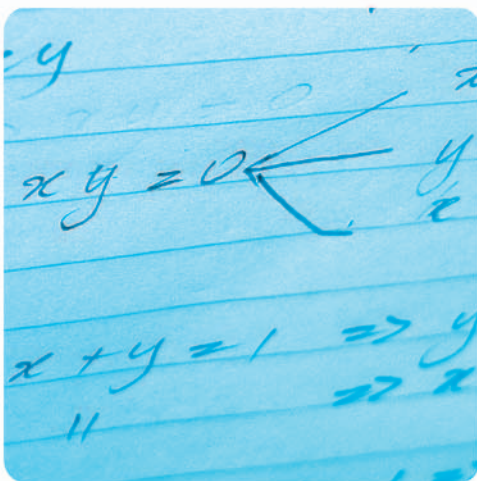
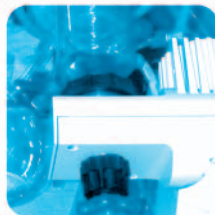


# Faculty of Natural and Agricultural Sciences

## 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 Clasie 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.

## Centre for

# Microscopy

“Internal researchers and students at the faculty remain the key users of the centre at present.” - Prof. Pieter van Wyk.



*Prof. Pieter van Wyk.*

### Overview

**R**esearch and training outputs at the Centre for Microscopy, as a service to departments in the Faculty of Natural and Agricultural Sciences and outside institutions, are determined by the hours of usage of the apparatus and laboratories.

In 2008 the total usage of the scanning electron microscope (SEM) amounted to 792 hours, for the transmission electron microscope (TEM) 75 hours and for the confocal laser scanning microscope (CLSM) 53 hours. The total microscope usage for 2008 was 920 hours compared to the 844 hours of 2007. The average usage of the respective microscopes over the past four years amounted to

566 hours per year for the SEM, 88 hours per year for the TEM, and 72 hours for the CLSM. Variations in the average usage remain representative as students and researchers complete projects and start new ones.

The above usage represents only the actual number of hours that people handled the microscopes. Any time spent planning the experiments and preparing the objects beforehand is not taken into account in the above-mentioned usage. The preparation of materials forms a very important component of microscopic research and takes up most of the time when it comes to the use of the centre's facilities. The total

utilisation of the centre, which includes the preparation of all materials and the use of all other apparatus, amounted to 204 days of the 240 days per year for 2008, compared to 178 in 2007.

A particular highlight of 2008 was a Zeiss workshop on the handling and care of optical microscopes, held at the centre on 16-17 April. The workshop also included demonstrations of the facilities at the centre. Fifty people, including some from the UFS, the Central University of Technology, Van Rensburg Pathologists and the National Museum, attended the proceedings.

Sixteen people from Liberty Life visited the centre on Biodiversity Day (21 May) as part of their team-building activities. Full demonstrations were given of all the microscopes, with the emphasis on biodiversity, along with lectures on the application of microscopy.

Another highlight of 2008 was the training of a foreign student, Janine Kotke-Levin van Stendal, Eastern Germany, who was completing a research project with Prof. Marian Tredoux of the Department of Geology in South Africa. For this purpose, the Shimadzu scanning electron microscope with the EDX was used. The Shimadzu scanning electron microscope was also used to conduct a food quality control for Mr H Schmidt of Pest Control. Mr Andrew Kessler, from the University of Cape Town, also used the confocal laser microscope to complete his final experiments as part of the yeast project

launched in 2006 towards his Ph.D.

Some highlights in terms of research included the attendance of the annual congress of the Microscopy Society of Southern Africa (MSSA2008) in Botswana by Prof. Pieter van Wyk and Ms Beanéiri Janecke. The following lectures were presented: "Electron and confocal microscopic examination of oxylipin accumulation in fermentative and non-fermentative yeasts" (Swart CW; Van Wyk PWJ & Kock JLF) and "Comparison between microbial biofilms of local beer and curdled milk in a clay pot" (Janecke BB *et al.*).

The Leica prize for the best research with a confocal microscope was awarded to Ms Chantel Swart and was collected on her behalf by Prof. Van Wyk. Ms Janecke furthermore represented the centre at the Southern African Wildlife Management Association's annual conference with a seminar, "Assessment of faecal nitrogen as an indicator of nutritional status of browser and mixed feeder game species in the central Free State" (Janecke BB & Smit GN).

The centre was also involved in two school projects in cooperation with Prof. Rudi L Verhoeven of the Department Plant Sciences. The projects, presented by learners during the 2008 Expo for schools, focused on ultra-structural differences between plants treated with an electrical current to determine electrical conduction. The Jeol microscope was used for this purpose.

An order was placed for a Nikon AZ-100, which is a new type of microscope with a camera for stereo optical microscopy. This microscope meets a variety of research needs, particularly in terms of the accurate measurement and morphology of larger types of live organisms that cannot be examined by means of the electron microscopes. Delivery and installation is planned for early 2009.

The electricity supply dilemma that struck South Africa in 2008 affected the centre and its users significantly. Power failures caused



*Students undergoing training on the transmission electron microscope.*

unnecessary expenses and a loss of working hours. In an effort to resolve this problem, the centre was equipped with an emergency power supply and (UPS). Any future power failures will therefore not inflict so much damage on the microscopes. The dean, and in particular university management, were thanked for the expenditure that has made it possible for future research at the centre to proceed with as little disruption as possible.

The usual courses in the preparation of materials and the handling of apparatus were presented to honours students of the Departments of Zoology and Entomology (DRK/ENT614), Microbial, Biochemical and Food Biotechnology (MKB/BOC614) and Plant Sciences (PWS614). These courses, lasting three days each, were presented to each group separately. A one-day course was offered to honours students of Genetics (GEN 686) and Medical Microbiology and Virology (MKM601). The second-year students of the Departments of Zoology and Entomology and Plant Sciences attended an introductory course in microscopy on 18 March and 25 April respectively.

Follow-up courses in the practical handling of the electron micro-

scopes were held for postgraduate students and researchers from 16-16 May and from 6-9 October. Individual training was offered on an ongoing basis throughout the year to researchers and postgraduates, according to the needs of the respective departments, to teach them the skills to independently prepare objects and handle the microscopes.

## Utilisation of the centre

Internal researchers and students at the faculty remain the key users of the centre at present. The following departments, personnel and students made use of the centre's facilities in 2008 (approximate usage only):

### Department of Chemistry:

Luyt R (by Van Wyk PWJ: SEM: 16 hours; TEM 11 hours), Mokoena M (SEM: 10 hours; by Janecke BB: CEM Hons. 6 hours).

### Department of Zoology and Entomology:

Adendorff J (SEM: 2 hours), Basson L (SEM: 5 hours), Brink S (SEM: 3 hours), Haddad C (SEM: 3 hours), Janse van Rensburg C (SEM: 2 hours), Landman H (SEM: 6 hours), Terry S (SEM: 14 hours),



Ms Beanétri Janecke and Prof. Pieter van Wyk at the annual congress of the Microscopy Society of Southern Africa in Botswana.

## Staff

**Affiliated Professor:** Prof. Pieter van Wyk

**Research Officer:** Ms Beanétri Janecke

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Van As J (SEM: 3 hours), Van As L (SEM: 1 hour), West D (SEM: 43 hours).

### Department of Physics:

Biggs M (by Janecke BB: SEM: 3 hours), Coetsee L (SEM: 102 hours), Cronje S (SEM: 1 hour), Dhlamini S (SEM: 5 hours), Harris R (SEM: 1 hour), Kroon T (SEM: 7 hours; TEM: 2 hours), Nsimama P (by Janecke BB: SEM: 10 hours), Ntwaeaborwa M (SEM: 1 hour; TEM: 1 hour).

The following students of the Qwaqwa Campus in this department did not personally work with the microscopes, and their research on the Shimadzu SSX-550 was done by Liza Coetzee: Jappie Jafta Dolo (Ph.D.), Thami Koa (M.Sc.), Kewele Foka (Hons.), Abdub Ali (M.Sc.), Daniel Bem (Ph.D.), Patrick Nsimama (Ph.D.).

### Department of Geology:

Joubert A (SEM: 2 hours), Gauert C (SEM: 5 hours), Kottke-Levin J (SEM: 28 hours), Ndaluliwa K (SEM: 8 hours).

### Department of Microbial, Biochemical and Food Biotechnology:

Ells R (CLSM: 9 hours), Kakoma K (by Van Wyk PWJ; TEM: 9 hours), Leeuw N (TEM: 2 hours), Mabizela L (TEM: 15 hours), Moolman I (CLSM: 2 hours), Moore I (by Janecke BB: SEM: 3 hours), Ncango D (CLSM: 4 hours; SEM: 7 hours; TEM: 3 hours), Nthokoa K (SEM 4 hours), Randall C (SEM: 3 hours), Swart C (CLSM: 7 hours;

SEM: 4 hours; TEM: 4 hours), Van Marwijk J (TEM: 5 hours).

### Department of Plant Sciences:

Amenorpe G (SEM: 34 hours), Joubert L (SEM: 62 hours), Mweta D (SEM: 17 hours; CLSM: 5 hours), Verhoeven RL (SEM: 31 hours).

### Department of Animal, Wildlife and Grassland Sciences

Malan P (SEM: 17 hours).

### Centre: user support and the service and repair of microscopes:

Bester Dreyer (CUT student; Cardiothoracic Surgery/CUT collaboration) (SEM: 182 hours).

The hours of support rendered by the centre's staff to all of the above-mentioned departments' users in respect of the use of microscopes and image processing amounted to 18 hours for the CLSM, 20 hours for the SEMs and 6 hours for the TEM. Beginner and refresher courses (SEM: 15 hours, TEM: 10 hours, workshop: 20 hours).

Maintenance to the Jeol: 6 hours; Shimadzu: 86 hours and TEM: 11 hours. This maintenance period of 103 hours includes approximately 35 hours of repairs carried out by personnel themselves. In light of the average service fee charged by external companies, this means a saving of approximately R60 000. The component repaired by the Electronics Division constituted an additional saving of R35 000, meaning a total saving of R95 000 for the faculty. ■

## Research outputs

### Research articles

**Coetsee, E., Terblans, J.J. & Swart, H.C.** 2008.  $Y_2SiO_5:Ce$  thin films grown by PLD. *Physica Status Solidi C* 5(2): 634-637.

**Dhlamini, M.S., Terblans, J.J., Kroon, R.E., Ntwaeaborwa, O.M., Ngaruiya, J.M., Botha, J.R. & Swart, H.C.** 2008. Photoluminescence properties of  $SiO_2$  surface passivated PbS nanoparticles. *South African Journal of Science* 104(9-10): 398-400.

**Dhlamini, M.S., Terblans, J.J., Ntwaeaborwa, O.M., Joubert, H.D. & Swart, H.C.** 2008. Preparations and luminescent properties of PbS nanoparticle phosphors incorporated in a  $SiO_2$  matrix. *Physica Status Solidi C* 5(2): 598-601.

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- of powder and pulsed laser deposited PbS nanoparticles in SiO<sub>2</sub>. *Journal of Luminescence* 128(12): 1997-2003.
- Dolo, J.J., Swart, H.C., Terblans, J.J., Coetsee, E., Dhlamini, M.S., Ntwaeaborwa, O.M. & Dejene, B.F.** 2008. Degradation of commercial Gd<sub>2</sub>O<sub>3</sub>:Tb phosphor. *Physica Status Solidi C* 5(2): 594-597.
- Dramicanin, M.D., Viana, A., Andric, Z., Djokovic, V. & Luyt, A.S.** 2008. Synthesis of Y<sub>2</sub>SiO<sub>5</sub>:Eu<sup>3+</sup> nanoparticles from a hydrothermally prepared silica sol. *Journal of Alloys and Compounds* 464: 357-360.
- Mishra, S.B. & Luyt, A.S.** 2008. Effect of organic peroxides on the morphological, thermal and tensile properties of EVA-organoclay nanocomposites. *eXPRESS Polymer Letters* 4: 256-264.
- Ncango, D.M., Swart, C.W., Goldblatt, M.E., Pohl, C.H., Van Wyk, P.W.J., Botes, P.J. & Kock, J.L.F.** 2008. Oxylipin and mitochondrion probes to track yeast sexual cells. *Canadian Journal of Microbiology* 54(6): 450-455.
- Ntwaeaborwa, O.M., Dhlamini, M.S., Botha, J.R. & Swart, H.C.** 2008. Characterization of sol-gel SiO<sub>2</sub>:Ce,Tb powder and pulsed laser deposited thin film phosphor. *Physica Status Solidi C* 5(2): 602-605.
- Radhakrishnan, T., Georges, M., Nair, P. & Luyt, A.S.** 2008. Composites comprising CdS nanoparticles and poly(ethylene oxide): Optical properties and influence of the nanofiller content on the thermal behaviour of the host matrix. *Colloid and Polymer Science* 286: 683-689.
- Reed, C., Basson, L., Van As, L. & Dyková, I.** 2007. Four new myxozoans (Myxosporea: Bivalvulida) from intertidal fishes along the south coast of Africa. *Folia Parasitologica* 54: 283-292.
- Sebolai, O.M., Pohl, C.H., Botes, P.J., Van Wyk, P.W.J. & Kock, J.L.F.** 2008. The influence of acetylsalicylic acid on oxylipin migration in *Cryptococcus neoformans* var. *neoformans* UOFS Y-1378. *Canadian Journal of Microbiology* 54(2): 91-96.
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- Van As, L.L. & Van As, J.G.** 2007. *Lamproglena hepseti* n.sp. (Copepoda: Lernaecidae), a gill parasite of the African pike, *Hepsetus odoe* (Bloch) from the Okavango River and Delta, Botswana. *Systematic Parasitology* 67: 19-24.

## Chapters in books

- Ntwaeaborwa, O.M., Swart, H.C., Kroon, R.E., Botha, J.R., Ngaruiya, J.M. & Holloway, P.H.** 2008. Enhanced photoluminescence of rare-earth activators in sol-gel derived SiO<sub>2</sub> by energy transfer from ZnO nanoparticles and co-activators. In *Photoluminescence Research Progress*, edited by H.K. Wright and G.V. Edwards. Hauppauge: Nova Science Publishers. pp. 287-306

## Conference contributions

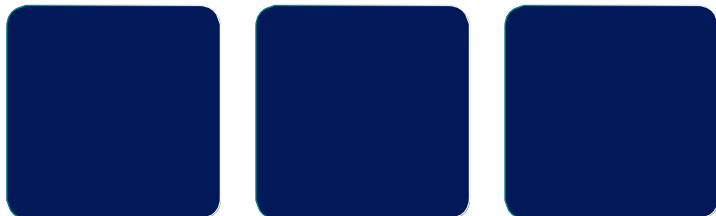
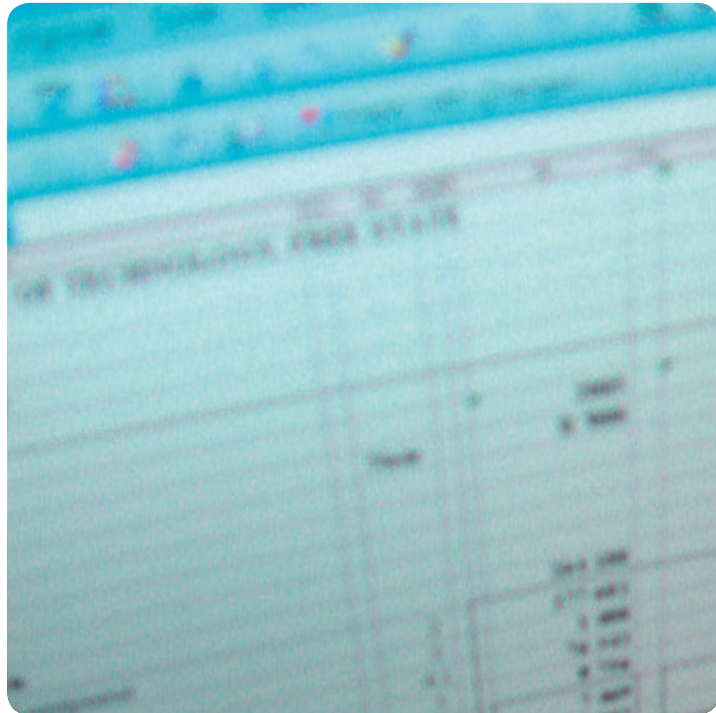
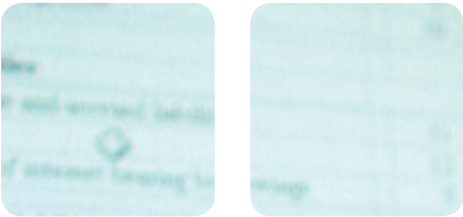
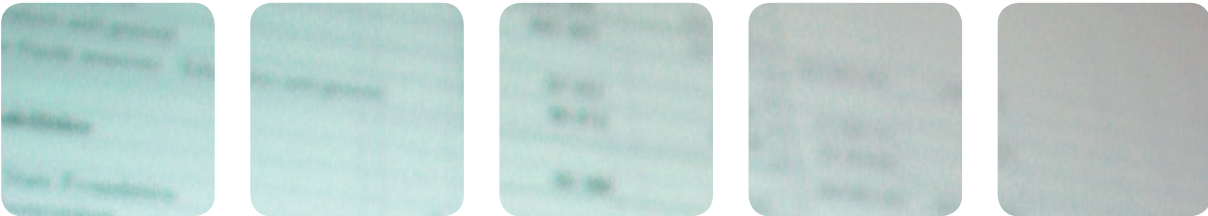
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# Statistical data

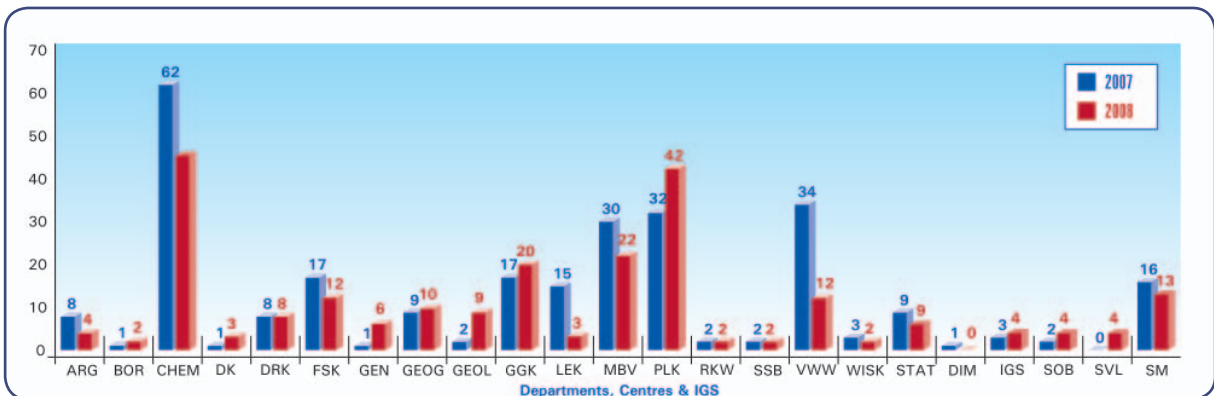


## Research outputs: 2007-2008

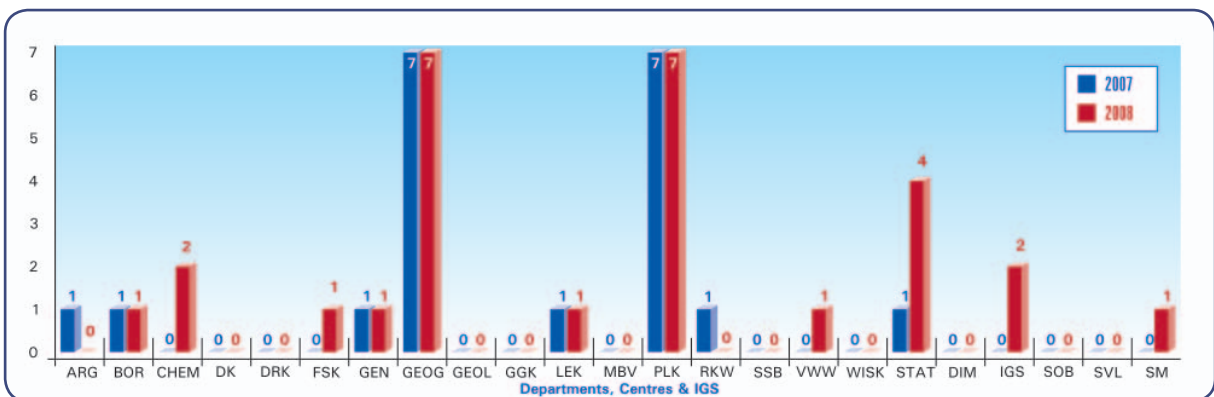
### List of abbreviations

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		

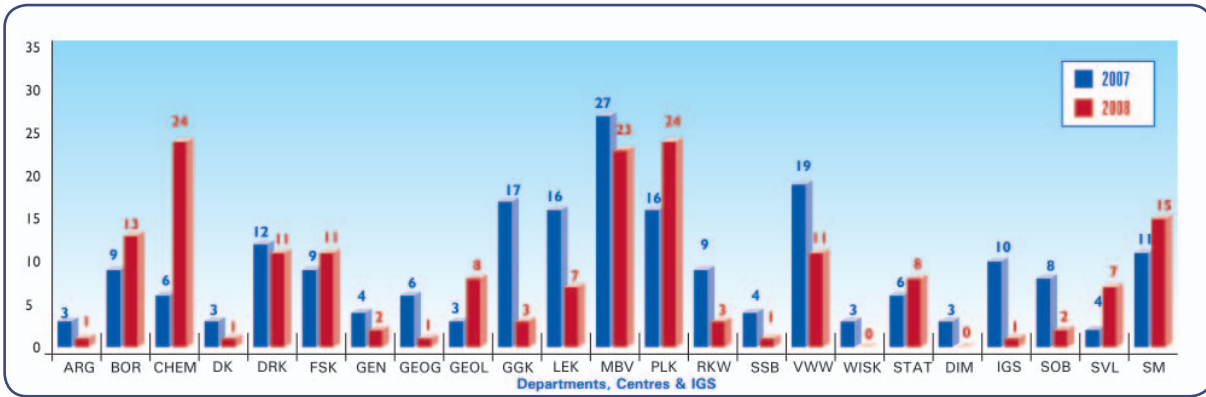
### Accredited articles



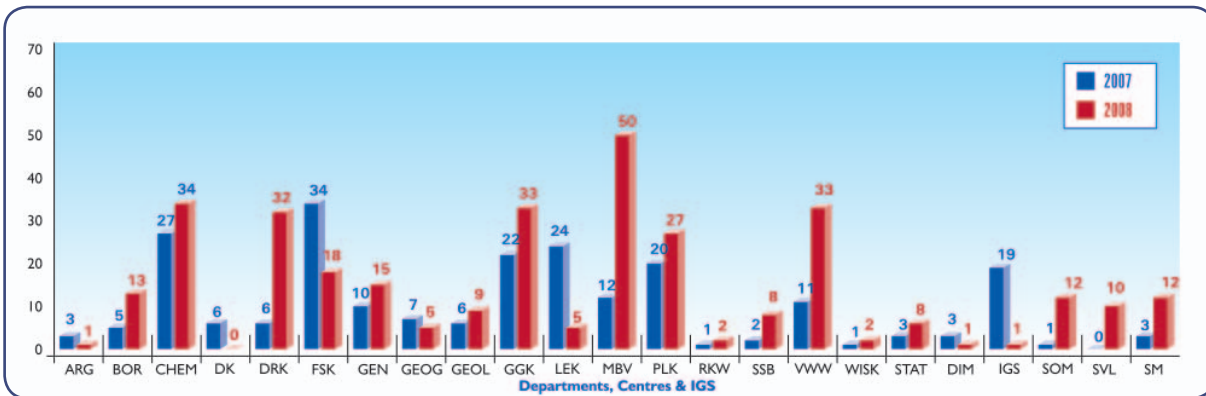
### Books



### International conferences



### Local conferences



## Student figures: 2007-2008

### Student figures

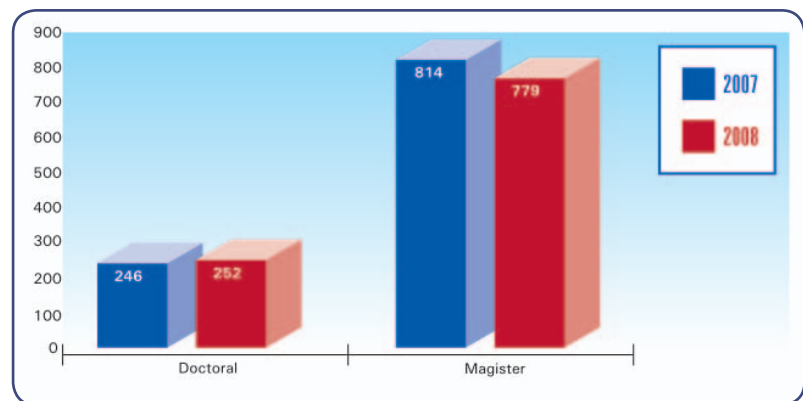
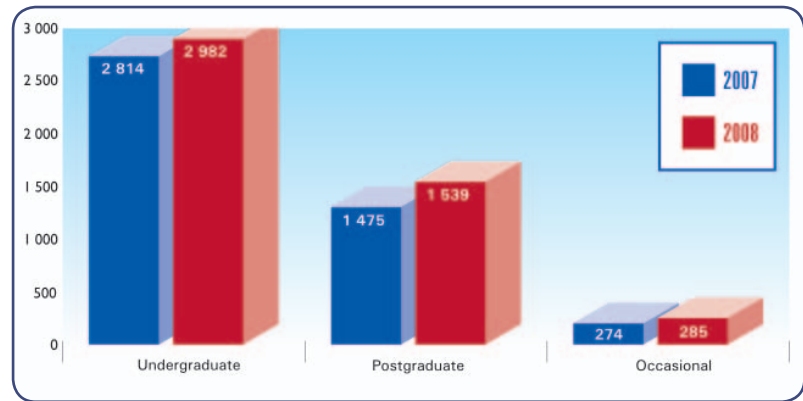
Year	Description	Black	Coloured	Asian	White	Total
2007	Undergraduate	1492	66	38	1218	2814
	Postgraduate	710	41	40	684	1475
	Occasional	230	6	2	36	274
<b>*TOTAL</b>		<b>2432</b>	<b>113</b>	<b>80</b>	<b>1938</b>	<b>4563</b>
2008	Undergraduate	1667	51	37	1227	2982
	Postgraduate	755	40	43	701	1539
	Occasional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

### 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
<b>Total</b>	<b>352</b>	<b>429</b>

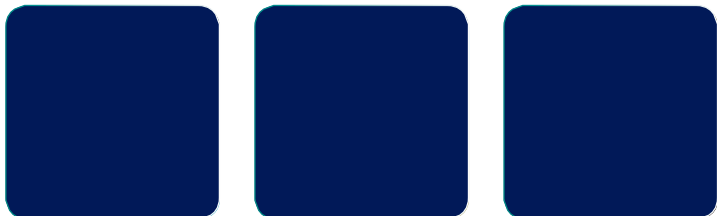
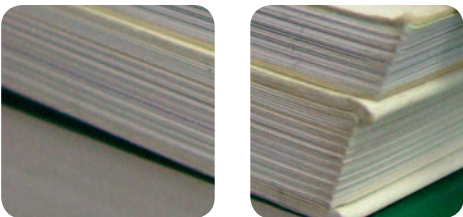
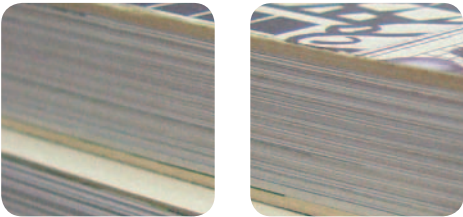
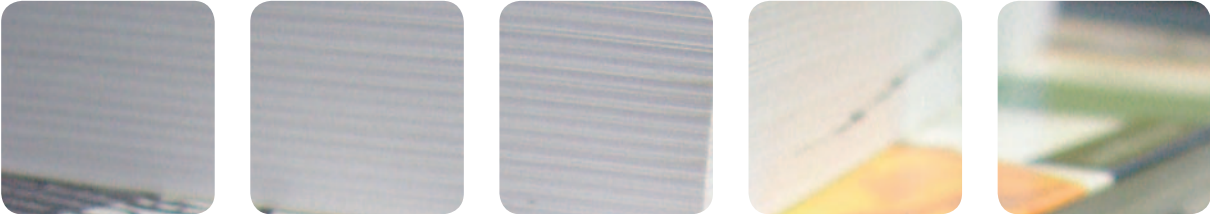
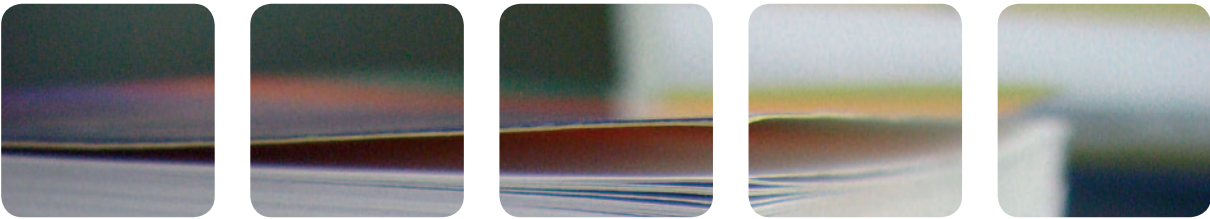
\*2008 Final HEMIS figures not available

### 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

**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

