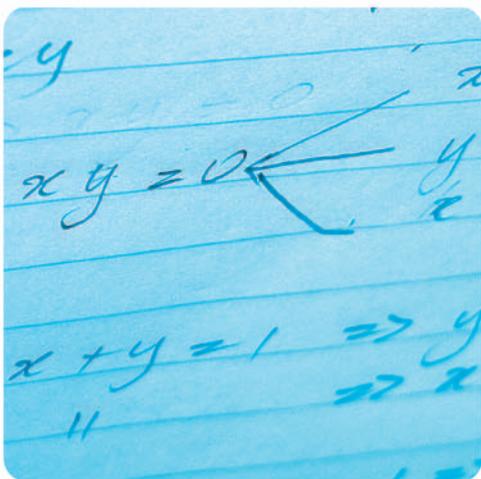


Faculty of Natural and Agricultural Sciences

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

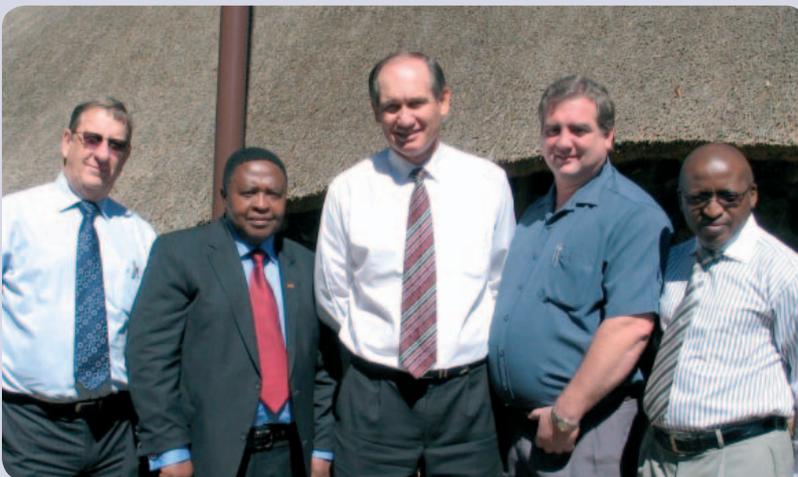


During the visit are, from the left: Prof. Herman van Schalkwyk, Dean: Faculty of Natural and Agricultural Sciences at the UFS, Prof. Robert Jones, Senior Vice-President: System Academic Administration at the University of Minnesota, Dr Meredith Quiad, Associate Vice-President and Dean: International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

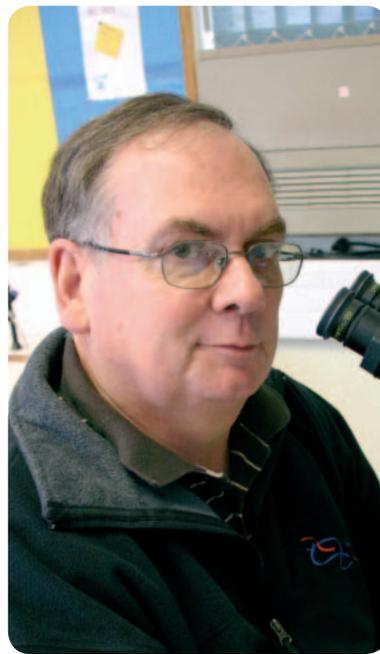


The faculty once again produced another report in which the various departments and centres highlighted their activities for 2007. The report was so well received that a second edition had to be printed. Here are some of the departmental chairpersons during the launch of the report in June 2008.

Department of

Genetics

“The re-establishment of the department was a proud moment for us” - Prof. Johan Spies.



Prof. Johan Spies.

Overview

The Department of Genetics aims to acquire and disseminate knowledge of Genetics to the benefit of all. This is done by research and education on undergraduate and postgraduate levels.

The re-establishment of the department was celebrated on 12 September 2008 by means of a mini-conference held on the Main Campus of the University of the Free State (UFS) in Bloemfontein. At this conference lectures were presented on the history of the department by Prof. Herman van Schalkwyk, Dean of the Faculty of Natural and Agricultural Sciences, the current research and possible future focus areas in

animal genetics by Prof. Paul Grobler, Associate Professor in the department, human genetics by Prof. Chris Viljoen, Associate Professor in the Department of Haematology and Cell Biology at the UFS and plant genetics by Prof. Johan Spies, Chairperson of the Department of Genetics.

During 2008 Ms Paula Spies joined the department as lecturer in Molecular Systematics and Cytogenetics. She completed her M.Sc. thesis in the department and replaced Dr Adèle Strydom who moved to Pretoria.

The department received a visit from a Hungarian delegation from the University of Kaposvár during

July 2008. This visit forms part of a South African-Hungarian research collaboration initiative and is done in collaboration with the National Zoological Gardens. The visit was followed by a visit in August to Hungary by Profs Spies, Grobler, Antoinette Kotzé and Ms Karen Ehlers, all from the Department of Genetics, as well as two representatives from the National Zoological Gardens of South Africa.

Staff members were active in various organisations and Prof. Spies is currently the Chairperson of the Clivia Society. Prof. Grobler acts as Adjunct Associate Professor for the Department of Fisheries and Wildlife Sciences at Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, United States of America (USA). He is also a Council Member of the South African Genetics Society and the Southern African Wildlife Management Association (SAWMA).

Prof. Antoinette Kotzé is currently a Council Member of SAWMA, Chair of the African Association of Zoos and Aquariums Research and Monitoring Working Group and Chair of the National Zoological Gardens of South Africa's Research and Ethics Committee. She also serves on the Board of Directors of the Mabula Ground Hornbill Research and Conservation Project, she is Member of the National Cheetah Conservation Forum and a Management Member of the Vulture Conservation Programme.

Various national and international congresses were attended during the year. On international level, Prof. Johan Spies delivered the keynote address at the Annual General Meeting of the Clivia Society. In February, Prof. Grobler visited the Virginia Tech campus and presented an invited lecture. During the same visit to the USA, he also travelled to the Coriell Institute for Medical Research and presented an invited lecture at that institution. Ms Paula Spies presented an invited paper at the fourth Monocot Symposium in Copenhagen, Denmark, during August 2008. This paper concentrated on chromosomal evolution in the genus *Lachenalia*.

On a national level, Profs Johan Spies and Paul Grobler, Mr Frank Maleka, Ms Spies and three post-graduate students attended the bi-annual Congress of the South African Genetics Society in Pretoria where two lectures and a poster were presented. At this occasion Prof. Spies was awarded with a fellowship of the society for his contribution to the society and to genetics. Prof. Grobler attended the Annual Meeting of the SAWMA in the Eastern Cape from 16-19 September 2008 where he chaired one session. He was also placed second in the compe-



Prof. Paul Grobler, Ms Karen Ehlers and Prof. Antoinette Kotzé with a sedated rhinoceros calf.

dition for the best senior presentation. Prof. Antoinette Kotzé also attended this meeting, as well as the 19th Annual Conference of the African Association of Zoos and Aquariums (PAAZAB) at uShaka Seaworld, Durban and the 3rd Animal Keepers Association of Africa Conference (CangoAKAACon2008) in Oudtshoorn.

The animal genetics team (Profs Paul Grobler and Antoinette Kotzé

and Ms Karen Ehlers) are busy with a number of projects, including the following: a project that aims to investigate the nature and extent of hybridization between blue and black wildebeest in South Africa (in collaboration with the University of Pretoria, the National Zoological Gardens, the National Museum in Bloemfontein, and conservation officers from the Free State and KwaZulu Natal Provinces); DNA profiling of black rhino in the Weenen Game Reserve (with KZN Wildlife); conservation and environment: the genetic management of baboon populations (Gauteng Department of Agriculture); the National Genetic Database for cheetah (National Zoological Gardens, Pretoria; Department of Genetics, University of Pretoria; De Wildt Cheetah and Wildlife Trust, Hillsdale College, USA; University of Vienna, Austria); population management of crane species (National Zoological Gardens, Pretoria; Endangered



At the celebration on the establishment of the Department of Genetics are, from the left: Prof. Herman van Schalkwyk, Dean of the Faculty of Natural and Agricultural Sciences at the UFS, Prof. Johan Spies, Department Chairperson of Genetics at the UFS, Prof. Chris Viljoen, associate professor at the department of Haematology and Cell Biology and previously associated with the Department of Genetics; seated: Prof. Paul Grobler, associate professor at the department of Genetics.



Profs Johan Spies (front) and József Lanszki from the Faculty of Animal Sciences at the University of Kaposvár (Hungary) busy feeding tame red deer on the university's experimental farm.

Wildlife Trust); genetic and population studies on ground hornbills (National Zoological Gardens, Pretoria; Endangered Wildlife Trust, Ground Hornbill Working Group; Mabula Ground Hornbill Research and Conservation Project; University of Pretoria; Natural History Museum, Paris, France); and the

compilation of an atlas for haemoglobin profiles (BIORAD, Germany; SANParks; University of Limpopo).

Other projects of the team include white rhino conservation and genetics (Mpumalanga Parks and Tourism Agency), an Amphibian Prioritization Workshop (Johannesburg Zoo, PAAZAB, Henry Doorly Zoo, Amphibian ARK) and an investigation of the geographic genetic structure among vervet monkey populations, to regulate the release of monkeys from sanctuaries (University of Milwaukee-Wisconsin, USA). The vervet monkey project is also about to be expanded to include collaboration with a team at the University of California in the USA involved in a study on the use of vervet monkeys as an integrated genetic and genomic resources model system.

A study on genetic diversity in different *Clivia* species and the pos-

sible application of these results in forensics is currently being done. Research on the genes involved in the formation of flower colour in *Clivia* has already identified four genes in the anthocyanin pathway and tested their expression in different cultivars.

Prof. Trudy Turner from the Department of Physical Anthropology at the University of Milwaukee-Wisconsin, USA, visited the department in January 2008 and again in July 2008. During the February visit she conducted a joint field trip with Prof. Paul Grobler to collect vervet monkey samples near Parys in the Free State Province. In July she accompanied Prof. Grobler and a group of postgraduate students on an extensive field trip to sample vervet monkeys in the Eastern Cape area (Tsolwana and Baviaans-kloof areas).

During the Hungarian visit to South Africa the following lectures were delivered:

- Dr Tamas Molnar: Molecular research at the Kaposvár University.
- Prof. Jozsef Lanszki: Biodiversity of the Drava River with special emphasis on otter research.
- Dr Janos Nagy: Deer farming in Hungary.

Prof. Janice Britton-Davidian from Montpellier University, France visited the department during November and delivered a lecture on "The pygmy mice story".

Prof. Johan Spies acts as information officer for the distribution of knowledge obtained during the research on *Clivia* and handles many enquiries from the *Clivia* breeders. Prof. Antoinette Kotzé participated in a radio and a television programme. ■

Staff

Professor: Prof. Johan Spies

Associate Professor: Prof. Paul Grobler

Affiliated Associate Professor: Prof. Antoinette Kotzé

Lecturers: Ms Karen Ehlers, Ms Paula Spies, Mr Frank Maleka

Professional Officer: Ms Susan Reinecke

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Research outputs

Research articles

Engelbrecht, G.M., Du Preez, C.C. & Spies, J.J. 2008. Response of *Lachenalia* growing in soil to nitrogen fertilisation during the pot plant phase. *South African Journal of Plant and Soil* 25: 92-98.

Kotze, A., Ehlers, K., Cilliers, D. & Grobler, J.P. 2008. The power of

resolution of microsatellite markers and assignment tests to determine the origin of cheetah (*Acinonyx jubatus*) in southern Africa. *Mammalian Biology* 73: 457-462.

Spies, J.J. & Holder, F. 2008. IAPT/IOPB chromosome data - Poaceae. *Taxon* 57: 211-212.

Spies, J.J., Spies, P., Reinecke, S.M.C., Kleynhans, R., Duncan, G.D. & Edwards, T.J. 2008. IAPT/IOPB chromosome data - *Lachenalia*. *Taxon* 57: 212-213.

Turnbull, P.C.B., Diekman, M., Kilian, J.W., Versveld, W., De Vos, W., Arntzen, L., Wolter, K., Bartels, P. & Kotze, A. 2008. Naturally acquired antibodies to *Bacillus anthracis* protective antigen in cultures of Southern Africa. *Onderstepoort Journal of Veterinary Research* 75: 95-102.

Venter, A.M. & Spies, J.J. 2008. IAPT/IOPB chromosome data - *Lycium*. *Taxon* 57: 213.

Chapters in books

Kotze, A., Allenby, C. & Morgan, D.R. 2008. The role of captive facilities in wildlife ranching. In *Wildlife Ranching in South Africa*, edited by National Department of Agriculture, Pretoria, South Africa. Pretoria: Department of Agriculture. pp. 66-69.

Conference contributions

Allenby, C., Mhlari, H. & Kotze, A. 2008. *Why an environmental accreditation programme: The National Zoological Gardens (NZG) experience*. Poster presented at the 3rd Animal Keepers Association of Africa Conference (CangoAKAACon2008): The Year of the Frog, Cango Wildlife Range, Oudtshoorn, South Africa. 15-18 September.

Bubb, A., Ehlers, K., Grobler, J.P. & Kotze, A. 2008. *Genetic management of the baboon population in the Suikerbosrand Nature Reserve*. Poster presented at the Southern African Wildlife Management Association (SAWMA) Conference: Biodiversity Conservation: The Science Management Interface, Mpekweni Beach Resort, Port Alfred, South Africa. 16-19 September.

Dalton, D.L. & Kotze, A. 2008. *Genetics and genomes – tools for avian conservation*. Paper presented at the 4th Annual Birds of Prey Working Group (EWT-BoPWG) Conference, Sukuza, Kruger National Park, South Africa. 26-30 May.

Grobler, J.P., Ehlers, K. & Kotze, A. 2008. *Application and limitations of assignment methods used to determine the geographic origin of translocated cheetah*. Paper presented at the 20th Biennial Congress of the South African Genetics Society, Sanlam Auditorium, UP Conference Centre, University of Pretoria, South Africa. 27-29 March.

Grobler, J.P., Kotze, A., Ehlers, K. & Turner, T. 2008. *Application and limi-*

tations of assignment methods in conservation genetics: Two case studies from South Africa. Paper presented at the Southern African Wildlife Management Association (SAWMA) Conference: Biodiversity Conservation: The Science Management Interface, Mpekweni Beach Resort, Port Alfred, South Africa. 16-19 September.

Grobler, J.P., Kotze, A., Ehlers, K., Bloomer, P., Rushworth, I., Brink, J. & Vrahimis, S. 2008. *Hybridization between black- and blue wildebeest (Connochaetes gnou and C. taurinus): Approaches to the genetic management of sympatric congeners*. Poster presented at the 20th Biennial Congress of the South African Genetics Society, Sanlam Auditorium, UP Conference Centre, University of Pretoria, South Africa. 27-29 March.

Ingle-Möller, R. & Kotze, A. 2008. *Implementation of the African SPIDER Framework as a sustainable professional and environmental enrichment programme*. Paper presented at the 19th Annual General Meeting and Conference of the African Association of Zoos and Aquaria (PAAZAB), uShaka Seaworld, Durban, South Africa. 7-9 May.

Ingle-Moller, R., Chauke, T., Mpolokeng, R., Du Plessis, E., Goosen, K., Morgan, D. & Kotze, A. 2008. *Year of the frog: Enriching amphibians through a structured environmental enrichment programme at the National Zoological Gardens of South Africa*. Paper presented at the 19th Annual General Meeting and Conference of the African Association of Zoos and Aquaria (PAAZAB), uShaka Seaworld, Durban, South Africa. 7-9 May.

Jonker, L., Kaljee, J., Kotze, A., Ehlers, K. & Grobler, J.P. 2008. *Aspects of genetic diversity within and between wildebeest species (genus: Connochaetes)*. Poster presented at the Southern African Wildlife Management Association (SAWMA) Conference: Biodiversity Conservation: The Science Management Interface, Mpekweni Beach Resort, Port Alfred, South Africa. 16-19 September.

Kleynhans, R., Spies, J.J. & Spies, P. 2008. *Cross-ability in the genus Lachenalia*. Paper presented at the 20th Biennial Congress of the South African Genetics Society, Sanlam Auditorium, UP Conference Centre, University of Pretoria, South Africa. 27-29 March.

Kotze, A. & Allenby, C. 2008. *The year of the frog: Leaping for conservation*. Paper presented at the Southern African Wildlife Management Association (SAWMA) Conference: Biodiversity Conservation: The Science Man-

agement Interface, Mpekweni Beach Resort, Port Alfred, South Africa. 16-19 September.

Kotze, A., Lekgethisho, D., York, D., Van der Spuy, S., Weldon, C. & Du Preez, L. 2008. *Determination of Batrachochytrium dendrobatidis occurrence on amphibians in South Africa based on DNA analysis*. Poster presented at the 20th Biennial Congress of the South African Genetics Society, Sanlam Auditorium, UP Conference Centre, University of Pretoria, South Africa. 27-29 March.

Kotze, A., Lekgethisho, D., York, D., Van der Spuy, S., Weldon, C., Du Preez, L., Dalton, D.L. & Morgan, D.R. 2008. *Evaluation of Batrachochytrium dendrobatidis in amphibian samples from South Africa using a DNA-based assay*. Paper presented at the 19th Annual General Meeting and Conference of the Africa Association of Zoos and Aquaria (PAAZAB), uShaka Seaworld, Durban, South Africa. 7-9 May.

Payn, K.G., Maleka, M.F., Janse, B.J.H., Dvorak, W.S. & Myburg, A.A. 2008. *Population genetic analysis of Eucalyptus urophylla based on chloroplast DNA, microsatellite and single nucleotide polymorphism (SNP) diversity*. Paper presented at the 20th Biennial Congress of the South African Genetics Society, Sanlam Auditorium, UP Conference Centre, University of Pretoria, South Africa. 27-29 March.

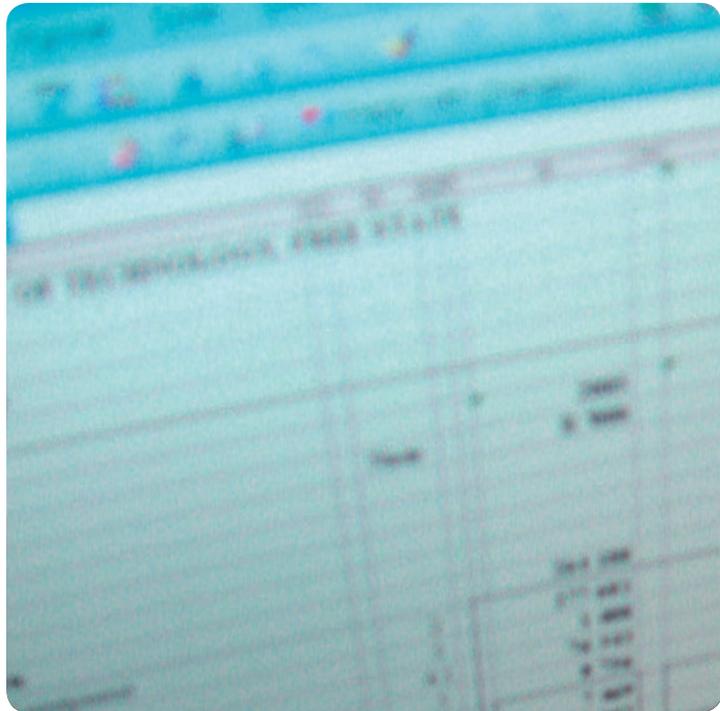
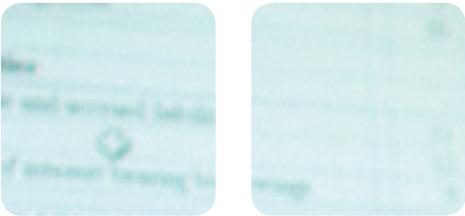
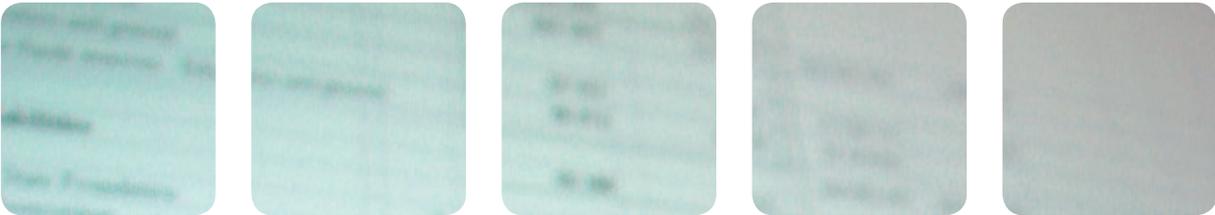
Shrestha, J.N.B., Galal, S., Mariante A.d.S., Kotze, A., Delgado, J.V. & Devendra, C. 2008. *Impact of globalization on livestock and poultry genetic resources in the world*. Invited paper presented at the 7th Global Conference of Rare Breeds International (RBI): Impact of the Globalisation on the Animal Genetic Resources, National Institute of Animal Husbandry (NIAH), Hanoi, Vietnam. 15-19 September.

Spies, P., Spies, J.J. & Kleynhans, R. 2008. *Chromosomal evolution in the genus Lachenalia (Hyacinthaceae)*. Invited paper presented at the IVth International Conference on the Comparative Biology of the Monocotyledons, H.C. Ørsted Institute, University of Copenhagen, Copenhagen, Denmark. 11-15 August.

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Statistical data

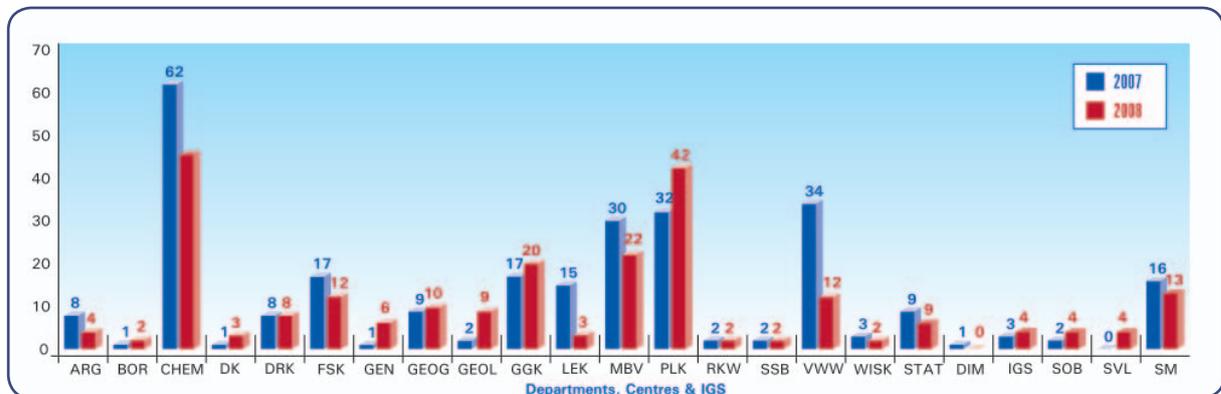


Research outputs: 2007-2008

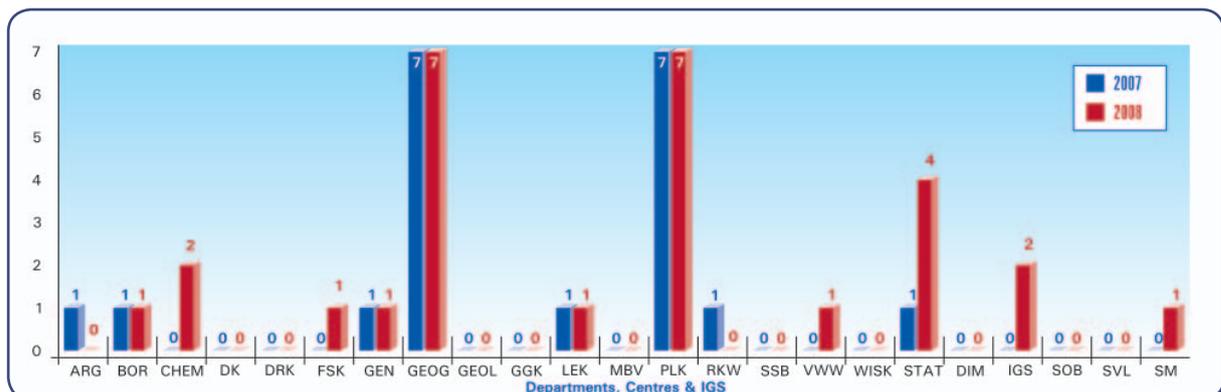
List of abbreviations

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		

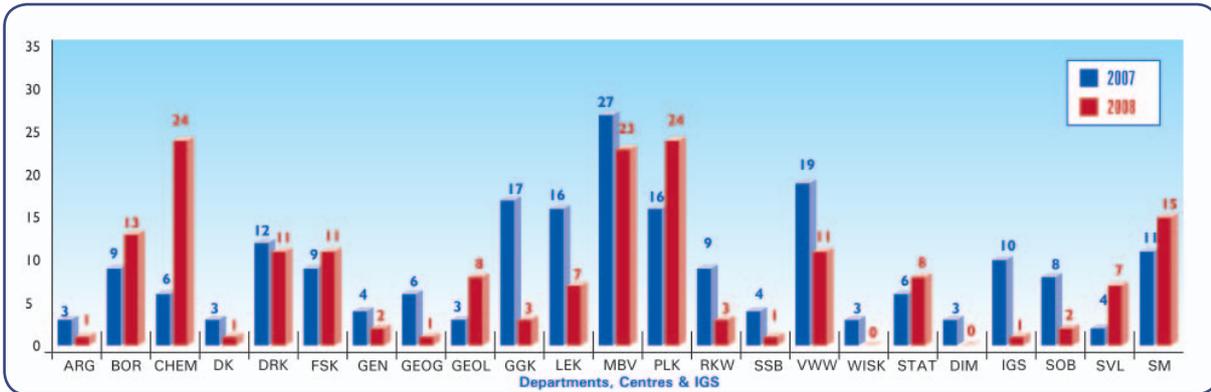
Accredited articles



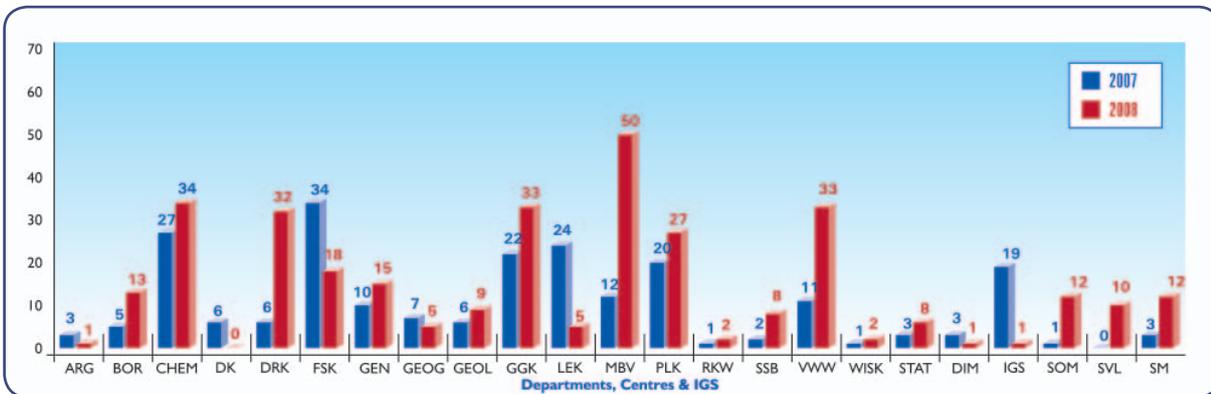
Books



International conferences



Local conferences



Student figures: 2007-2008

Student figures

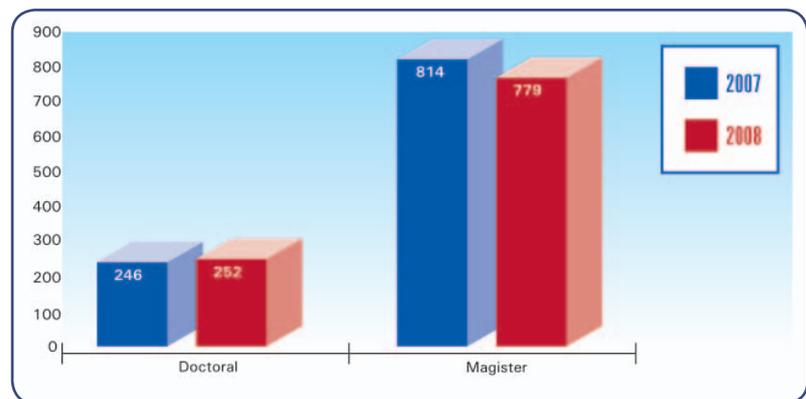
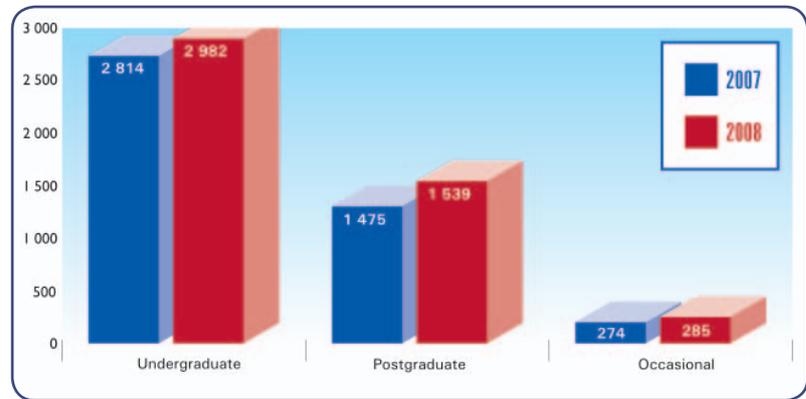
Year	Description	Black	Coloured	Asian	White	Total
2007	Undergraduate	1492	66	38	1218	2814
	Postgraduate	710	41	40	684	1475
	Occasional	230	6	2	36	274
*TOTAL		2432	113	80	1938	4563
2008	Undergraduate	1667	51	37	1227	2982
	Postgraduate	755	40	43	701	1539
	Occasional	260	5	1	19	285
* TOTAL		2682	96	81	1947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

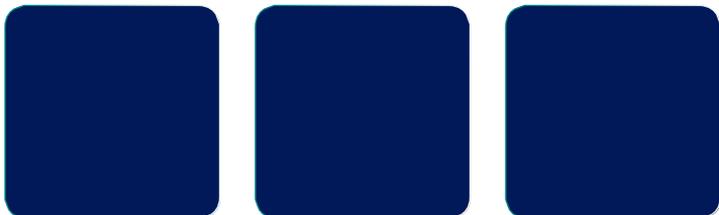
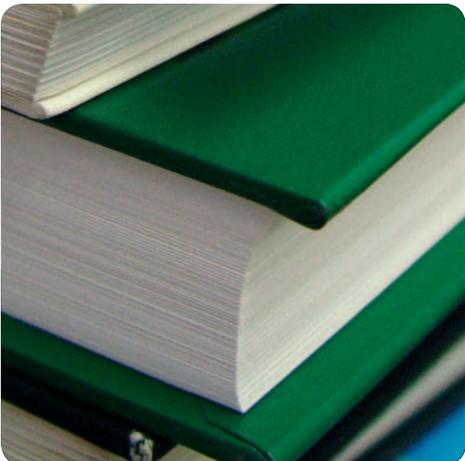
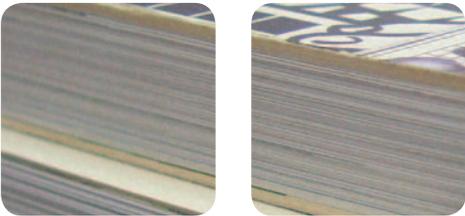
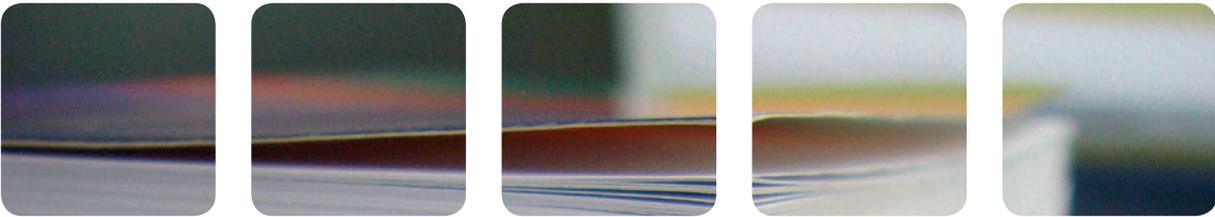
*2008 Final HEMIS figures not available

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

