theme "Challenges in a changing agricultural environment". Some of the guest speakers are, from the left: Mr Corwyn Botha, Chairman: Agri Business Chamber and Managing Director of the Cape Agri Group, Mr Motsepe Matlala, President of NAFU, Mr Hans van der Merwe, Executive Head: Agri SA, Prof. Herman van Schalkwyk: Dean: Faculty of Natural and Agricultural Sciences at the UFS, and Mr Sugar Ramakarane, Head: Department of Agriculture, Free State Province.

Winners of NSTF awards assist with recruitment of students



Here are, from the left: Dr Martin Ntwaeaborwa, senior lecturer at the Department of Physics and finalist in the category for black researchers, Prof. Kenneth Swart, FARMOVS-PAREXEL, Prof. Maryke Labuschagne, head of Plant Breeding at the UFS's Department of Plant Sciences and female recipient of the award for the development of research capacity over the past five to ten years, and Prof. Jan van der Westhuizen, Department of Chemistry at the UFS; front: Ms Kedibone Aphane, MRC. Prof. Swart and Prof. Van der Westhuizen were the leaders of the team who received the award for the development of innovation by a corporate organisation or institution.

Representatives of the South African Medical Research Council (MRC) visited the UFS to recruit students who want to study in the fields of sci-

ence, engineering and technology. To assist with the recruitment, the winners of awards made by the National Science and Technology Forum (NSTF) earlier this year,

made presentations to create an interest amongst students. The UFS had four finalists of whom two were the winners in their respective categories.

Young scientists learn what faculty can offer



Young science lovers gathered in Sasolburg for the annual Sasol TechnoX in August 2008. The faculty's exhibition captured the learners' attention through an interactive representation of the application fields of science. Delegates from the Departments of Mathematics and Applied Mathematics, Chemistry, Zoology and Entomology, as well as UFS Marketing stood ready to answer the questions of the 20 832 learners who attended the event. Pictured here is Theo Viljoen, M.Sc. student in Forensic Entomology, sharing interesting facts regarding insects with learners.

Two UFS academics appointed on the Land Bank Board



Prof. Herman van Schalkwyk (left), Dean: Faculty of Natural and Agricultural Sciences, and Mr Theo Potgieter from the UFS School of Management were appointed on the Land Bank Board in March 2008. Prof. van Schalkwyk was appointed as Director and Deputy Chairperson and Mr Potgieter as Director of the Board. The appointments were made by the Minister of Agriculture and Land Affairs, Ms Lulu Xingwana, and are effective for a period of four years.

UFS extends exchange agreement with USA university



Here are, from the left, front: Dr SK de Datta, Vice-Rector: International Affairs, VT, Prof. Herman van Schalkwyk, Dean of the Faculty of Natural and Agricultural Sciences, UFS, Dr Martin Ntwaeaborwa, senior lecturer at the Department of Physics, UFS; back: Prof. Jim McKenna, Department of Crop, Soil and Environmental Affairs, VT, Prof. Izak Groenewald, Director of the Centre for Sustainable Agriculture and Rural Development at the UFS and responsible for the faculty's international liaison, Dr Michael Bertelsen, VT's international office, Dr Aldo Stroebel, Head: Internationalisation at the UFS and Dr Liesel Herselman, senior lecturer at the Department of Plant Sciences, UFS.

A delegation from the faculty visited the Virginia Tech University (VT) in the USA in June 2008 to confirm and extend the existing student exchange agreements between the two institutions.

During the visit the agreement, which started in 1997, was extended for the next five years. More than 150 students from both institutions have already taken part in this exchange agreement and it is the most successful student exchange agreement that VT is involved in. Although agricultural students from the UFS initially took part in the agreement, it was extended to other departments in the faculty and also to the rest of the UFS.

Itjoriseng Project launched



The faculty launched the Itjoriseng Project on the Main Campus in Bloemfontein in March 2008. The aim of the project is to improve the skills of teachers in the subjects Mathematics and Physical Science for Grades 10–12. "Itjoriseng" is the Sotho word for "sharpen yourself". At the launch were, from the left: Mr Mzamo Jacobs, Director: Curriculum Development for Further Education and Training, Free State Department of Education, Mr Johan Kruger, Faculty Manager, Ms Elna Marais, Chief Education Specialist: Curriculum Development, Free State Department of Education, and Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS.

2007 Faculty report launched

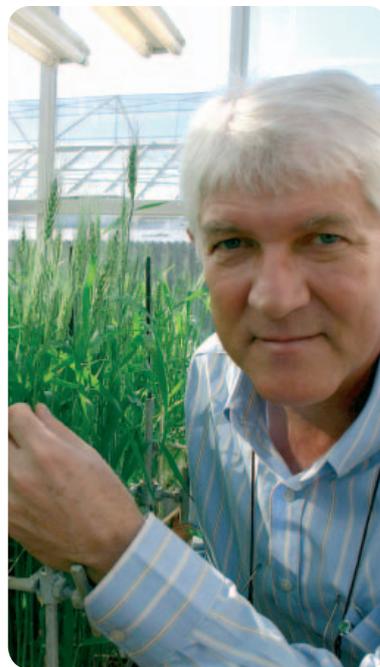


The faculty once again produced another report in which the various departments and centres highlighted their activities for 2007. The report was so well received that a second edition had to be printed. Here are some of the departmental chairpersons during the launch of the report in June 2008.

Department of

Plant Sciences

“Postgraduate training continues to be an important activity in Plant Sciences” - Prof. Sakkie Pretorius.



Prof. Sakkie Pretorius.

Overview

The Department of Plant Sciences, which consists of the disciplines Botany, Plant Breeding and Plant Pathology, participated in many educational, research and service activities during 2008.

Profs Amie van der Westhuizen, Maryke Labuschagne and Neal McLaren served as subject heads for the respective disciplines. Ms Joyce Moloi was the subject head for Botany at the Qwaqwa Campus. Postgraduate training continues to be an important activity in Plant Sciences and academic staff supervised 91 students during 2008. Of these, 20 students were from foreign countries.

During the April and September graduation ceremonies, eight doctoral and 13 master's degrees were conferred. In addition, lecturers and students attended a postgraduate plant science symposium organised by the University of Johannesburg. The presentations by Abdurrahman Beshir and Scott Sydenham were voted best in the honours and master's categories, respectively.

In **Botany**, Prof. Louis Scott retired from the department at the end of 2008, but will continue his productive palynological research on a part-time basis. Dr Frank Neumann, a post-doctoral fellow with Prof. Scott, resigned his position in 2008 but continues to

collaborate on projects covering aspects of the environmental history of KwaZulu-Natal and the Western Cape. Dr Andrea Sanderson, also a post-doctoral fellow, researched the Cretaceous period palynology of the Atlantic Ocean. Prof. Scott served as guest editor for the Elsevier publication *Journal of Arid Lands*, which should appear in 2009. Dr Carlos Cordova of Oklahoma State University, United States of America (USA), visited Prof. Scott for three months to do research on silica bodies in plants. He presented a faculty guest lecture on “A biome-based paleoecological approach using opal phytoliths”. Dr Yolanda Fernandez-Jalvo of Madrid spent time with Prof. Scott regarding a Spain-South Africa research agreement on pollen taphonomy.

Prof. Amie van der Westhuizen travelled to the University of Muenster in Germany in March where he served on the examination panel for the thesis defence of Dr Jenni Moldenhauer. Michael Austenfeld, of the same university, spent three months at the University of the Free State (UFS) under the mentorship of Profs Van der Westhuizen and Sakkie Pretorius to work on biochemical and molecular aspects of stripe rust resistance in wheat. The long-standing collaboration between the UFS and the Department of Plant Biochemistry and Technology at the University of Muenster resulted in joint approval of a three-year agreement between these universities by the National Research Foundation (NRF) and the Federal Ministry of

Education and Research (BMBF) in Germany.

Prof. Johann du Preez, a vegetation ecologist, collaborated with several institutions during 2008. He assisted the South African National Biodiversity Institute (SANBI) with research on Free State flora, the Department of Tourism, Environmental and Economic Affairs with developing a biodiversity plan for the Free State, and the Northern Cape Department of Environmental Affairs and Tourism with surveying provincial nature reserves. Moreover, his broad interest in nature has earned Prof. Du Preez a place in the "*Hoe verklaar jy dit?*" programme on RSG, a national radio station of the South African Broadcasting Corporation (SABC).

Prof. Johan Grobbelaar lectured on climate change to several audiences in Bloemfontein. He spoke about his experiences on Marion Island in the UFS staff wellness programme and, on a cultural note, presented an evening of Spanish music to Bloemfontein music lovers.

Ms Lize Joubert assisted with the African Earth Observation Network (AEON) Earthwise extension programme for schools in Prieska, Northern Cape.

At the Qwaqwa Campus, Prof. Rodney Moffett is compiling a Sesotho Plant Dictionary and has successfully completed a list of Sesotho names with the corre-



Undergraduate students participating in an excursion to the De Hoop Nature Reserve.

sponding botanical names, their synonyms and references.

Dr Erwin Sieben secured funding for two research projects on "Functional classification of wetland plants" and "Compiling vegetation data in wetlands in KwaZulu-Natal, Free State and Mpumalanga". He published several papers and presented his research at two congresses. He also updated the PLK334 undergraduate module resulting in an

improved study guide, with a new focus on vegetation ecology, for both campuses.

Ms Joyce Moloi, a plant physiologist, authored and co-authored presentations at the International Conference on Biotic Plant Interactions in Brisbane, Australia. Her Ph.D. research, under supervision of Prof. Amie van der Westhuizen, was supported by the NRF's Thutuka programme.

Mr Robert Lentsoane designed and offered a short course on basic gardening principles.

In **Plant Breeding**, Dr Liezel Herselman visited the Virginia Polytechnic Institute and State University in Blacksburg, Virginia, USA, as part of a UFS delegation to renew the existing exchange



Some doctoral graduates and their promoters. From the left are: Prof. Johann du Preez, Dr Robert Brand (Ph.D. student in Botany), Prof. Johann Grobbelaar, Dr Nadine Koning (Ph.D. student in Botany), Prof. Sakkie Pretorius, Departmental Chairperson, Ms and Dr JD Rossouw (Ph.D. student in Plant Breeding/Plant Pathology), Dr Ansa van Vuuren (Ph.D. student in Plant Breeding) and Prof. Maryke Labuschagne.



Prof. Maryke Labuschagne receiving an award from the South African Cereal Science and Technology Association (CSTA) presented by Dr Duodo, CSTA president.



Michael Austenfeld (middle) of the University of Muenster in Germany spent three months in the department to work on biochemical and molecular aspects of stripe rust resistance in wheat. He was hosted by Profs Amie van der Westhuizen (left) and Sakkie Pretorius.

agreement the two universities. Prof. Maryke Labuschagne visited the Mauritius Sugar Industry Research Institute, Mauritius, and CIMMYT, ICRISAT and IITA representatives in Nairobi, Kenya, to discuss postgraduate and other research. In addition, she served as the South African representative at the American Association for Cereal Chemists (AACC) International Annual Meeting, in Honolulu, Hawaii where she moderated and chaired different sessions. During a visit to Ghent, Belgium, Prof. Labuschagne co-authored three presentations at

the First Scientific Meeting of the Global Cassava Partnership.

Prof. Labuschagne received several awards in 2008. As winner of the National Science and Technology Forum (NSTF) award in the category "Research Capacity Development", she received R100 000. She also received the South African Cereal Science and Technology award of R30 000 for research and development. Furthermore, she was elected "South African Agriculturalist of 2008" by the Agricultural Writers' Association of South Africa.

To improve the infrastructure of the molecular plant breeding laboratory, Dr Herselman received an amount of R700 000 from the NRF's National Equipment Programme for a 'GelScan 3000' apparatus. Another laboratory in the division was upgraded and new work spaces were created from storerooms. Prof. Labuschagne's appointment to the genetically modified organisms (GMO) advisory committee of the South African government was extended for another term. Between Prof. Labuschagne and Dr Herselman, they authored or co-authored ten papers in accredited journals.

Two Ph.D. students in Plant Breeding spent 2008 at the John Innes Centre in Norwich, United Kingdom (UK). These students, with Prof. Renée Prins of CenGen as principal promoter, are conducting research funded by the Biotechnology and Biological Sciences Research Council (BBSRC) on genetic aspects of rust resistance in wheat.

In **Plant Pathology**, Prof. Wijnand Swart was part of a six-person delegation nominated by the Department of Science and Technology (DST) to visit Mexico on a fact-finding mission with a view to a bilateral agreement on scientific cooperation between South Africa and Mexico. He was also invited to The Netherlands where he presented two papers on policy issues in South African agriculture.

Prof. Sakkie Pretorius visited Ethiopia to assist the Durable Rust Resistance in Wheat (DRRW) project, coordinated by Cornell University in the USA, in establishing critical facilities at designated research institutions. He was also invited to Shimla and New Delhi in India where he gave presentations on research relating to the Ug99 wheat stem rust race. At the UFS he continued his NRF and Winter Cereal Trust-supported research on durable resistance in wheat to rust diseases. Prof. Renée Prins of CenGen and an affiliated staff member at UFS, provided the molecular genetics support to this research. One of Prof. Pretorius' responsibilities is the extensive testing of all commercial wheat



Prof. Gary Peterson (middle), Texas AgriLife & Extension Center, Lubbock, Texas and INTSORMIL Southern Africa programme coordinator and Dr John Yohe (right), INTSORMIL Programme Director, Lincoln, Nebraska with Mr Leo Mpofu, currently a Ph.D. student in Plant Pathology at the UFS. Mr Mpofu's studies are fully supported by the INTSORMIL programme.

cultivars and promising breeding lines to rust diseases. This work is done in collaboration with the Agricultural Research Council's (ARC) Small Grain Institute, Pannar and Sensako.

Two master's and three doctoral students were recruited to work with Profs Neal McLaren and Wijnand Swart. Prof. McLaren secured new research projects on mycotoxins in sorghum grain as well as the regional INTSORMIL programme for Southern Africa. Dr John Leslie (Kansas State University, USA) and Dr Gary Peterson (Texas A&M University, USA), respectively INTSORMIL Principal Investigator and Southern Africa Regional Coordinator, visited Prof.

McLaren to discuss progress. Dr Leslie also acts as co-promoter for the Ph.D. project of Ms Adr  Minnaar-Ontong. In the rust programme, Prof. Pretorius hosted Dr Rick Ward, coordinator of the DRRW project at Cornell University, as well as Dr Bob McIntosh from the University of Sydney, Australia.

In his capacity as a field crops pathologist Prof. McLaren served as panel member for the Sclerotinia Working Group, Soybean Rust Task Team and Sorghum Forum. Ms Wilmarie Kriel, an expert on Fusarium head blight of wheat, gave five presentations on this topic at farmer's days and a seed conference during the year. ■

Research outputs

Research articles

Benesi, I.R.M., Labuschagne, M.T., Herselman, L., Mahungu, N.M. & Saka, J.K. 2008. The effect of genotype, location and season on cassava starch extraction. *Euphytica* 160(1): 59-74.

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Staff

Main Campus:

Professors: Profs Sakkie Pretorius, Johan Grobbelaar, Maryke Labuschagne, Neal McLaren, Louis Scott, Wijnand Swart, Amie van der Westhuizen, Charl van Deventer, Rudi Verhoeven

Associate Professor: Prof. Johann du Preez

Affiliated Associate Professors: Profs Koos van Rensburg (ARC-GCI), Ren e Prins (CenGen)

Senior Lecturer: Dr Liezel Herselman

Lecturers: Drs Barbara Mashope, Elizma Koen, Lintle Mohase, Gerhard Potgieter, Andor Venter, Botma Visser, Ms Wilmarie Kriel

Professional and Technical Staff: Mss Cornel Bender, Lize Joubert, Mr Hendri Pretorius

Administrative and Support Staff: Mss Sadie Geldenhuys, Suzine Uys, Erna van Deventer, Zelda van der Linde, Hilda Dlamini, Lilian Molosi, Messrs Gerald Moshodi, Dirk Jansen, Petrus Foko, Simon Pheneti

Qwaqwa Campus:

Lecturers: Dr Erwin Sieben, Mr Robert Lentsoane, Ms Joyce Moloi

Junior Lecturer: Mr Raymond Pitso

Research Fellow: Prof. Rodney Moffett

Assistants: Messrs Ngaka Mzizi, Pheello Mojau

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Kotze, D., Ellery, W., Rountree, M., Grenfell, M., Marneweck, G., Nxele, I., Breen, C., Dini, J., Batchelor, A. & Sieben, E. 2008. *WET-Rehab Plan: Guidelines for planning wetland rehabilitation in South Africa*. Report TT 336/08 to the Water Research Commission (WRC), Pretoria, South Africa.

Sieben, E.J.J., Kotze, D.C., Ellery, W.N. & Russell, W. 2008. *Using vegetation in wetland rehabilitation*. Chapter 6 in *WET-Rehab Methods: National Guidelines and Methods for Wetland Rehabilitation*, edited by W. Russel. Report TT 341/08 to the Water Research Commission (WRC), Pretoria, South Africa.

Conference contributions

Akinbo, O., Labuschagne, M.T. & Fregene, M. 2008. *Quantitative trait loci (QTL) mapping of protein content in backcross derivatives of inter-spe-*



Prof. Maryke Labuschagne was voted South Africa Agriculturist of 2008 by the Agricultural Writers' Association of South Africa. Pictured with her are the Farmer and Emerging Farmer of the Year.



Dr Robert McIntosh (right), emeritus professor from the University of Sydney, Australia, and an advisor to the Durable Rust Resistance in Wheat project coordinated by Cornell University, during his visit to Prof. Sakkie Pretorius.



The National Science and Technology Forum (NSTF) prize for capacity building was awarded to Prof. Maryke Labuschagne. Here are: Mr MA Mangena, Minister of Science and Technology, Prof. Labuschagne and a representative of Eskom, which was the sponsor of the award.

- cific hybrids from M. esculenta ssp flabellifolia and cassava (Manihot esculenta Crantz).* Poster presented at the XVI Plant and Animal Genome Conference, San Diego, California, USA. 12-16 January.
- Akinbo, O., Labuschagne, M.T., Marin, J., Ospina, C., Gutierrez, J & Fregene, M.** 2008. *Quantitative trait loci (QTL) mapping of protein content in backcross derivatives of inter-specific hybrids from Manihot esculenta ssp flabellifolia and cassava (Manihot esculenta Crantz).* Poster presented at the 1st Scientific Meeting of the Global Cassava Partnership (GCP-1): Cassava Meeting the Challenges of the New Millennium, Institute of Plant Biotechnology for Developing Countries (IPBO), Ghent, Belgium. 21-25 July.
- Akinbo, O., Labuschagne, M.T., Ospina, C., Marin, J., Gutierrez, J. & Fregene, M.** 2008. *Bringing wild alleles back into the primary gene pool: Introgression of high protein content from Manihot esculenta ssp flabellifolia into cassava (Manihot esculenta Crantz).* Poster presented at the 1st Scientific Meeting of the Global Cassava Partnership (GCP-1): Cassava Meeting the Challenges of the New Millennium, Institute of Plant Biotechnology for Developing Countries (IPBO), Ghent, Belgium. 21-25 July.
- Appelgryn, J.J. & Visser, B.** 2008. *Evidence for volatile signalling between leaf-rust infected and uninfected wheat.* Oral presentation delivered during the 34th Annual Conference of the South African Association of Botanists (SAAB), (Joint Conference with the Southern African Society for Systematic Biology), Drakensville Mountain Resort, Drakensberg, South Africa. 14-18 January.
- Bender, C.M., Pretorius, Z.A. & Prins, R.** 2008. *Inheritance of adult plant resistance in wheat to stripe rust.* Oral presentation delivered during the 7th South African Plant Breeders Symposium, Alpine Heath, Drakensberg, South Africa. 10-13 March.
- Berner, J. & Van der Westhuizen, A.J.** 2008. *A role for lipids and phenolics in the RWA resistance response.* Oral presentation delivered at the 23rd International Congress of Entomology (ICE2008): Celebrating Entomology – Contributing to Modern Science, International Convention Centre, Durban, South Africa. 6-12 July.
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- De Waal, C., Venter, A.M. & Miller, J.S.** 2008. *Breeding systems in African Lycium (Solanaceae).* Oral presentation delivered during the 34th Annual Conference of the South African Association of Botanists (SAAB), (Joint Conference with the Southern African Society for Systematic Biology), Drakensville Mountain Resort, Drakensberg, South Africa. 14-18 January.
- Grobbelaar, J.U.** 2008. *Factors governing algal growth in photobioreactors: the “open” versus the “closed” debate.* Invited paper delivered during the 3rd Congress of the International Society for Applied Phycology and the 11th International Conference on Applied Phycology, National University of Ireland, Galway, Ireland. 21-27 June.
- Grobbelaar, J.U.** 2008. *From laboratory to commercial production.* Invited paper delivered during the 3rd Congress of the International Society for Applied Phycology and the 11th International Conference on Applied Phycology, National University of Ireland, Galway, Ireland. 21-27 June.
- Grobbelaar, J.U.** 2008. *The upper limits of photosynthesis and implications for algal biotechnology.* Invited paper delivered during the 3rd Congress of the International Society for Applied Phycology and the 11th International Conference on Applied Phycology, National University of Ireland, Galway, Ireland. 21-27 June.
- Jin, Y., Szabo, L. & Pretorius, Z.A.** 2008. *Virulence variation within the Ug99 lineage.* Proceedings of the 11th International Wheat Genetics Symposium (IWGS), Brisbane Convention Centre, Brisbane, Australia, edited by R. Appels, R. Eastwood, E. Lagudah, P. Langridge & M.M. Lynne. Sydney: Sydney University Press. 24-29 August.
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- Koen, E., Elago, O. & Labuschagne, M.T.** 2008. *RP-HPLC analysis of protein composition of temperature stressed wheat.* Oral presentation delivered during the 7th South African Plant Breeders Symposium, Alpine Heath, Drakensberg, South Africa. 10-13 March.
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- Lindeque, R.C., Tolmay, V.L. & Labuschagne, M.T.** 2008. *The effect of vernalization on host plant resistance of wheat to Russian aphid, Diuraphis noxia biotype RWASA2.* Poster presented at the 23rd International Congress of Entomology (ICE2008): Celebrating Entomology – Contributing to Modern Science, International

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- Mweta, D.E., Labuschagne, M.T., Koen, E. & Saka, J.D.K.** 2008. *Properties of starches from cocoyam (Colocasia esculenta) and cassava (Manihot esculenta Crantz) grown in Malawi*. Oral presentation delivered during the 7th South African Plant Breeders Symposium, Alpine Heath, Drakensberg, South Africa. 10-13 March.
- Neumann, F.H., Kagan, E.J. & Stein, M.** 2008. *High resolution pollen studies at the Holocene profile of Ein Feskha (Dead Sea): Are vegetation changes connected to earthquakes?* Poster presented at the Joint 12th International Palynological Congress (IPC-XII 2008) and the 13th International Organisation of Palaeobotany Conference (IOPC-XIII 2008), Bonn, Germany. 30 August-5 September.
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- Prins, R., Pretorius, Z.A., Lehmensiek, A. & Bender, C.M.** 2008. *Genetic analysis of wheat rust resistance genes segregating in a Kariega x Avocet S population*. Proceedings of the 11th International Wheat Genetics Symposium (IWGS), Brisbane Convention Centre, Brisbane, Australia. 24-29 August. Edited by R. Appels, R. Eastwood, E. Lagudah, P. Langridge & M.M. Lynne. Sydney: Sydney University Press.
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- Quick, L., Chase, B.M., Meadows, M.E., Scott, L., Thomas, D.S.G. & Reimer, P.** 2008. *Late quaternary vegetation history and palaeoenvironments of the Cederberg Mountains of South Africa: evidence from hyrax middens*. Poster presented at the 3rd Southern Deserts Conference - Kalahari 2008: Climate change and the peopling of the Southern deserts, Molopo Lodge, Kalahari, South Africa. 16-19 September.
- Rossouw, J.D., Pretorius, Z.A., Lamkey, K. & Silva, H.D.** 2008. *QTL mapping for resistance to Stenocarpella maydis in maize*. Oral presentation delivered during the 7th South African Plant Breeders Symposium, Alpine Heath, Drakensberg, South Africa. 10-13 March.
- Scott, L., Gil-Romera, G., Marais, E., Brook, G.A. & Chase, B.M.** 2008. *Terrestrial pollen evidence for some phases of vegetation change in the Namib Desert since > 40 ka*. Oral presentation delivered during the 3rd Southern Deserts Conference - Kalahari 2008: Climate change and the peopling of the Southern deserts, Molopo Lodge, Kalahari, South Africa. 16-19 September.
- Sieben, E.J.J., Morris, C.D., Kotze, D.C. & Muasya, A.M.** 2008. *Changes in plant form and function across altitudinal and wetness gradients in wetlands of the Maloti-Drakensberg, South Africa*. In *Frontiers of vegetation science – An evolutionary angle*, edited by L. Mucina (et al.). Somerset West: Keith Phillips Images. Proceedings of the 51st Annual Symposium of the International Association for Vegetation Science (IAVS), Stellenbosch University, Stellenbosch, South Africa. 7-12 September. pp. 172-173.
- Swart, W.J.** 2008. *A systems approach to establishing scientific integrity in*

evidence based policy making. Invited paper delivered during the International Conference on Evidence Based Policy Making: International Best Practices in Connecting Science and Policy, De Bazel, Amsterdam, The Netherlands. 19-20 June.

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Swart, W.J. 2008. *Soil health: Issues pertaining to the cultivation of new crops in South Africa*. Oral presentation delivered during the 18th Soil-borne Diseases Interest Group Symposium, ARC Plant Protection Research Institute (ARC-PPRI), Stellenbosch, South Africa. 17-18 September.

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Van der Merwe, C.H.J., Visser, B., Pretorius, J.C. & Van der Westhuizen, A.J. 2008. *Evaluation of gene expression in wheat upon treatment with a novel plant activator*. Oral presentation delivered during the 34th Annual Conference of the South African Association of Botanists (SAAB), (Joint Conference with the Southern African Society for Systematic Biology), Drakensville Mountain Resort, Drakensberg, South Africa. 14-18 January.

Van der Westhuizen, A.J. 2008. *A review on the biochemical resistance response in wheat to the Russian wheat aphid*. Invited paper delivered during the Plant Induced Resistance for Pest and Disease Control (PIRAC) Workshop, Cape Town, South Africa. 26-29 October.

Van der Westhuizen, A.J. & Berner, J. 2008. *A role for lipid oxygenation in wheat during defense against the Russian wheat aphid?* Oral presentation delivered during the

International Conference on Biotic Plant Interactions, Brisbane, Australia. 27-29 March.

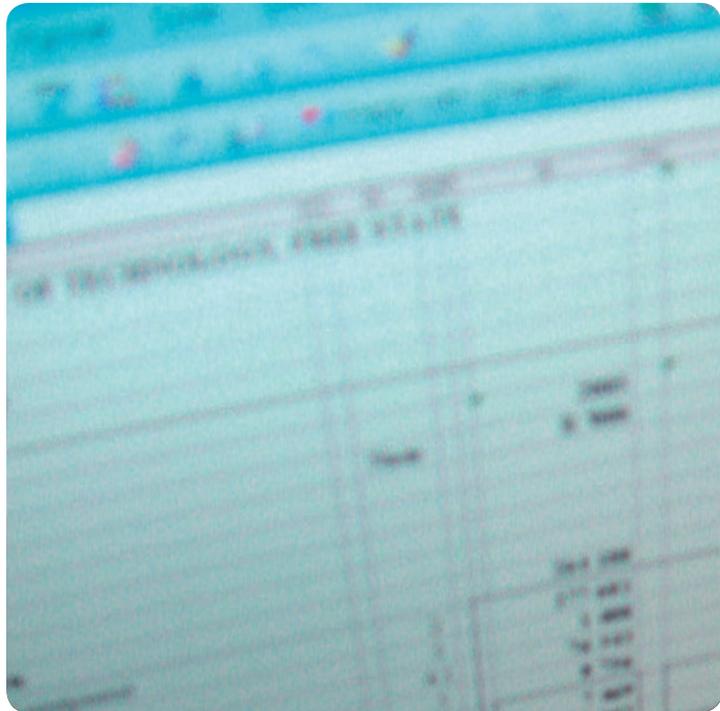
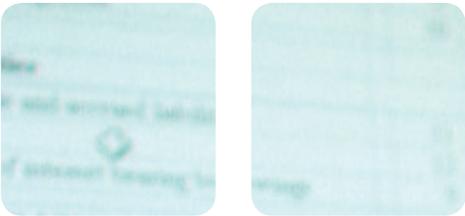
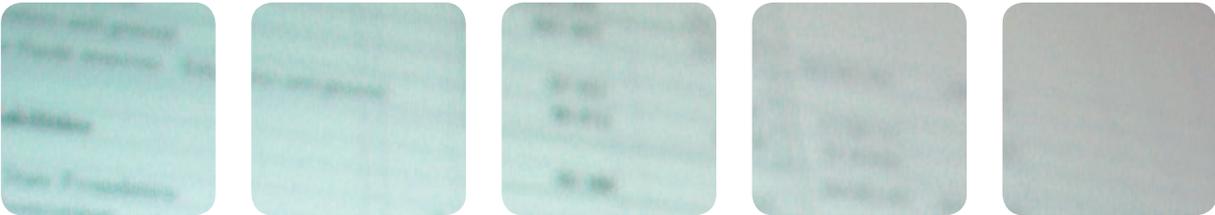
Van Deventer, C.S. & Otto, W.M. 2008. *Assessment of the general and specific combining abilities and heritabilities for nitrogen use efficiency components in South African irrigated wheat genotypes*. Oral presentation delivered during the 7th South African Plant Breeders Symposium, Alpine Heath, Drakensberg, South Africa. 10-13 March.

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Visser, D.D., Caldwell, P. & McLaren, N.W. 2008. *Biological control of Sclerotinia sclerotiorum using Trichoderma harzianum and silicon*. Poster presented at the 9th International Congress of Plant Pathology (ICPP2008): Healthy and Safe Food for Everybody, Lingotto Conference Centre, Turin, Piemonte, Italy. 24-29 August.



Statistical data

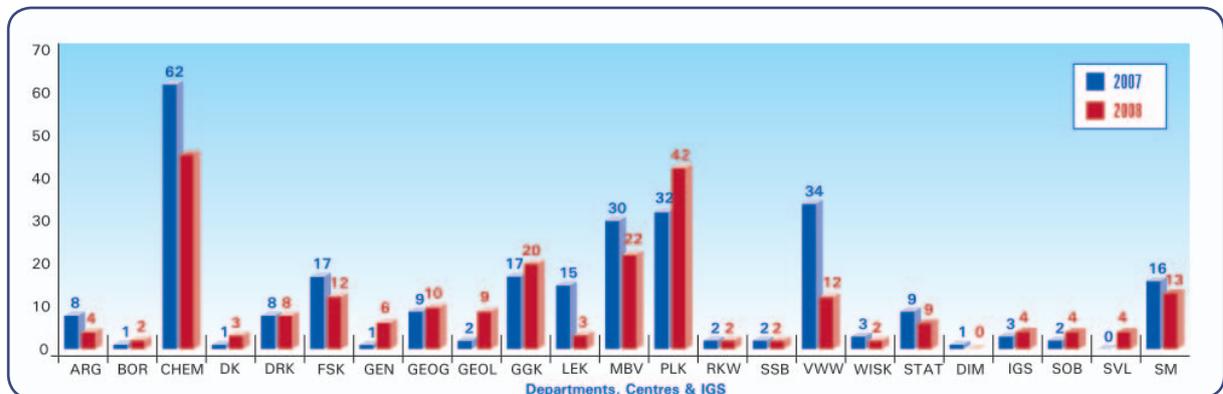


Research outputs: 2007-2008

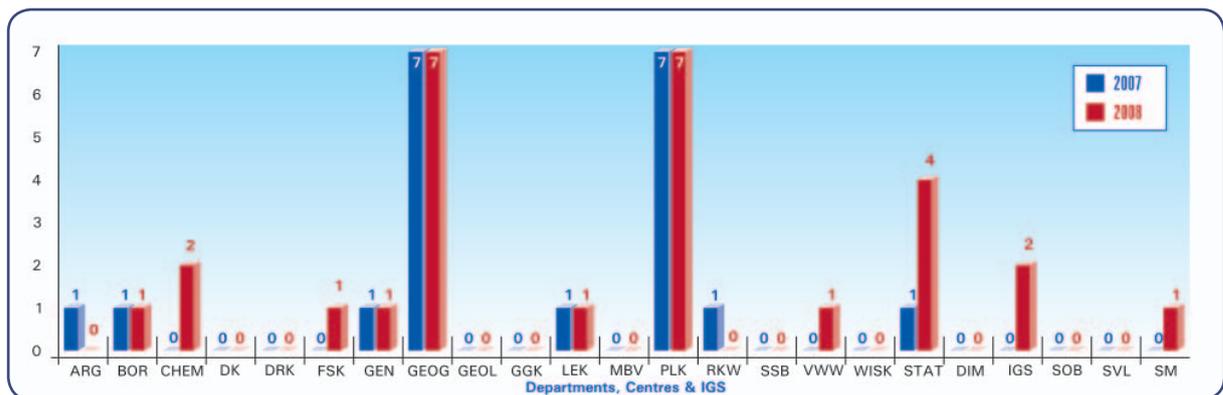
List of abbreviations

Abbreviation	Name	Abbreviation	Name
ARG	Department of Architecture	GGK	Department of Soil, Crop and Climate Sciences
BOR	Department of Quantity Surveying and Construction Management	IGS	Institute for Groundwater Studies
SOB	Centre for Environmental Management	LEK	Department of Agricultural Economics
CEM	Department of Chemistry	MBV	Department of Microbial, Biochemical and Food Biotechnology
SM	Centre for Microscopy	PLK	Department of Plant Sciences
SVL	Centre for Sustainable Agriculture and Rural Development	RKW	Department of Computer Science and Informatics
DK	Dean's Office	SSB	Department of Urban and Regional Planning
DRK	Department of Zoology and Entomology	SRB	Disaster Management Training and Education Centre for Africa (DIMTEC)
FSK	Department of Physics	VWW	Department of Animal, Wildlife and Grassland Sciences
GEN	Department of Genetics	STAT	Department of Mathematical Statistics and Actuarial Science
GEOG	Department of Geography	WISK	Department of Mathematics and Applied Mathematics
GEOL	Department of Geology		

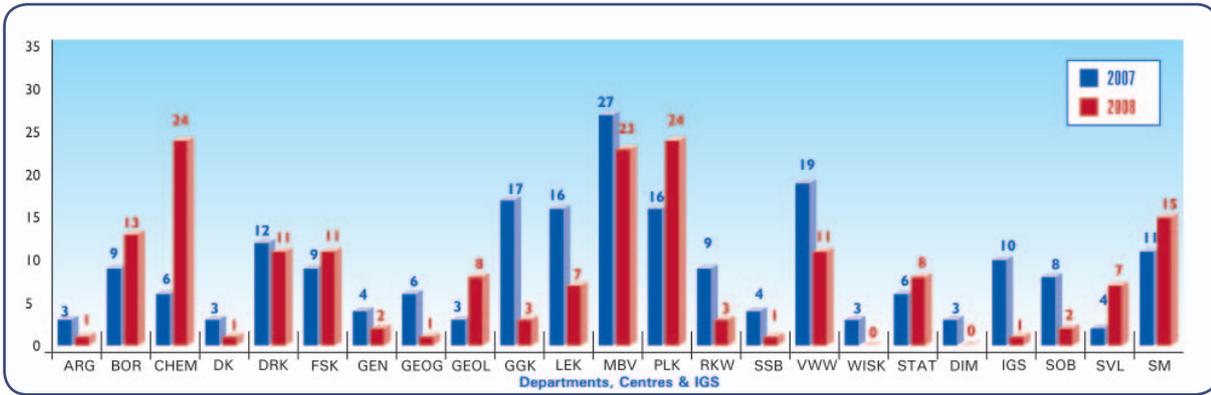
Accredited articles



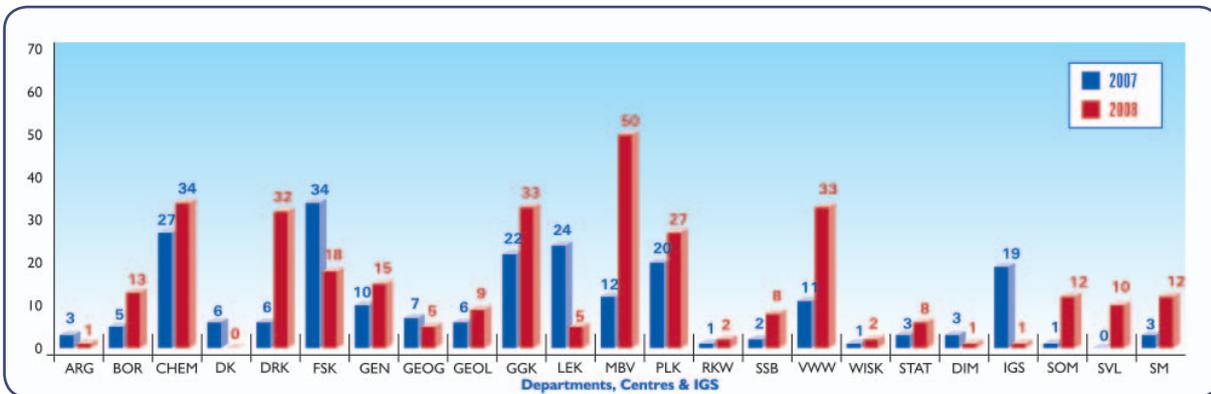
Books



International conferences



Local conferences



Student figures: 2007-2008

Student figures

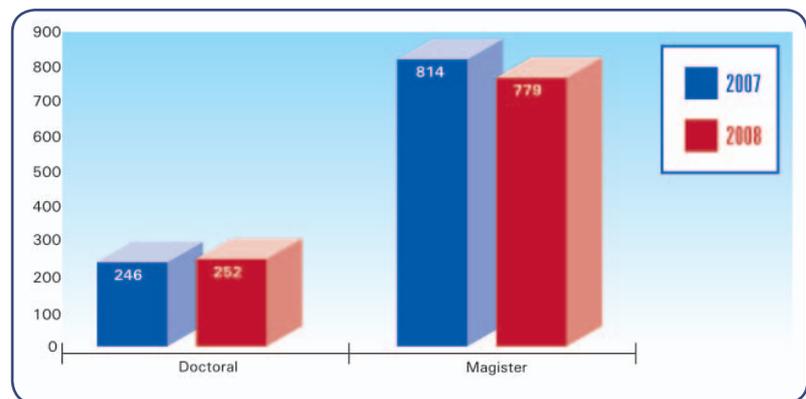
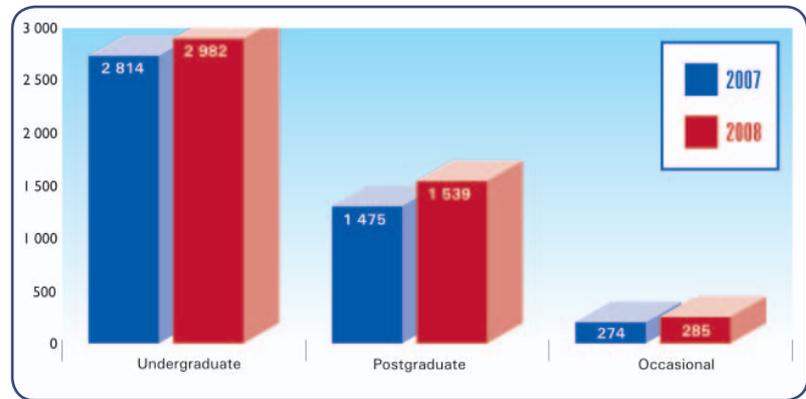
Year	Description	Black	Coloured	Asian	White	Total
2007	Undergraduate	1492	66	38	1218	2814
	Postgraduate	710	41	40	684	1475
	Occasional	230	6	2	36	274
*TOTAL		2432	113	80	1938	4563
2008	Undergraduate	1667	51	37	1227	2982
	Postgraduate	755	40	43	701	1539
	Occasional	260	5	1	19	285
* TOTAL		2682	96	81	1947	4806

International students

Nationality	Year	Year
	2007	*2008
Angola	2	0
Asian countries	20	24
Botswana	17	23
Democratic Republic of the Congo	0	1
European countries	9	10
Lesotho	118	144
Malawi	3	5
Mauritius	2	3
Mozambique	4	7
Namibia	54	65
North America	15	5
Other African countries	47	69
South America	1	0
Swaziland	5	6
Zambia	7	7
Zimbabwe	48	60
Total	352	429

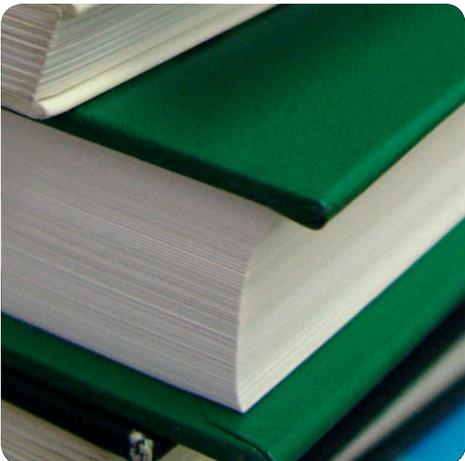
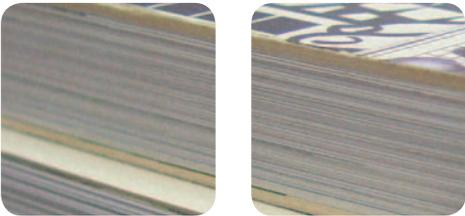
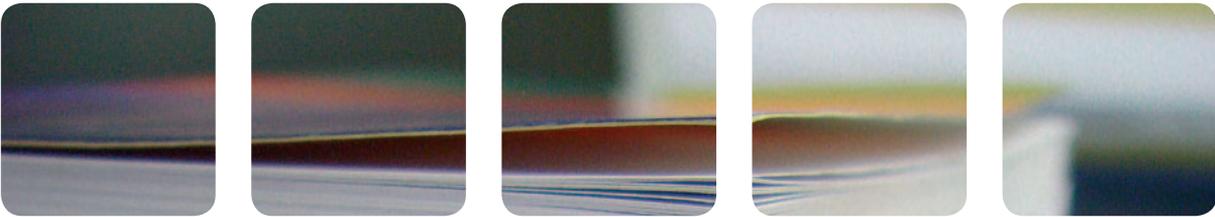
*2008 Final HEMIS figures not available

Comparison for the Faculty of Natural and Agricultural Sciences





Glossary



Glossary

A

AACC -	American Association for Cereal Chemists
AACE -	Association for the Advancement of Cost Engineering
ADF -	Amsterdam Density Functional Programme
ADG -	Average Daily Grain
AEASA -	Agricultural Economics Association of South Africa
AEON -	the African Earth Observation Network
AGU -	American Geophysical Union
AI -	Artificial Insemination
ARC -	Agricultural Research Council
ARV -	Antiretroviral
ASC -	Architecture Student Conference
ASAQS -	Association of South African Quantity Surveyors
ASOCSA -	Association of Schools of Construction of Southern Africa

B

BBSRC -	Biotechnology and Biological Sciences Research Council
BMBF -	Federal Ministry of Education and Research, Germany

C

CAA -	Commonwealth Association of Architects
CANSA -	Cancer Association of South Africa
CAB -	Centro de Astrobiología
CED -	Centre for Education Development
CePHMa -	Centre for Plant Health Management
CHESD -	Centre for Higher Education Studies and Development
CHPC -	Centre for High Performance Computing
CIDB -	Construction Industry Development Board
CIOB-SA -	Chartered Institute of Building, South Africa
CSIR -	Council for Scientific and Industrial Research Organisation
CSTA -	Cereal Science and Technology Association
CUT -	Central University of Technology

D

DiMTEC -	Disaster Management Training and Education Centre for Africa
DMISA -	Disaster Management Institute of Southern Africa
DRRW -	Durable Rust Resistance in Wheat
DST -	Department of Science and Technology
DWAF -	Department of Water Affairs and Forestry

E

ECA -	European Crystallographic Association
EGIC -	Economic Growth and International Competitiveness
EMSA -	Environmental Management Systems Association
EMS -	Environmental Management Systems
EPWP -	Expanded Public Works Programme

F

FAO -	Food and Agricultural Organisation
FETWater -	Framework Programme for Research Education and Training in Water
FMP -	Facilities Management Programme
FSRDPP -	Free State Rural Development Partnership Project
FTIR -	Fourier Transform Infra Red Spectrometer

G

FGAP -	Facility for Genomics and Proteomics
GIS -	Geographical Information Systems
GMO -	Genetically Modified Organisms
GRDM -	Groundwater Resource Directed Measures
GSSA -	Grassland Science Society of South Africa
GSSA -	Geological Society of South Africa

H

HCI -	Human-computer Interaction
HRTEM -	High Resolution Transmission Electron Microscopy

I

IAMA -	International Food and Agribusiness Management Association
IAU -	International Astronomical Union
ICACS -	International Conference on Atomic Collisions in Solids
ICCC -	International Conference on Coordination Chemistry
ICEC -	International Cost Engineering Council
ICRISAT -	International Crops Research Institute for the Semi-Arid Tropics
ICSU -	International Council for Science
IDC -	Industrial Development Corporation
IGC -	International Geological Congress
IGS -	Institute for Groundwater Studies
IMWA -	International Mine Water Association
INCRoP -	Insects on New Crops Programme
IPMP -	Intensive Project Management Programme
ISI -	International Statistical Institute
ISME -	International Society for Microbial Ecology
IT -	Information Technology
IUMS -	International Union of Microbiological Societies

L

LPI -	Lunar and Planetary Institute
LRAD -	Land Redistribution for Agricultural Development

M

MCEE -	Minnesota Council on Economic Education
MDC -	Maputo Development Corridor
MEC -	Member of the Executive Council
MNS -	Material and Nanosciences Cluster
MOU -	Memorandum of Understanding
MRC -	Medical Research Council
MSA -	Masters in Sustainable Agriculture
MSSA -	Microscopy Society of Southern Africa
MUCPP -	Mangaung University Community Partnership Programme

N

NAMC -	National Agricultural Marketing Council
NASA -	National Aeronautics and Space Administration
NASSP -	National Astrophysics and Space Science Programme
NBN -	National Bioinformatics Network
NCEE -	National Council for Economic Education
NDF -	Neutral Detergent Fibre
NECSA -	Nuclear Energy Corporation of South Africa
NERPO -	National Emergent Red Meat Producers Organisation
NGO -	Non-Governmental Organisation
NRF -	National Research Foundation
NSTF -	National Science and Technology Forum
NWGA -	National Wool Growers' Association

O

OECD -	Organisation for Economic Cooperation and Development
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P

PAQS -	Pacific Association of Quantity Surveyors
PDMS -	Provincial Disaster Management Centre
PRT -	Protein Research Trust

R

RDP -	Redress and Development Programme
RIBA -	Royal Institute of British Architects
RICS -	Royal Institute of Chartered Surveyors
RIEP -	Research Institute of Education Planning
RMMA -	Red Meat Abattoirs Association
RPO -	Red Meat Producers Organisation
RTPI -	Royal Town Planning Institute

S

SA -	South Africa
SAAPMB -	South African Association of Physicists in Medicine and Biology
SAB -	South African Breweries Limited

SABC -	South African Broadcasting Corporation
SACAP -	South African Council for the Architectural Professions
SACPCMP -	South African Council for the Property Valuers Profession
SACPLAN -	South African Council of Planners
SACQSP -	South African Council for the Quantity Surveying Profession
SADC -	Southern African Development Community
SAFA -	South African Feedlot Association
SAFEFE -	South African Foundation for Economic and Financial Education
SAFOI -	South African Fryer Oil Initiative
SAIA -	South African Institute of Architects
SAIM -	Society for Industrial and Applied Mathematics
SAISC -	Southern African Institute of Steel Construction
SANBI -	South African National Biodiversity Institute
SANCID -	South African Commission on Irrigation and Drainage
SANPAD -	South African Netherlands Research Programme on Alternatives in Development
SANSA -	South African National Survey of Arachnida
SAPOA -	South African Property Owners Association
SAPPS -	Symposium of the South African Pecan Producers Association
SAQA -	South African Qualifications Authority
SASA -	South African Statistical Association
SASHS -	Southern African Society for Horticultural Sciences
SASM -	South African Society for Microbiology
SAWMA -	South African Wildlife Management Association
SAWSS -	Southern African Weed Science Society
SCM -	Scientific Computing and Modeling
SEG -	Society of Economic Geologists
SEM -	Scanning Electron Microscope

SLE -	Senior Lecturer Equivalent
SSSSA -	Soil Science Society of South Africa
SWMA -	Southern African Wildlife Management Association

T

TEM -	Transmission Electron Microscope
THRIP -	Technology and Human Resource for Industry Programme

U

UCT -	University of Cape Town
UEC -	Unit for Earth Construction
UFS -	University of the Free State
UJ -	University of Johannesburg
UK -	United Kingdom
UN -	United Nations
UNESCO -	United Nations Educational, Scientific and Cultural Organisation
UNU -	United Nations University
UP -	University of Pretoria
USA -	United States of America
USAID -	United States Agency for International Development
UWC -	University of the Western Cape

W

WCAP -	World Conference on Animal Production
WITS -	University of the Witwatersrand
WRC -	Water Research Commission

