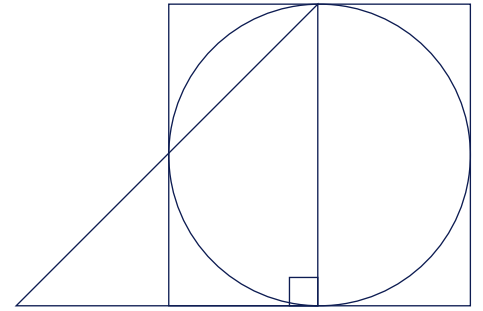


# Report

05/06



## Faculty of Natural and Agricultural Sciences



# Faculty of Natural and Agricultural Sciences

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University of the Free State

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The Afrikaans version is also available on a compact disc  
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Cover page: Aspects of natural and agricultural sciences.

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# From the Dean's office



*Prof. Herman van Schalkwyk.*

The Faculty of Natural and Agricultural Sciences at the University of the Free State (UFS) leads the way in the practising of natural and agricultural sciences in South Africa and the highest levels of quality and credibility are reflected.

Our commitment, however, reaches far beyond just this. It reaches beyond the borders of the country and across continents; its multi-disciplinary and practical approach is vested in all the disciplines presented by the faculty.

In 2005/06 the Faculty experienced significant growth in measurable outputs. A contributing factor was the comprehensive apparatus strategy and plan which was implemented in 2005. With this strategy, university funds were used to leverage other funds in order to obtain huge discounts from suppliers of apparatus. In this way the faculty managed to obtain almost R50 million worth of apparatus in 2005.

The strategy was continued in 2006 when an agreement to the value of R7 542 531 was reached with Shimadzu, according to which apparatus was supplied to the faculty at discount prices. The agreement, which is valid for three years, entails the free replacement of apparatus which is purchased during this period with upgraded versions.

The new apparatus forms part of the UFS vision to compete internationally with quality research outputs in certain niche areas, to provide leadership in advanced training to students from the African continent and to establish the university as a leader among South African universities.

Two researchers with a B rating from the National Research Foundation (NRF) were also appointed. Both of these initiatives bore fruit and in 2006 the faculty increased its total research outputs by

about 13%. As an example, the Department of Chemistry's outputs increased by 100%.

The faculty has been bursting at the seams over the past couple of years. Student figures rose from 3 935 undergraduate, postgraduate and occasional students in 2005, to 4 224 in 2006. There is also strong representivity of students from other African countries and in 2005/06 almost 600 students studied at the faculty.

An extended B.Sc. programme has been presented to students since 2005. The programme aims at providing students who do not comply with all the requirements for the B.Sc. programme with the necessary sub-structure to complete the B.Sc. degree successfully. A preliminary evaluation of the results indicates that the programme is delivering the desired results.

The alignment of the Qwaqwa Campus, which was incorporated into the UFS in January 2003, remains a challenge. Regular discussions are held with staff on the campus in order to make the faculty's programmes more sustainable and to align it with the broader strategic plan of the UFS.

On a national level, the faculty is in the process of making its mark in terms of teaching and community service. In 2005 the faculty again actively began utilising its

experimental farms. A three-way agreement between the UFS, the National Farmers Union (NAFU) and the Mangaung Local Municipality led to the establishment of the Lengau Agricultural Development Centre on the Sydenham Experimental Farm. The centre provides training and mentorship to small-scale upcoming farmers.

To be dynamic and progressive requires innovative thinking. It requires commitment and a desire to deliver excellent teaching and learning opportunities to students. It requires a willingness to form partnerships, and a multi-disciplinary and practical approach to the tertiary education environment in South Africa.

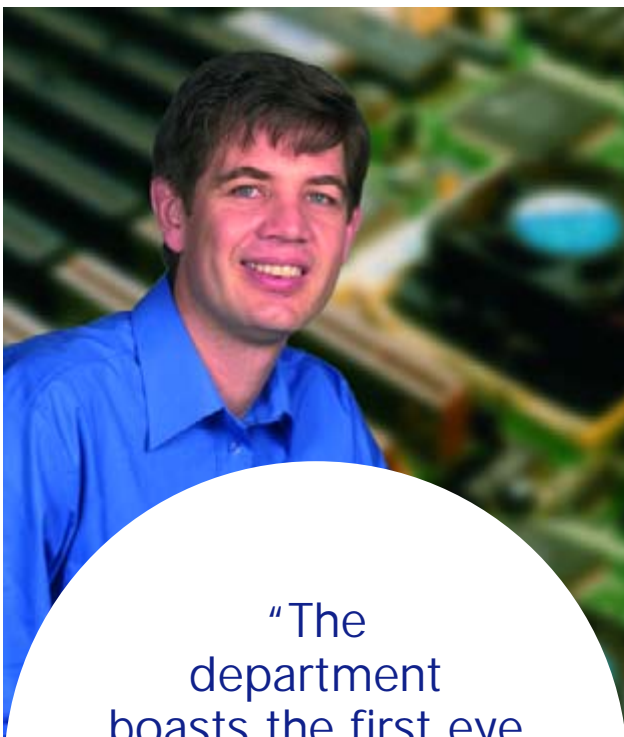
This report covers the faculty's activities in 2005/06. It is a reflection of two years' commitment on the part of a team of skilled and motivated academics and support staff.



**Prof. Herman van Schalkwyk**

Dean: Faculty of Natural and Agricultural Sciences  
University of the Free State

# Computer Science and Informatics



“The department boasts the first eye tracker in Africa that allows free eye movement.”

Prof. Janse Tolmie.

## Overview

In the pursuit of the Faculty of Natural and Agricultural Sciences and the university's strategic priorities for 2005, the Department of Computer Science and Informatics was active in the areas of education, research and community service. In order to ensure that our students obtain relevant and market-related training, the department switched to the teaching of a new programming language called C#.

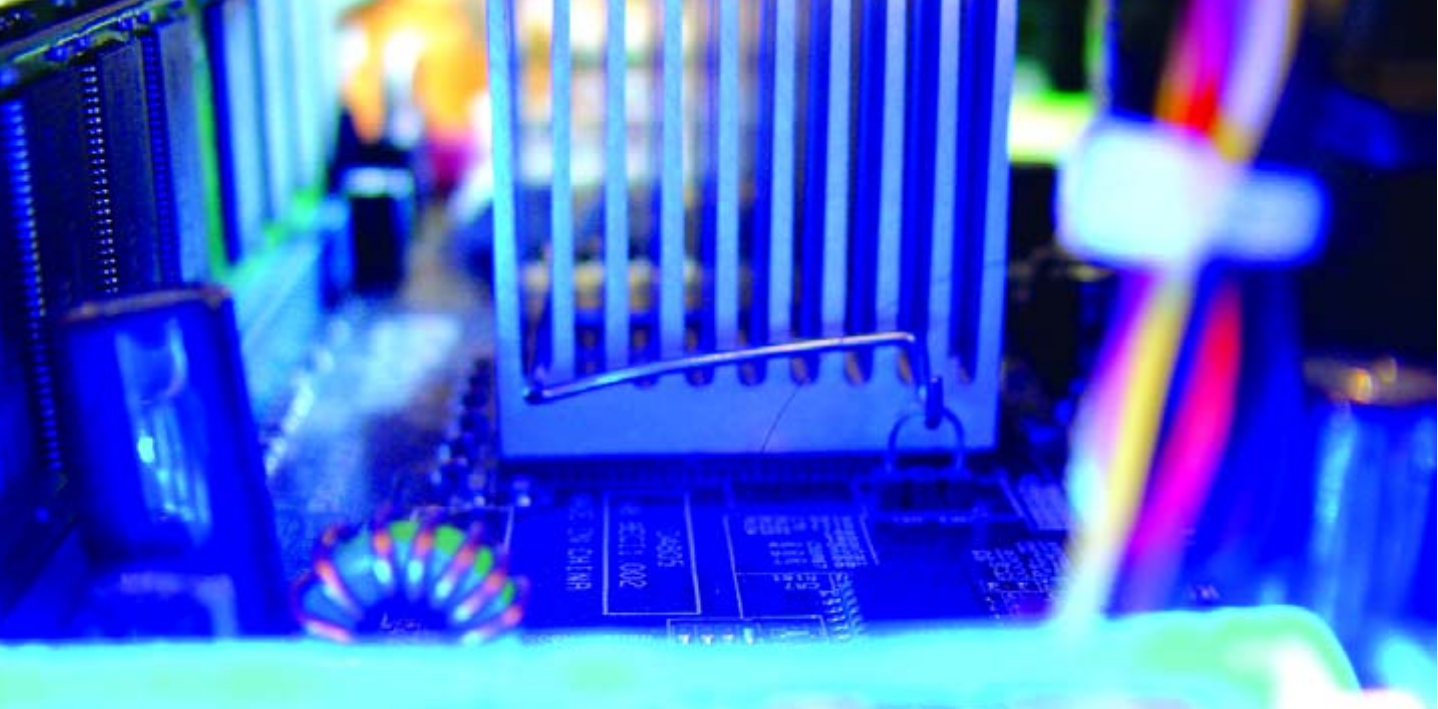
Community involvement was done in several ways: Prof. Pieter Blijnaut and Dr Anelize van Biljon acted as external moderators for Umalusi and Ms Nancy de Sousa trained officials from the Free State Department of Education in project management. Ms de Sousa was also involved in the phasing in of the use of computers at schools in the Bloemfontein area.

The department took part in the Bloemfontein Technology Project, which teaches computer literacy to learners from previously disadvantaged communities. Short courses in computer literacy were also presented to the community.

Research in the department was boosted tremendously by the establishment of the Telkom Centre of Excellence in 2005. The centre focuses on research in human-computer interaction and is equipped with sophisticated sight-tracking apparatus which makes it possible to analyse computer use. The Departments of Mathematical Statistics and Physics at the UFS were also involved in activities at the centre. Besides Telkom, Microsoft is also involved as a donor. Bursaries from Telkom were awarded to two students and Prof. Blijnaut is acting as director of the centre.

In 2005/06 research in the centre focused on human-computer interaction and data warehousing. A significant amount of research was conducted in these areas and research results led to a number of national and international publications.

The centre acquired an eye tracker for research purposes. This apparatus has many research possibilities, not only for Computer



At the eye tracker are from the left: Prof. Janse Tolmie, Departmental Chairperson, Ms Anne Jansen from the supplier Tobii Technologies in Sweden, and Prof. Pieter Blignaut.

Science, but also for other disciplines such as Psychology, Occupational Therapy and Marketing. This is the first eye tracker in Africa that allows free eye movement.

The centre's eye tracker opened up many opportunities for research projects in human-computer interaction. New research with great future potential focused on the quantification of usability studies, and a contract usability study was conducted for a group in Germany.

Research was also undertaken in the areas of human-computer interaction, knowledge-based systems, data warehouses and information systems. Several international publications were submitted on these topics. A

group of laboratory computers were set up as a Linux cluster to perform powerful calculations. This cluster is also used for simulations in a project that focuses on the optimisation of a programming language.

In 2006 the department was involved in a project on action research in e-learning, conducted in one of the undergraduate courses. This project was closely linked to the university's interest in blended learning. On postgraduate level, it became evident that programmes that enable students to combine management modules and IT management modules with pure IT modules, have become very popular. The number of honours students increased to more than 50 during the year.

## Academic staff

### Main Campus

**Professors:** Proff. Janse Tolmie, Pieter Blignaut, Theo Mc Donald, Hans Messerschmidt

**Senior Lecturer:** Dr Lizette de Wet  
**Lecturers:** Drs Liezel Nel, Anelize van Biljon, Messrs Andries Burger, Deon du Plessis, Dana Kotze, Eduan Kotze, Johan van Rooyen, Ms Engela Dednam

**Junior Lecturers:** Messrs Rouxan Fouché, Philip Penning, Fanie Riekert, Ray Shih, Johan Pretorius, Ms Annelie Naudé

### Qwaqwa Campus

**Senior Lecturer:** Dr Mike Kyobe  
**Junior Lecturers:** Messrs Jacques Eysele, Walter Gwiba, Molapo Jonathan, Isaac Mokhotla, Frederick Mudavanhu, Benedict Sebastian, Mss Nidhi Mary-John, Victoria Mochochonono, Ruth Wario

### Vista Campus

**Lecturer:** Ms Nancy de Sousa  
**Junior Lecturers:** Messrs Rudolf Oosthuizen, Timothy Mahloko, David Ramatlotlo

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# Research outputs

## Publications

**Blignaut, P.J. & Cruywagen, I.** 2005. Development of an information kiosk for a large transport company: Lessons learned. *Journal of Cases on Information Technology* 7(4): 27-45.

**Blignaut, P.J. & McDonald, T.** 2006. Die implikasies van lees- en skryfvoorkeurtaal met betrekking tot internettoegang vir Suid-Afrikaanse gebruikers. *Suid-Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie* 25(3): 165-171.

**De Wet, L. & Van Aswegen, W.** 2005. Determining the usability of computer input devices by Parkinson's disease sufferers. *SA Family Practice* 47(1): 58-59.

**Messerschmidt, H.J. & Messerschmidt, J.J.E.** 2006. Die kategorisering van onderskikkings: Enkele kenmerke van dat-samestellings. *Southern African Linguistics and Applied Language Studies* 24(1): 7-22.

**Nel, E.** 2006. Enhancing collaborative learning in a blended learning environment: Applying a process planning model. *Systemic Practice and Action Research* 19(6): 553-576.

## Chapters in books

**Blignaut, P.J., Burger, A.J., McDonald, T. & Tolmie, C.J.** 2005. Computer attitude and anxiety. In *Encyclopedia of Information Science and Technology, Volume I-V*, edited by M. Khosrow-Pour. USA: Idea Group Publishing. pp. 495-501.

**Messerschmidt, H.J., Messerschmidt, J.J.E., Blanckenberg, L. & Van der Westhuizen, J.** 2005. In *Semi-automatic generation of LA grammars, multilingualism and electronic language management*, edited by W. Daelemans, T. Du Plessis, C. Snyman & L. Teck. Pretoria: Van Schaik. pp. 70-80.

**Kyobe, M.E.** 2006. Entrepreneur behaviors on E-Commerce security. In *Encyclopedia of E-Commerce, E-Government, and Mobile Commerce Idea Group Inc.*, edited by M. Khosrow-Pour. USA: Information Resources Management Association. pp. 437-444.

## Conference contributions

**Beelders, T., Blignaut, P.J. & McDonald, T.** 2005. *A word processor prototype to assess the effect of culture on usability*. Paper presented at the Southern African Telecommunication Networks & Applications Conference, Drakensberg, South Africa.

**Beelders, T., McDonald, T. & Blignaut, P.J.** 2005. *A proposed study to determine the effects of culture on the usability of word processors*. Proceedings of the 4th Conference on Human-Computer Interaction in Southern Africa, Johannesburg, South Africa. pp. 29-33.

**Blignaut, P.J. & McDonald, T.** 2005. *Capturing usability data on-the-go*. Paper presented at the 5th International Conference on Measuring Behavior, Wageningen, The Netherlands.

**De Wet, L. & McDonald, T.** 2006. *Gender and cultural differences (if any): South African school children and computer games*. Paper presented at the 5th International Conference on Computer and Games, Turin, Italy.

**Kyobe, M.E.** 2005. *Addressing E-crime and computer security issues in small organisations in South Africa*. Paper presented at the European Management and Technology Conference, Rome, Italy.

**McDonald, T.** 2006. *Neurobdb: A database application for processing neutron water meter data*. Paper presented at the Combined Congress of the South African Society of Crop Production and the Soil Science Society of South Africa, Durban, South Africa.

**McDonald, T. & Blignaut, P.J.** 2005. *The effect of cultural differences on the efficiency of searches on a university website*. Paper presented at the 11th International Conference on Human-Computer Interaction, Las Vegas, USA.

**Nazir, A. & McDonald, T.** 2006. *Challenges in developing a cost-effective data warehouse for a tertiary institution in a developing country*. Proceedings of the 7th International Conference on Data, Text and Web Mining: Business Applications and Management Information Engineering, Prague, Czech Republic. pp. 389-397.

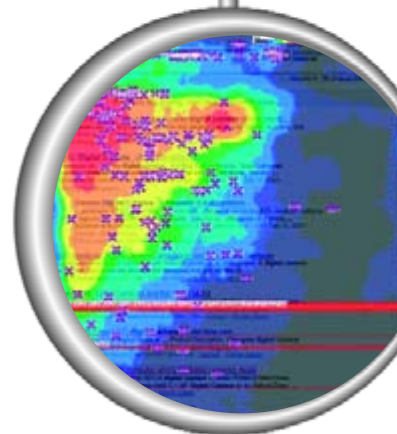
**Nazir, A. & McDonald, T.** 2006. *Lessons learned in developing a data warehouse for a tertiary institution in South Africa*. Paper presented at the 2nd Foundation of Tertiary Institutions of the Northern Metropolis (FOTIM) International Quality Assurance Conference, Pretoria, South Africa.

**Nel, E.** 2006. *Enhancing online collaboration practices in South African undergraduate classrooms*. Paper presented at the 8th Annual Conference on World Wide Web Applications, Bloemfontein, South Africa.

**Nel, E.** 2006. *Voices from a South African blended learning classroom: Reflections based on an action research diary*. Paper presented at the 2006 Conference of the Education Association of South Africa (EASA), Bloemfontein, South Africa.

**Nel, L.** 2005. *Incorporating student feedback in the enhancement of online collaborative activities*. Proceedings of the 4th International Conference on Technology in Teaching and Learning in Higher Education, University of Peking, Beijing. Edited by C. Spirou & Q. Wang. pp. 209-213.

**Nel, L. & Wilkinson, A.C.** *Design for interaction: The implementation of a collaborative e-learning approach in undergraduate education*. Proceedings of the 4th International Conference on Technology in Teaching and Learning in Higher Education, University of Peking, Beijing. Edited by C. Spirou & Q. Wang. pp. 215-219.





# Statistical data of the faculty



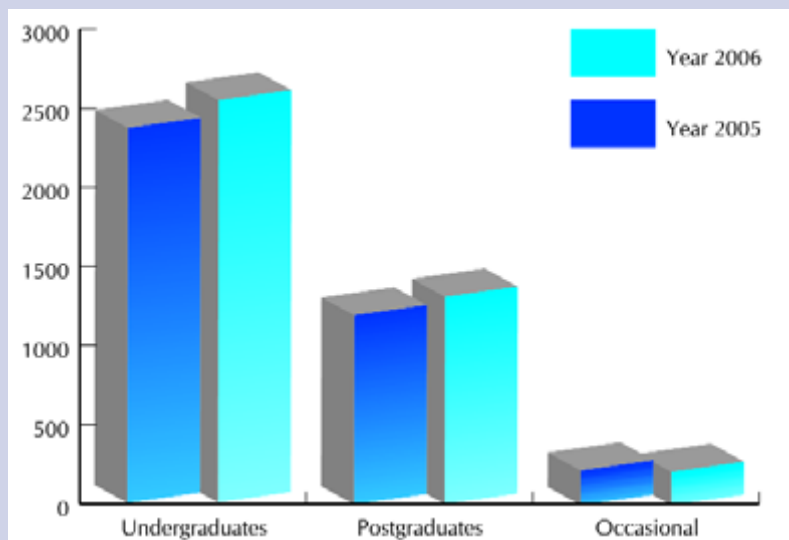
# Student figures

Faculty of Natural and Agricultural Sciences, 2005/06

| Male              |             |           |           |             |             |
|-------------------|-------------|-----------|-----------|-------------|-------------|
| 2005              |             |           |           |             |             |
| Description       | African     | Coloured  | Indian    | White       | Total       |
| Undergraduate     | 676         | 31        | 26        | 724         | 1457        |
| Postgraduate      | 351         | 22        | 15        | 400         | 788         |
| Occasional        | 84          | 3         | 4         | 17          | 108         |
| <b>Total 2005</b> | <b>1111</b> | <b>56</b> | <b>45</b> | <b>1141</b> | <b>2353</b> |
| 2006              |             |           |           |             |             |
| Description       | African     | Coloured  | Indian    | White       | Total       |
| Undergraduate     | 729         | 28        | 21        | 768         | 1546        |
| Postgraduate      | 385         | 21        | 16        | 431         | 853         |
| Occasional        | 68          | 2         | 2         | 23          | 95          |
| <b>Total 2006</b> | <b>1182</b> | <b>51</b> | <b>39</b> | <b>1222</b> | <b>2494</b> |

| Female            |            |           |           |            |             |
|-------------------|------------|-----------|-----------|------------|-------------|
| 2005              |            |           |           |            |             |
| Description       | African    | Coloured  | Indian    | White      | Total       |
| Undergraduate     | 563        | 41        | 11        | 394        | 1009        |
| Postgraduate      | 206        | 16        | 11        | 221        | 454         |
| Occasional        | 101        | 5         | 2         | 11         | 119         |
| <b>Total 2005</b> | <b>870</b> | <b>62</b> | <b>24</b> | <b>626</b> | <b>1582</b> |
| 2006              |            |           |           |            |             |
| Description       | African    | Coloured  | Indian    | White      | Total       |
| Undergraduate     | 641        | 39        | 17        | 401        | 1098        |
| Postgraduate      | 243        | 15        | 17        | 234        | 509         |
| Occasional        | 103        | 2         | 2         | 16         | 123         |
| <b>Total 2006</b> | <b>987</b> | <b>56</b> | <b>36</b> | <b>651</b> | <b>1730</b> |

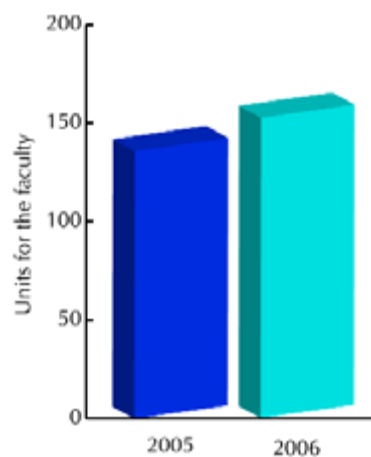
| Total             |             |            |           |             |             |
|-------------------|-------------|------------|-----------|-------------|-------------|
| 2005              |             |            |           |             |             |
| Description       | African     | Coloured   | Indian    | White       | Total       |
| Undergraduate     | 1239        | 72         | 37        | 1118        | 2466        |
| Postgraduate      | 557         | 38         | 26        | 621         | 1242        |
| Occasional        | 185         | 8          | 6         | 28          | 227         |
| <b>Total 2005</b> | <b>1981</b> | <b>118</b> | <b>69</b> | <b>1767</b> | <b>3935</b> |
| 2006              |             |            |           |             |             |
| Description       | African     | Coloured   | Indian    | White       | Total       |
| Undergraduate     | 1370        | 67         | 38        | 1169        | 2644        |
| Postgraduate      | 628         | 36         | 33        | 665         | 1362        |
| Occasional        | 171         | 4          | 4         | 39          | 218         |
| <b>Total 2006</b> | <b>2169</b> | <b>107</b> | <b>75</b> | <b>1873</b> | <b>4224</b> |



Student figures

| Student nationality |             |             |
|---------------------|-------------|-------------|
| Nationality         | 2005        | 2006        |
| Angola              | 1           |             |
| Asian countries     | 21          | 18          |
| Botswana            | 20          | 20          |
| European countries  | 6           | 6           |
| Lesotho             | 142         | 142         |
| Malawi              | 2           | 1           |
| Mauritius           |             | 2           |
| Mozambique          | 8           | 7           |
| Namibia             | 40          | 42          |
| No information      | 1           |             |
| North America       | 4           | 4           |
| Other Africa        | 45          | 48          |
| South Africa        | 3610        | 3893        |
| South America       |             | 1           |
| Swaziland           | 13          | 13          |
| Zambia              | 4           | 6           |
| Zimbabwe            | 18          | 21          |
| <b>Total</b>        | <b>3935</b> | <b>4224</b> |

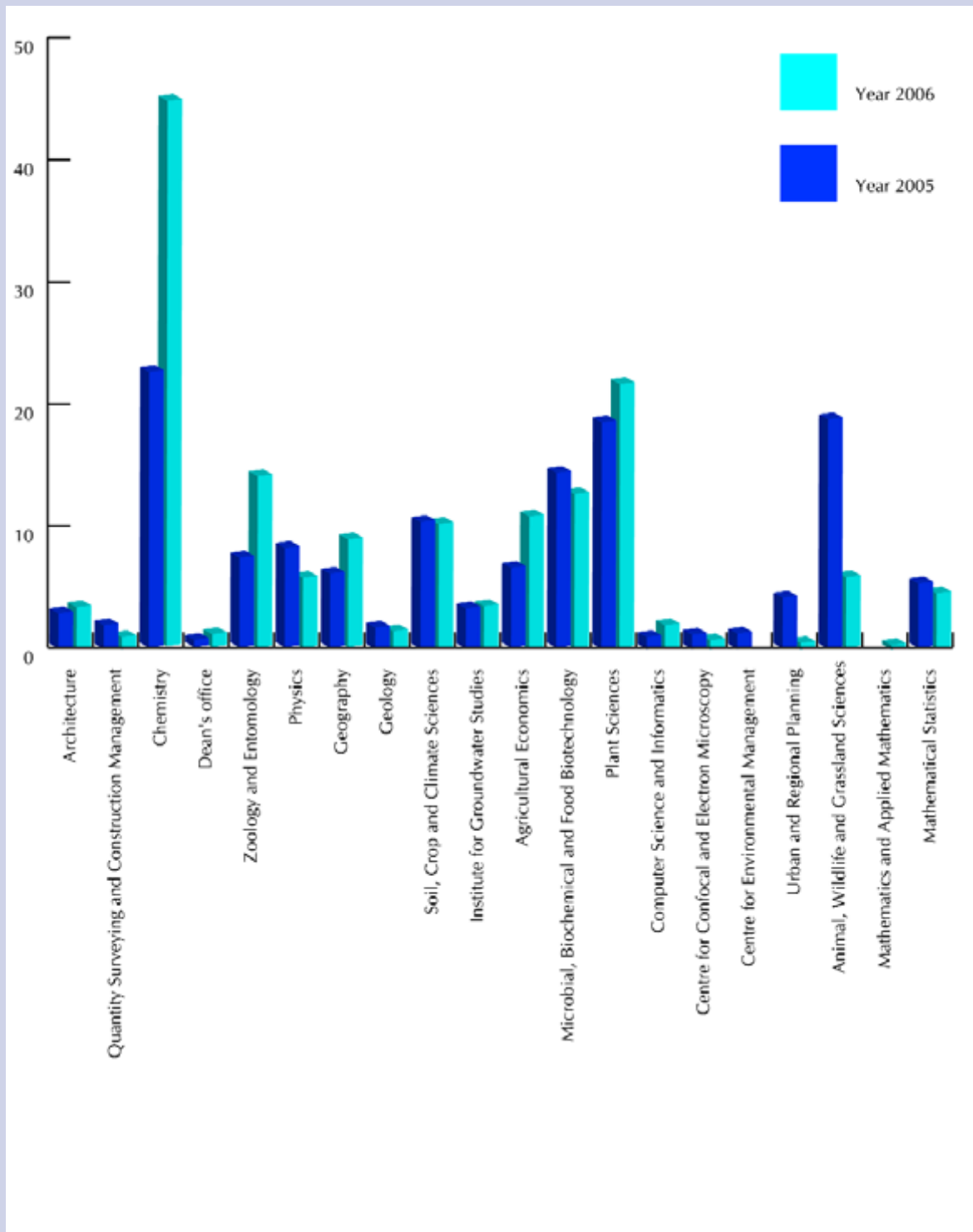
## Research outputs for the Faculty of Natural and Agricultural Sciences



Articles published in accredited approved research journals.

## Departmental research outputs

Articles published in accredited approved research journals, 2005/06



# Glossary



# Glossary

## A

|         |  |
|---------|--|
| ACIAR   | Australian Centre for International Agricultural Research      |
| AEASA   | Agricultural Economics Association of South Africa             |
| ALPRU   | African Large Predator Research Unit                           |
| ARC     | Agricultural Research Council                                  |
| ARMSCOR | Armaments Corporation of South Africa                          |
| ARS     | Agri Risk Specialists  |
| ASAQS   | Association of South African Quantity Surveyors                |
| ASSA    | Anatomical Society of South Africa                             |
| ASTER   | Advanced Spaceborne Thermal Emission and Reflection Radiometer |
| AVS     | American Vacuum Society  |

## C

|           |  |
|-----------|--|
| CANSA     | Cancer Association of South Africa                           |
| CATSA     | Catalysis Society of South Africa                            |
| CBD       | Convention of Biological Diversity                           |
| CCEM      | Centre for Confocal and Electron Microscopy                  |
| CePHMa    | Centre for Plant Health Management                           |
| CfPB      | Centre for People and Buildings                              |
| CIAT      | International Centre for Tropical Agriculture                |
| CIDB      | Construction Industry Development Board                      |
| CIMMYT    | International Maize and Wheat Improvement Centre             |
| CIOB      | Chartered Institute of Building                              |
| CIOB-SA   | Chartered Institute of Building - South Africa               |
| CSACEE    | Central South African Council on Economic Education          |
| CSIC-INTA | Centro de Astrobiología                                      |
| CSIR      | Council for Scientific and Industrial Research               |
| CSIRO     | Commonwealth Scientific and Industrial Research Organisation |

## D

|        |  |
|--------|--|
| DEAT   | Department of Environmental Affairs and Tourism              |
| DiMTEC | Disaster Management Training and Education Centre for Africa |
| DMISA  | Disaster Management Institute of South Africa                |
| DST    | Department of Science and Technology                         |

## E

|       |   |
|-------|---|
| EAAP  | European Association for Animal Production            |
| EASA  | Education Association of South Africa                 |
| ECA   | European Crystallographic Association                 |
| EIGG  | Environmental Inorganic Geochemistry Group            |
| EPWP  | Expanded Public Works Programme                       |
| ESBES | European Symposium on Biochemical Engineering Science |
| ESREL | European Safety and Reliability                       |
| ESRP  | Economic and Social Rehabilitation Programme          |

## F

|       |  |
|-------|--|
| FAO   | Food and Agriculture Organisation                              |
| FEMS  | Federation of European Microbiological Societies               |
| FMP   | Facilities Management Programme                                |
| FOTIM | Foundation of Tertiary Institutions of the Northern Metropolis |

## FSRPO

Free State Red Meat Producers Organisation

## G

|          |   |
|----------|---|
| GIS      | Geographical Information Systems        |
| Glen ADI | Glen Agricultural Development Institute |
| GM       | Genetically Modified                    |
| GMBA     | Gauteng Master Builders' Association    |
| GMO      | Genetically Modified Organisms          |
| GWK      | Griekwaland-Wes Koöperasie              |

## H

|       |   |
|-------|---|
| HIV   | Human Immunodeficiency Virus                          |
| HPCSA | Health Professions Council of South Africa            |
| HPLC  | High Performance Liquid Chromatography                |
| HSPCM | Health and Safety Programme for Construction Managers |

## I

|           |  |
|-----------|--|
| IAGOD     | International Association on the Genesis of Ore Deposits         |
| IAH       | International Association of Hydrogeologists                     |
| ICCC      | International Conference on Coordination Chemistry               |
| ICEC      | International Cost Engineering Council                           |
| ICID      | International Commission on Irrigation and Drainage              |
| ICP       | Inductively Coupled Plasma                                       |
| ICRBM     | International Conference on Rodent Biology and Management        |
| ICRISAT   | International Crops Research Institute for the Semi-Arid Tropics |
| IDC       | Industrial Development Corporation                               |
| IGS       | Institute for Groundwater Studies                                |
| IITA      | International Institute of Tropical Agriculture                  |
| INCRoP    | Insects on New Crops Programme                                   |
| INTSORMIL | International Sorghum and Millet Research Support Programme      |

## IPMA

International Project Management Association

## IPMP

Intensive Project Management Programme

## IRDP

Institutional Research and Development Programme

## IRWH

In-field Rainwater Harvesting

## IUCr

International Union of Crystallography

## IUMS

International Union of Microbial Societies

## IUPAP

International Union of Pure and Applied Physics

## J

|     |                                  |
|-----|----------------------------------|
| JFM | Journal of Facilities Management |
|-----|----------------------------------|

## L

LExEn Life in Extreme Environments

## M

|         |   |
|---------|---|
| MIRCHEN | Microbiological Resources Centre                    |
| MIT     | Massachusetts Institute of Technology               |
| MRM     | Mineral Resource Management                         |
| MSA     | Master's Degree in Sustainable Agriculture          |
| MSSA    | Microscopy Society of Southern Africa               |
| MUCPP   | Mangaung University Community Partnership Programme |
| MURP    | Master's Degree in Urban and Regional Planning      |

## N

|        |   |
|--------|---|
| NaCOF  | National Climate Outlook Forum  |
| NAFU   | National African Farmers Union  |
| NAMC   | National Agricultural Marketing Council   |
| NASA   | National Aeronautics and Space Administration                                       |
| NASSP  | National Astrophysics and Space Science Programme                                   |
| NCEE   | National Council for Economic Education   |
| NDA    | National Department of Agriculture  |
| NECSA  | National Energy Commission of South Africa  |
| NELSAM | Natural Earthquake Laboratory in South African Mines                                |
| NERPO  | National Emergent Red Meat Producers' Organisation                                  |
| NGO    | Non-Governmental Organisation   |
| NML    | National Metrological Laboratory  |
| NMMU   | Nelson Mandela Metropolitan University  |
| NMR    | Nuclear Magnetic Resonance  |
| NRF    | National Research Foundation  |
| NUFU   | Norwegian Council of Universities Committee for Development, Research and Education |
| NWGA   | National Wool Growers' Association  |

## O

|      |  |
|------|--|
| OABS | Optimal Agricultural Business Solutions                |
| OECD | Organisation for Economic Co-operation and Development |

## P

|       |  |
|-------|--|
| PARSA | Parasitological Association of Southern Africa     |
| PDMIW | Processing and Disposal of Mineral Industry Wastes |
| POT   | Peaks over Threshold                               |
| PPP   | Public Private Partnership                         |
| PRT   | Protein Research Trust                             |

## R

|      |  |
|------|--|
| RICS | Royal Institute of Chartered Surveyors   |
| RIEP | Research Institute of Education Planning |
| RNA  | Research Niche Area                      |
| RPO  | Red Meat Producers' Organisation         |

## S

|         |  |
|---------|--|
| SA      | South Africa   |
| SAACE   | South African Association of Consulting Engineers                            |
| SAB     | The South African Breweries Limited  |
| SACI    | South African Chemical Institute   |
| SACPCMP | South African Council for the Project and Construction Management Profession |
| SACPVP  | South African Council for the Property Valuation Profession                  |
| SACQSP  | South African Council for the Quantity Surveying Profession                  |
| SADC    | Southern African Development Community                                       |
| SAFMA   | South African Facilities Management Association                              |
| SAFOI   | South African Fryer Oil Initiative   |
| SAIP    | South African Institute of Physics   |
| SAISC   | Southern African Institute of Steel Construction                             |
| SAMSI   | Statistical and Applied Mathematical Sciences Institute                      |

|          |   |          |   |          |  |
|----------|---|----------|---|----------|--|
| SANCIAHS | South African National Committee for the International Association of Hydrological Sciences | SEDA     | Small Enterprise Development Agency   | UNEP     | United Nations Environment Programme                             |
| SANCU    | South African National Consumer Union   | SMME     | Small, Medium and Micro Enterprises   | UNESCO   | United Nations Educational, Scientific and Cultural Organisation |
| SANPAD   | South Africa-Netherlands Research Programme on Alternatives in Development                  | SRC      | Student Representative Council  | USA      | United States of America   |
| SAPOA    | South African Property Owners' Association  | SRL      | Sustainable Rural Livelihood  | USAID    | United States Agency for International Development               |
| SAPS     | South African Police Services   | SSAG     | Society of South African Geographers  | UTCHEM   | University of Texas Chemical Compositional Simulator             |
| SAQA     | South African Qualifications Authority  | <b>T</b> |   | UWC      | University of the Western Cape                                   |
| SASAS    | South African Society for Animal Science  | THRIP    | South African National Research Foundation Thrust for Industry-Related Projects | <b>W</b> |  |
| SASQUA   | Southern African Society for Quaternary Research  | TUE      | Technical University Eindhoven  | WARFSA   | Water Research Fund of Southern Africa                           |
| SAVAH    | South African Association of Visual Arts Historians   | <b>U</b> |   | WATOC    | World Association of Theoretically Orientated Chemists           |
| SBE      | Sustainable Built Environments  | UCT      | University of Cape Town   | WFP      | World Food Programme   |
|          |   | UFS      | University of the Free State  | WITS     | University of the Witwatersrand                                  |
|          |   | UJ       | University of Johannesburg  | WRC      | Water Research Commission  |
|          |   | UK       | United Kingdom  | WUA      | Water Users' Association   |
|          |   | UN       | United Nations  |          |  |