

09

Faculty of
Natural and Agricultural Sciences

Annual Report





**Faculty of Natural and
Agricultural Sciences
Annual Report 2009**

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Preface

From the Dean's Office

It is with great pride and gratitude that I write this preface to the 2009 Annual Report of the Faculty of Natural and Agricultural Sciences because in spite of the ramifications of the global economic downturn on the core business of institutions of higher learning across the world, the Faculty remained steadily on course with respect to its vision and mission. Through dedication and hard work staff and students continued to excel, once again with some notable special achievements, of which a few are highlighted below.

Our student enrolments continued to rise as young men and women both nationally and from other parts of Africa and the rest of the world remain attracted to the diverse and high quality training and research opportunities we offer. To mention but a few, our expertise in plant pathology, lipid biotechnology and nanoscience is world renown, and we are one of only a few South African universities involved in forensic science. We do training and research in disaster risk management and mitigation, and offer a postgraduate course with the largest footprint in Africa. Agriculturally

we have the most specialized group servicing the farming industry, including capacity building programmes for newly settled and prospective emerging commercial farmers. Our building science departments are leaders in the country and are consistently successful in accreditation processes (often unconditionally) by national and international professional bodies.

The highly successful equipment strategy remained on track as we systematically continued to grow our capacity in state-of-the-art equipment, bearing fruit in further improving the quality and quantity of research and training outputs. We are also grateful for a substantial grant received from the Department of Higher Education and Training which will enable us to relieve some of the pressure on our physical facilities and better equip several laboratories. Our cadre of NRF-rated researchers grew including the attainment of B-ratings by a number of staff members. The Strategic Academic Clusters (Water Management in Water-scarce Areas, Technologies for Sustainable Crop Industries in Semi-arid Regions, Materials and Nanosciences,

and Advanced Biomolecular Sciences) also continued to gain momentum as vibrant hubs of multidisciplinary research and training, focusing on key Southern African problems and the expanding of knowledge for greater technological advancement and innovation.

As mentioned earlier, staff and students were once again prominent in focusing national and international attention on the faculty as recipients of significant research awards, the sharing of expertise, their election to high profile academic bodies and the organization of special events. I highlight but a few of these:

- Prof. Esta van Heerden (Department of Microbial, Biochemical and Food Biotechnology) won the 2009 Third World Academy of Science Young Scientist Award.
- At the congress of the South African Society for Plant Pathology Prof. Neal McLaren (Department Plant of Sciences) received the society's award for applied plant pathology research, while Prof. Zakkie Pretorius received the C.H. Persoon medal

(gold), which is the highest award for contributions to this field of study in South Africa. It was only the fifth time since its inception that the award was made.

- Under the leadership of Prof. Jo van As (Department of Zoology and Entomology) a highly successful year long public scientific programme was offered to commemorate Charles Darwin's birthday and the publication of his book, *The Origin of Species*, 150 years ago. It involved lectures by staff from several departments within our faculty, from other faculties, the National Museum (Bloemfontein) and the Central University of Technology.
- Prof. Marian Tredoux (Department of Geology) was nominated Fellow of the Geological Society of South Africa.
- Prof. Gideon Steyl (Department of Chemistry) was awarded the first Jan Boeyens medal for outstanding work in theoretical Chemistry/Physics by a young scientist (younger than 40 years) in the process outclassing nominees from WITS, UP, US and UCT at the locally held international INDABA congress. Prof. André Roodt, Departmental Chairperson, was elected Vice-president of the European Crystallographic Association which has approximately 45 member countries from Europe, Africa and the Middle East.
- Prof. Hendrik Swart, Departmental Chairperson, and Dr Martin Ntwaeaborwa (Department of Physics) were both recipients of NSTF awards, the former for Research Capacity Development and the latter as a Distinguished Young

Black Researcher. At the South African Institute of Physics congress Ms A Dhlamini received the Publication Award for the best publication in a scientific journal, originating from a Ph.D. thesis (Promoters, Proff. HC Swart and JJ Terblans) while Mr. WA Jordaan received it for the best publication in a scientific journal, originating from an MSc. dissertation (Supervisors, Proff. JJ Terblans and HC Swart).

- Prof. Johan Greyling (Department of Animal, Wildlife and Grassland Sciences) received a silver medal for his contribution to research at the Annual Meeting of the SA Society for Animal Sciences in November 2008 and was also re-elected to the SASAS Council. Prof. Hennie Snyman was named Free State's Agriculturalist of the Year by the Central Agricultural Writers Association.
- From the Department of Soil, Crop and Climate Sciences Prof. Cornie van Huyssteen was elected President and Dr. Piet le Roux as Council Member of the Soil Science Society of South Africa.
- Mr. Andries Jordaan, Head of the Disaster Management Training and Education Centre for Africa (DiMTEC) was approached by the government of the Republic of the Congo for assistance with their national disaster management plan, focusing specifically on Brazzaville, as well as the establishment of a disaster management centre.
- The Department of Quantity Surveying and Construction Management received unconditional accreditation

for construction management from the Chartered Institute of Building, as well as confirmation that they complied with the requirements for recognition as an accredited centre. Prof. Verster, the Departmental Chairperson, was elected Vice-President (Education) of the CIOB (Africa).

- The Department of Architecture brought out a special edition of the academic publication *Architecture South Africa*. Craig Atkins was among the top ten students on the shortlist for the Africa Thesis Awards.

The faculty and the university are greatly indebted to these and all the staff members and students who again worked tirelessly to excel and further raise the academic stature of our institution both nationally and internationally. As a faculty we also express our sincere gratitude to our former Dean, Prof. Herman van Schalkwyk, who once again led us with great distinction in 2009. It is now my pleasure to present to you this Annual Report with the hope that it will not only make for informative and stimulating reading but that it will also open up possibilities for mutually beneficial and productive collaboration.

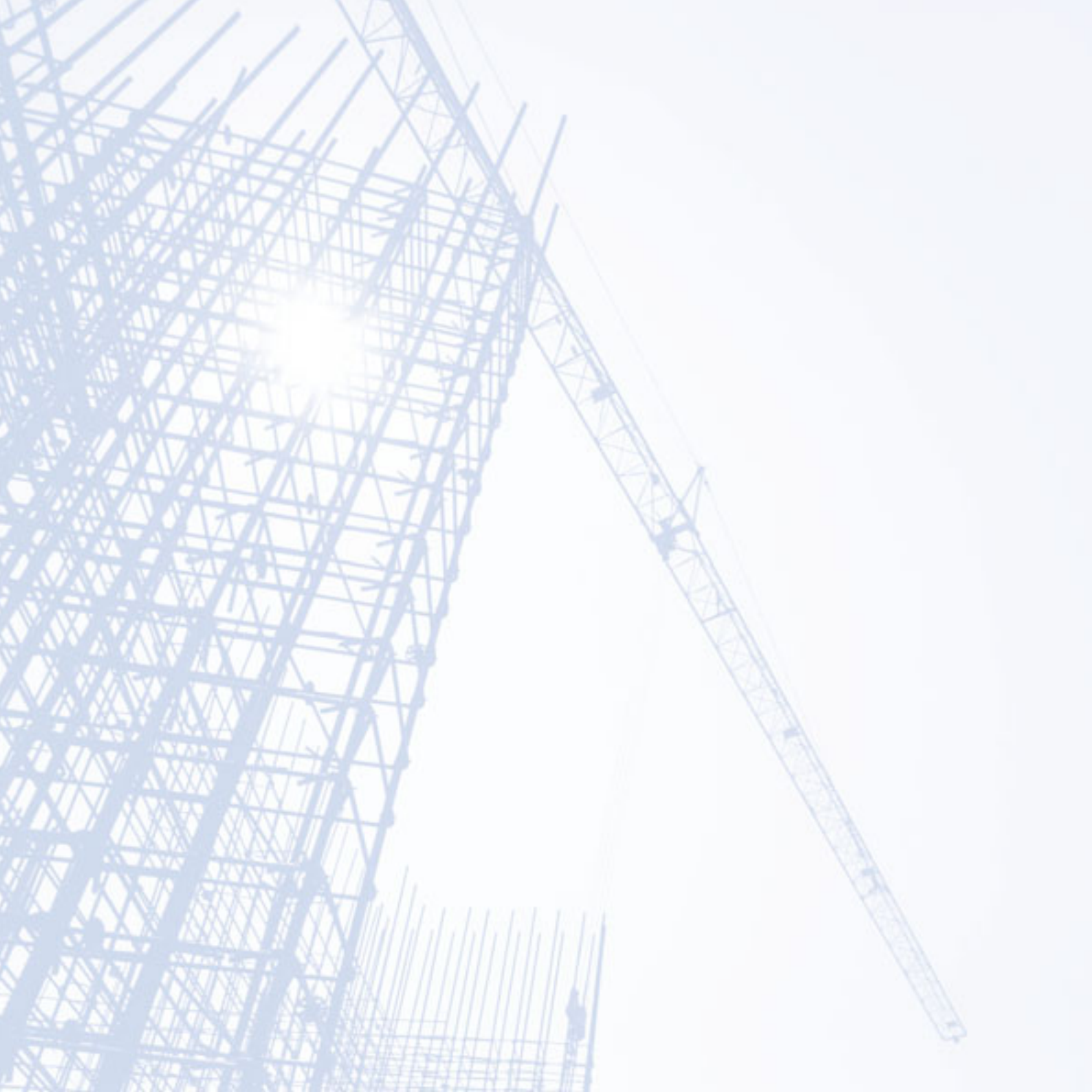


Prof. N.J.L. Heideman
Acting Dean

Faculty of Natural and
Agricultural Sciences
University of the Free State

Departments in

Building Sciences



05 Architecture

Overview

The Department of Architecture will remember the year 2009 for the long-awaited publication of *A record of some recent research and development* edited by Prof. Pattabi Raman. This publication of ten refereed articles was authored by the staff of the Department of Architecture and published as a special issue (July/August 2009) with the *Architecture South Africa – Journal of the South African Institute of Architects*.

Another highlight of 2009 was the 21st Sophia Gray Memorial Lecture and Exhibition presented by Prof. Walter Peters, formerly from the University of KwaZulu-Natal. Prof. Peters reflected on *More ways of being an architect*. He empha-

sised the importance of the history of architecture as a building block in the education and training of architects. Throughout his career Prof. Peters was active in architecture education, practice and as the editor of 100 issues of the tri-annual *Journal of the KwaZulu-Natal Institute of Architecture*. His exhibition was also show-cased in Durban.

In 2009 the department had a total of 236 enrolled students of which 103 graduated in the B. Arch. (Stud), B. Arch. (Stud) Hons. and M. Arch. (Prof.) degrees. The department received a total of 282 applications for the first year to the B. Arch. (Stud) degree in 2009 of which only 59 could be accommodated.

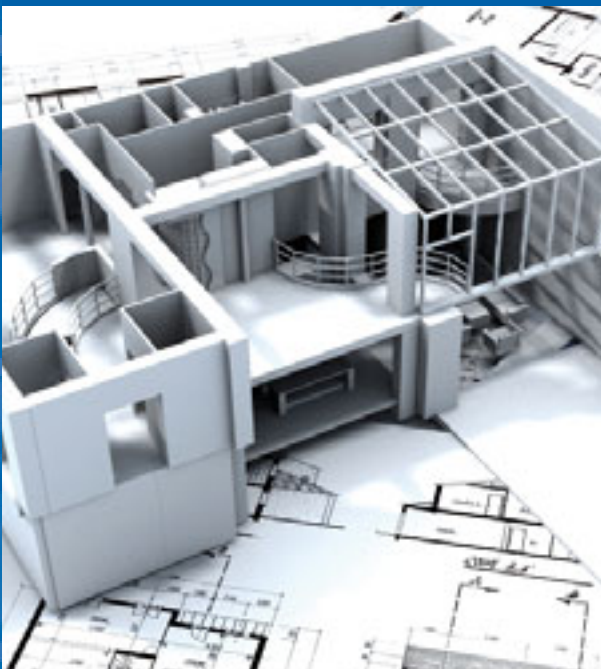


“One of the department’s students was the winner of the annual Regional Corobrik Students Competition.”

- Prof. Jan Smit



Right: Free State Institute of Architects Award for Architecture for the design of House Burger at Oubos Estate, Bloemfontein by Smit Architects (Prof. Jan Smit).

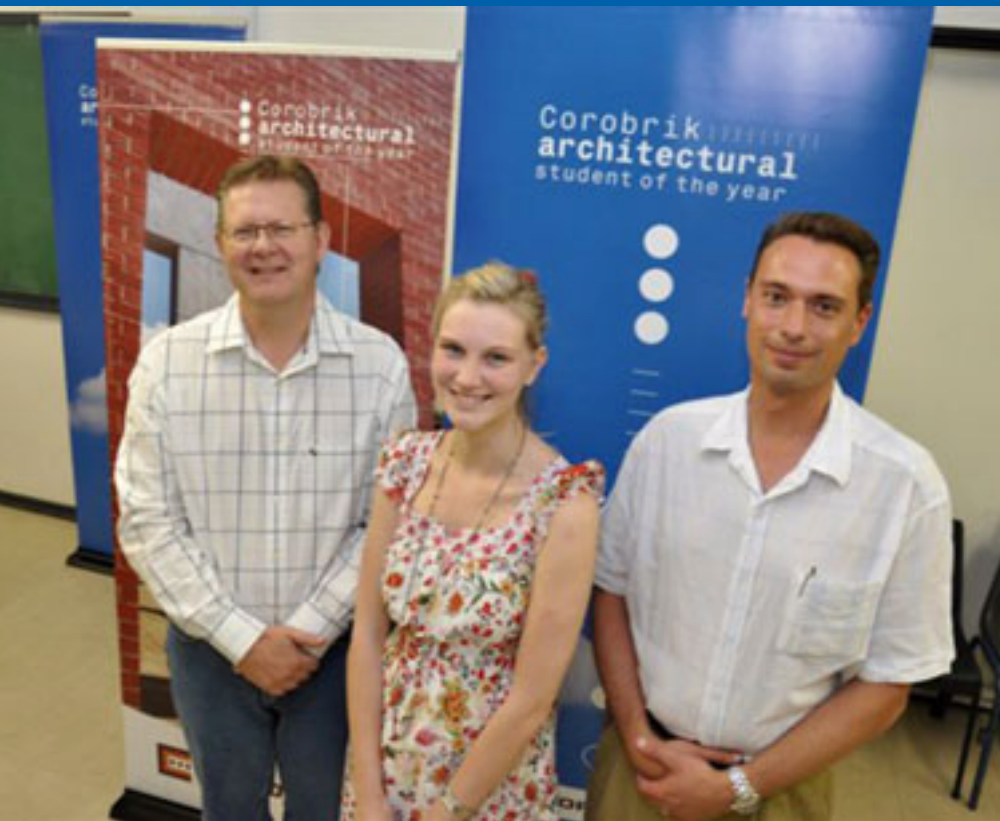


Activities and achievements

The students successfully undertook their annual design education tours in different year groups to Johannesburg, Clarens, Philippolis, Durban and Cape Town, respectively.

The third-year students took part in the national competition of the Cement and Concrete Institute. Annually each university enters three projects. Ms Nicola Botes was our finalist in the top ten. Another competition that the third-year students entered into was the annual national Murray & Roberts Des Baker Architecture Design competition. The department entered Mr Kat Thloloe and Mr Eric Ouko as the team from the University of the Free State (UFS) and they received the third prize.

Two of the department's students formed part of a group from the UFS that entered the National Sanlam Creativity for Progress Competition. This is the second consecutive year that Ms Madelein Markram (M. Arch. (Prof.) student) and Mr Conrad Stoffberg (B. Arch. Hons. student) reached the final round of this competition. They had to make proposals on how to get trained and newly graduated people back to the rural areas of the country. The students proposed to rejuvenate old run-down railway stations as possible new small business centres around South Africa.



The winner of the annual Regional Corobrik Students Competition: from the left, Prof. Jan Smit, Ms Tascha de Lange (best Free State regional thesis student), Mr Gary Westwood, Regional Manager of Corobrik Free State.

Staff members served on various national councils and institutes. Messrs Bosman, Du Preez, Pretorius, Ras, and Prof. Smit are members of The South African Institute of Architects (SAIA) and together with Mr Bitzer are registered with the South African Council for the Architectural Professions (SACAP).

After a colourful academic career of 20 years Ms Petria Smit left the department in April 2009 in order to concentrate her efforts on the successful practice with her husband, Prof. Jan Smit. She made valuable contributions to both the technical and theoretical design thinking of the department from the first- to fifth-year modules. These specific qualities displayed by Ms Smit have proven to be very valuable attributes for architectural academics. In 1995 she played a crucial part to establish the Unit for Earth Construction and coordinated the activities for many years. The department hopes to still have access to her expertise on a part time basis in future.

Prof. Jan Smit and Ms Petria Smit's designs received coverage in the popular press for houses designed and built in Bloemfontein. Their design for House Burger was awarded the bi-annual Free State Institute of Architects Award for Architecture.

Other projects that also received this award were Selosesha Library by Bannie Britz Architect and Urban Planner and The Urban Hotel in Bloemfontein by The Roodt Partnership, both previous members of staff of this department.

Prof. Raman acted as the group leader at the Winter School of the European Architecture Schools Association of Gazi University in Ankara, Turkey. He

presented a lecture at this event on *Space lost and found* and ran a Research Writing Workshop from 26 January 2009 to 6 February 2009 at Gazi University.

He also presented a paper entitled *Architecture as an Artefact in the Landscape* at the annual conference of the Art Historical Workshop of South Africa at the University of Cape Town from 2 to 4 April 2009. He acted as an assessor for the bi-annual Awards for Architecture in the Free State and KwaZulu-Natal (published by the KZN Institutes Journal). Prof. Raman was invited to present a lecture on the *Relation between architecture and landscape setting* at the Department of Architecture of the University of the Witwatersrand on 28 May 2009. He presented a lecture entitled *Theorisation of practice* at the Continuing Professional Development Course of the KwaZulu-Natal Institute for Architecture on 31 July 2009 to 1 August 2009. He was invited to participate in the National Research Foundation's (NRF) Workshop on Architectural Research at the University of the Witwatersrand on 21 October 2009. He acted as an external examiner for the M. Arch. (Prof.) degree course at the University of the Witwatersrand from 10 to 12 December 2009. He continued to be a Technical Advisor to the Freedom Park Project in Pretoria and he participated in the Winter School of the UFS on 16 July 2009.

Mr Jan Ras is a member of the SAIA Education Committee. He also organised the annual Sophia Gray Memorial Lecture and Mini-Conference. He has a private practice and has served on several advisory committees.

Mr Kobus Du Preez is the chairperson of the Permit Committee of the Free State Heritage Authority. He organised the 21st annual Sophia Gray Memorial Exhibition at the Oliewenhuis Art Museum (20 August to 16 September 2009). Third-year students of History of the Environment (OGT304) collected the information and built the models that were used in the exhibition.

Mr Du Preez presented a lecture, *Bloemfontein: before and after Thomas Baines*, to The Friends of Oliewenhuis Art Museum at Oliewenhuis Art Museum on 18 June 2009. He also acted as an external examiner for Design in the M. Arch. (Prof.) degree at the University of Pretoria and as external moderator in Advanced History of Architecture and Urbanism at the University of the Witwatersrand. Mr Du Preez was the coordinator for the annual Architecture Winter School at the UFS campus.

Ms Martie Bitzer was appointed as full-time senior lecturer in the department and delivered a paper entitled *The Art and Science of the Object – Visual and Spatial Literacy* at the KZNIA Conference in Durban that was held from 31 July to 1 August 2009. The theme of the conference was: *Architectural education – from theory to practice*.

Mr Gerhard Bosman attended a Provincial Rural Housing Implementation Strategy Symposium in the Eastern Cape Province from 9 to 10 July 2009. He attended on behalf of the Unit for Earth Construction (UEC) at the invitation of the Department of Housing and made a presentation to the Rural Housing Directorate: Policy Planning and Research about the advantage of



Free State Institute of Architects Award for Architecture for the design of the Taxi Terminus Building, DF Malherbe entrance, UFS Main Campus by Typology Architects (Mr Henry Pretorius)

earth-construction technology in rural areas like the Eastern Cape Province.

Ms Petria Smit and Mr Gerhard Bosman, in conjunction with Prof. Das Steyn, retired Head of the Department of Urban and Regional Planning, concluded the final phase of the research project, *A South African Renaissance: acceptability of sustainable, high-quality earth-constructed, public and private buildings to support sustainable local economic development*. This concluded the research funded by the South African Netherlands Research Programme on Alternatives in Development (SANPAD).

Mr Gerhard Bosman presented a public talk on *Green Building in South Africa* at the first Groen Kern Festival held at Ms Sharon Walker's School of Gardening in Langenhoven Park on 26 September 2009.

Mr Rudolf Bitzer presented a paper at the South African Journal of Art History's SAJAH Conference that took place on 3 and 4 April 2009. The conference venue was the architecture building at the upper campus of the University of Cape Town (UCT). The paper was titled: *Artefact, delight and zeitgeist in Architecture* and focused on delight as a good indicator of what the zeitgeist was during the time of construction of a specific structure.

Mr Bitzer also attended a design workshop that was hosted by the Cement and Concrete Institute with presenters Mr Andrew Makin, also from South Africa, as well as Mr Peter Stutchbury and Mr Richard Lepplastrier from Australia. It was an inspiring experience that focused the attendees on

The 21st annual Sophia Gray Memorial Exhibition at the Olliewenhuis Art Museum in Bloemfontein.



basic design principles during the design process.

Mr Henry Pretorius, junior lecturer in the department and practising architect of Typology Architects, was commissioned by the UFS Department of Physical Planning to resolve the increasing number of vehicular traffic on the campus of the UFS and to make provision for two new parking areas to the south and the west of the campus. It was also decided to provide a more permanent structure for commuters making use of taxi transportation at the DF Malherbe entrance on the western side of the campus, improving

on the existing pickup point inside the university grounds. The project was awarded the biannual Free State Institute of Architects Award for Architecture. This is a great achievement for a young architect.

Staff matters

Ms Wilandi Esterhuysen, lecturer in Building Science (second year) received her M.Arch. degree in March 2009. She left the department at the end of 2009 to continue her career at the Nelson Mandela Metropolitan University (NMMU) in Port Elizabeth.

Mr Jako Olivier was appointed as junior lecturer in the department. Mr Olivier lectures Design (third year) and Theory of Architecture (second year). Ms Carmen Dickens was appointed as contract junior lecturer to lecture Presentation Techniques (first year) and Design (second year).

Two new support staff members joined the team in 2009. Ms Yolanda Pretorius was appointed to follow up Ms Martie de Jager who left the department after thirteen years as the Departmental Secretary. Mr Matthews Roman was appointed as the new messenger.

Research outputs

Research articles

Bosman, G. 2009. Teaching earth construction in the Free State: 1995 - 2007. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 34-39.

Esterhuysen, W. 2009. The artistic manipulation of structure and fabric in the machine-age alternative or mainstream. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 82-88.

Laubscher, J. 2009. Teaching architecture and building science. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 40-43.

Le Roux, P.C. 2009. Building performance evaluation (BPE) in the design studio. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 68-72.

Pretorius, H.B. 2009. The influence of landscape and steel sheds on three houses by Jan & Petria Smit. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 24-32.

Raman, P. 2009. A critique of the built work of some of our alumni and staff (Front piece). *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 20-23.

Raman, P. 2009. A record of research and development: Edited by P.G.Raman. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 2-100.

Raman, P. 2009. Narrative shifts in Architecture. *South African Journal of Art History* 22(22): 250-276.

Raman, P. 2009. Sophia Gray memorial Lecture 2005 - Introduction (Front piece). *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 8-14.

Raman, P. 2009. Sophia Gray memorial lecture: 2005 - Stories, Architecture and life (Front piece). *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 9-15.

Raman, P. 2009. Voice-over on three projects (Front piece). *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 15-19.

Raman, P.G. 2009. Flickers of hope in a sea of indifference. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 16-19.

Raman, P.G. 2009. Indian Architecture. *Architecture South Africa: Journal of the South African Institute of Architects, Special Issue July/August*: 56-61.

Raman, P.G. 2009. Mutating typology, Seven Fountains Primary School, KwaZulu-Natal. *Architecture South Africa: Journal of the South African Institute of Architects* September/October: 30-33.

Raman, P.G. 2009. Small is still beautiful in the Free State. *Architecture South Africa: Journal of the South African Institute of Architects* May/June: 10-13.

Smit, J.D. 2009. The design studio as a laboratory of experiential learning. *Architecture South Africa: Journal of the South African Institute of Architects, Special issue July/August*: 44-49.

Smit, P. 2009. Earth construction: Alternative or mainstream. *Architecture*

South Africa: Journal of the South African Institute of Architects, Special issue July/August: 74-81.

Swart, G. 2009. A golden promise at the end of the jubilee rainbow – theoretical premises and perspectives of our school. *Journal of the South African Institute of Architects, Special issue July/August*: 50-67.

Van Der Merwe, A. 2009. Chair designs in socio-cultural context: Reflections on three chairs by Gaudi, Rietveld and Aalto. *Architecture South Africa: Journal of the South African Institute of Architects, Special issue July/August*: 90-99.

Chapters in books

Du Preez, J.L. & Swart, G.P. 2009. The interior – Free State, Northern Cape & Karoo. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing. pp. 220-221.

Raman, P. 2009. Change and continuity in contemporary South African architecture and urbanism. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 14-18.

Raman, P. 2009. Free State: 52 House Enkalweni. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 226-229.

Raman, P. 2009. Free State: 53 House Pienaar. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 134-135.

Raman, P. 2009. Johannesburg: 48 Westcliff Estate. In *10+ Years 100+ Buildings – Architecture in a*

democratic South Africa, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 206-209.

Raman, P. 2009. Johannesburg & Environs (Gauteng): 27 – Walter Sisulu Square of dedication. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 134-135.

Raman, P. 2009. Limpopo province - House Tzaneen. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 38-41.

Raman, P. 2009. Mpumalanga - Mpumalanga provincial government complex. In *10+ Years 100+ Buildings – Architecture in a democratic South Africa*, edited by O. Joubert. Cape Town: Bell-Roberts Gallery and Publishing: pp. 54-55.

Conference contributions

Bitzer, M.M. 2009. *The art & science of the object - Visual & spatial literacy*. Paper presented at the Architectural Theory: From Education to Practice Conference, Durban, South Africa. 31 July-1 August.

Bitzer, W.R. 2009. *Architecture of delight as an indicator of Zeitgeist*. Paper presented at the 3rd Annual Conference of the South African Journal of Art History (SAJAH): The artifacts of your discipline: (extra) ordinary (con) texts, Cape Town, South Africa. 3-4 April.

Du Preez, J.L. & Kotze, C.P. 2009. *The artifacts of your discipline: (extra) ordinary (con) texts: The evolution of the genius loci of Bloemfontein*. Paper presented at the 3rd Annual Conference of the South African Journal of Art History (SAJAH): The artifacts of your discipline: (extra) ordinary (con) texts, Cape Town, South Africa. 3-4 April.

Raman, P. 2009. *Architecture as an artifact in the landscape*. Paper presented at the 3rd Annual Conference of the South African Journal of Art History (SAJAH): The artifacts of your discipline: (extra) ordinary (con) texts, Cape Town, South Africa. 3-4 April.

Raman, P. 2009. *Theorization of practice*. Paper presented at the Continuing Professional Development Practice Conference (CPD), Durban, South Africa. 31 July-1 August.

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Associate Professor: Prof. Jan Smit

Senior Lecturer: Ms Martie Bitzer

Lecturers: Messrs Gerhard Bosman, Kobus du Preez, Jan Ras

Junior Lecturers: Messrs Henry Pretorius, Jako Olivier, Rudolf Bitzer, Ms Wilandi Esterhuysen

Contract Lecturers: Messrs Charl-Pierre Cilliers, Ms Carmen Dickens

Secretary: Ms Yolanda Pretorius

Clerk (academic year): Ms Ansue Schultz

Departmental Assistant: Ms Zelda Bronkhorst

Messenger: Mr Matthews Roman



06

Quantity Surveying and Construction Management

Overview

During 2009 the Department of Quantity Surveying and Construction Management was involved in various activities, events and developments and experienced a number of highlights.

The University of the Free State (UFS) is still the only university outside the United Kingdom (UK) that offers an internationally accredited open learning programme in Quantity Surveying, accredited by the Royal Institution of Chartered Surveyors (RICS).

Students performed excellently at national as well as international level in 2009. Mr Herman Berry was chosen as the best honours student and received

the prestigious gold medal of the Association of South African Quantity Surveyors. Ms Pietersen, a 2009 Quantity Surveying honours student, received the coveted RICS prize as well as the Bell-John prize for the most versatile student in any study year. Mr Brown received the South African student prize for the highest overall average achieved in B.Sc. Honours (Construction Management) from the Chartered Institute of Building (CIOB). Mr Brown also received the LTA Building prize and the PPS prize for the best final-year student in B.Sc. (Construction Management).

The department took part in research projects in collaboration with the Council



“Three Kovsies received all three coveted national awards of the Association of South African Quantity Surveyors.”

- Prof. Basie Verster



Lecturers and their wives/husbands at the ASOCSA Congress held in Livingstone, Zambia in May 2009. Front: Mr CH van Zyl; First row: Mr FH Berry, Mrs Liezél Berry, Mrs Elsabe Marx; Back row: Mrs Benita and Mrs Gerrit Zulch, Mrs Hilda Verster, Prof. Basie Verster, Mrs Dalene van Zyl and Dr Hendrik Marx.



for Scientific and Industrial Research (CSIR), the Trans African Concessions (Pty) Ltd (TRAC) and the Construction Industry Development Board (CIDB). Comprehensive results were published in 2008/9. During 2009 an additional research project on Indicators for the Construction Industry was successfully completed for the CIDB. Departmental lecturers and students also presented sixteen papers at international congresses in Louvain, Belgium; Livingstone, Zambia; Kuala Lumpur, Malaysia; Cape Town, Port Elizabeth and Durban, South Africa.

In the field of education, students are offered lectures through the medium of residential and open learning programmes. In 2009, the department served a total of 303 undergraduate students; 113 honours students, 36 students at master's level and 7 Ph.D. students.

The department also presented various registered short programmes and courses as an additional training action. In 2009, 68 students were registered for the QCP open learning programme; 30 students completed the Facilities Management Programme (FMP) supported by the South African Property Owners' Association (SAPOA) and 49 students completed the Intensive Project Management Programme (IPMP), also supported by SAPOA. These programmes have been extended to Namibia and were for the first time presented in Windhoek during December 2009.



Top left: The DJ Laing Scholarship prize for the best first year student in Quantity Surveying nationally (at all tertiary institutions in SA) was awarded to Hananja Steyn.

Top right: The Gold Medal of the ASAQS for the best Quantity Surveying student, nationally (at all tertiary institutions in SA) was awarded to Herman Berry.

Right: The Davis Langdon Prize for outstanding performance in the subject: Professional Practice in all 4 years of study nationally (at all tertiary institutions in SA), was awarded to Olive du Preez.



Activities and achievements

Over the past few years, the department has made significant contributions to the various professions and to the construction industry as a whole. The department has also maintained statutory accreditation by the South African Council for the Quantity Surveying Profession (SACQSP), the South African Council for the Project and Construction Management Professions (SACPCMP) and the South African Council for the Property Valuers Profession (SACPVP). Internationally, the department is accredited by the Royal Institution of Chartered Surveyors (RICS) in the UK, and the Chartered Institute of Building (CIOB), also in the UK.

Alumni of the UFS practise mainly in South Africa, but many are employed in countries such as England, Ireland, Dubai and some African countries. To serve the many facets of the industry, personnel are appointed from diverse backgrounds such as quantity surveying, construction management, project management, engineering and property economy.

Prof. Basie Verster, Head of the Department, serves on the South African Council for the Quantity Surveying Profession, is Chairman of the Education Standard Research Committee of the Council and is the Vice-President of CIOB for Africa. Prof. Verster also serves on the UFS Council.

Dr Hendrik Marx is a Council Member of the Association of Schools of Construction in Southern Africa (ASOCSA).

At international level, members of the department are actively involved in



Students of the Department of Quantity Surveying and Construction Management enjoying a closing function.

committees of the Chartered Institute of Building – Africa (CIOB Africa), the International Cost Engineering Council (ICEC) and the RICS in the UK. Prof. Verster was appointed Vice-Chairperson (Education) of the CIOB (Africa).

Three students of the Department of Quantity Surveying and Construction Management were honoured for their outstanding performances at national level. The president of the Association of South African Quantity Surveyors (ASAQS), Mr Indresen Pillay, presented the coveted prizes during a ceremony held at the university in February 2010. Mr Herman Berry is the 15th university student since 1970 to receive the Gold Medal for the best Quantity Surveying student in the honours degree. The Gold Medal is presented annually.

The *Acta Structilia* is a fully accredited scientific journal, endorsed by the

South African Council for the Quantity Surveying Profession (SACQSP) and the Royal Institution of Chartered Surveyors (RICS). In 2009, the journal celebrated its 16th year. This journal offers publication opportunities for independent, peer-reviewed articles by local and overseas researchers in the fields of physical and development sciences. Since 1993, 70 research articles, 12 review articles, 12 international articles, 14 commentaries, eight book reviews and eight introductions have been published.

In 2009, the 25th publication of the student journal *Bouvaria* was published.

Community service

The department's involvement with the community is recognised by the continued mentorship programme offered to emerging entrepreneurs. The Centre for Construction Entrepreneurs has offered

training to many small, emerging building contractors for the past 21 years.

Through the medium of the accredited Construction Mentorship Programme, the Department offers an on-going development service to emerging building contractors and other interest groups. The principle of the mentor-based development programme is currently the standard component for development in the construction industry. The highly reputed Expanded Public Works Programme (EPWP) accepted the principle of mentors for emerging building contractors in their programme. Personnel of the UFS, together with the CSIR and other consultants, are leading the development and implementation of mentorship. Only mentors who are accredited by the UFS may present mentorship services.

Research outputs

Research articles

Berry, F.H., Verster, J.J.P. & Zulch, B.G. 2009. Kommunikasie-volwasseheidsmodel vir die meting van bourekenkundige kommunikasie en kommunikasie-instrumente. *ACTA Structilia* 16(2): 1-17

Verster, J.J.P. 2009. Education, training and mentorship in pursuit of maturity in quantity surveying. *ACTA Structilia* 16(1): 121-142

Book

Hauptfleisch, A.C. & Sigle, H.M. 2009. *Structure of the built environment in South Africa*. 5th edition. Pretoria, Department of Construction Economics & Bloemfontein, Department of Quantity Surveying and Construction Management.

Conference contributions

Burger, M. & Verster, J.J.P. 2009. *The future of Project Management in the built environment: The need for industry-specific knowledge*. Paper presented at the South African Council for the Quantity Surveying Profession (SACQSP) and the International Cost Engineering Council (ICEC) Quantity Surveying Conference 2009: Constructing a bright future, Blue Waters Hotel, Durban, South Africa. 15-16 October.

Campbell, M.M., Hauptfleisch, A.C. & Marx, H.J. 2009. *The Impact of the Maputo Development Corridor on socio-economic development: A review of the legislative and regulatory framework*. Paper presented at the TG59 People in Construction Conference of the International Council for Research and Innovation in Building and Construction and the Construction Industry Development Board (CIDB), Southern African Build Environment

(SABERG) Research Centre, Port Elizabeth, South Africa. 12-14 July.

Campbell, M.M., Maritz, J. & Hauptfleisch, A.C. 2009. *The impact of the Maputo Development Corridor on wealth creation within the region it serves*. Paper presented at the Regional Studies Association (RSA) Annual International Conference: Understanding and Shaping Regions – Spatial, Social and Economic Futures, Katolieke Universiteit, Leuven, Belgium. 6-8 April.

Hauptfleisch, A.C. 2009. *Facilities management: Assessment of a primary body of knowledge for education in South Africa*. Paper presented at the Association of Schools of Construction of Southern Africa (ASOCSA) and the Council for the Built Environment (CBE) 4th Built Environment Conference, Zambezi Sun Livingstone, Zambia. 17-19 May.

Marx, H.J. 2009. *Clients' and consultants' perspective of the condition of the construction industry: Roadmap to the future*. Paper presented at the South African Council for the Quantity Surveying Profession (SACQSP) and the International Cost Engineering Council (ICEC) Quantity Surveying Conference 2009: Constructing a bright future, Blue Waters Hotel, Durban, South Africa. 15-16 October.

Marx, H.J. 2009. *Consultants' and clients' perspectives on the construction industry as captured by the cidb survey of construction industry indicators 2007*. Paper presented at the Association of Schools of Construction of Southern Africa (ASOCSA) and the Council for the Built Environment (CBE) 4th Built Environment Conference, Zambezi Sun Livingstone, Zambia. 17-19 May.

Marx, H.J. 2009. *Contractors' perspectives of the condition of the*

construction industry as captured by the cidb survey of construction industry indicators 2008. Paper presented at the Royal Institution of Chartered Surveyors (RICS) Construction and Building Research Conference (COBRA 2009), University of Cape Town, Cape Town, South Africa. 10-11 September.

Oosthuizen, P.M. & Verster, J.J.P. 2009. *The role of Law and Legislation in Quantity Surveying Maturity*. Paper presented at the Royal Institution of Chartered Surveyors (RICS) Construction and Building Research Conference (COBRA 2009), University of Cape Town, Cape Town, South Africa. 10-11 September.

Ramabodu, M.S. 2009. *Future alignment of the housing policy in South Africa with reference to low income housing*. Paper presented at the South African Council for the Quantity Surveying Profession (SACQSP) and the International Cost Engineering Council (ICEC) Quantity Surveying Conference 2009: Constructing a bright future, Blue Waters Hotel, Durban, South Africa. 15-16 October.

Van Vuuren, H.J. 2009. *Mentorship appointment customised to suit CIDB categories*. Paper presented at the TG59 People in Construction Conference of the International Council for Research and Innovation in Building and Construction and the Construction Industry Development Board (CIDB), Southern African Build Environment (SABERG) Research Centre, Port Elizabeth, South Africa. 12-14 July.

Van Zyl, C.H. & Verster, J.J.P. 2009. *Avoiding differences and disputes. A construction management perspective*. Paper presented at the Association of Schools of Construction of Southern Africa (ASOCSA) and the Council for the Built Environment (CBE) 4th Built

Environment Conference, Zambezi Sun Livingstone, Zambia. 17-19 May.

Verster, J.J.P., Hauptfleisch, A.C. & Kotzé, B.G. 2009. *Dimensions of Construction Management maturity and development towards a learned society*. Paper presented at the Association of Schools of Construction of Southern Africa (ASOCSA) and the Council for the Built Environment (CBE) 4th Built Environment Conference, Zambezi Sun Livingstone, Zambia. 17-19 May.

Verster, J.J.P., Van Zyl, C.H. & Kotzé, B.G. 2009. *Project Management: Structure, Maturity and the Pillars of Development in the South African Construction Industry*. Paper presented at the Royal Institution of Chartered Surveyors (RICS) Construction and Building Research Conference (COBRA 2009), University of Cape Town, Cape Town, South Africa. 10-11 September.

Verster, J.J.P., Van Zyl, C.H. & Kotzé, B.G. 2009. *The quantity surveyor*

and construction manager: Structure, maturity and the pillars of development.

Paper presented at the Pacific Association of Quantity Surveyors (PAQS) 13th Annual Congress, Equatorial Hotel, Kuala Lumpur, Malaysia. 17-18 August.

Verster, J.J.P. & Zulch, B.G. 2009. *Creativity and strategy: The development of construction professions*. Paper presented at the South African Council for the Quantity Surveying Profession (SACQSP) and the International Cost Engineering Council (ICEC) Quantity Surveying Conference 2009: Constructing a bright future, Blue Waters Hotel, Durban, South Africa. 15-16 October.

Zulch, B.G. & Verster, J.J.P. 2009. *Project management and relationship strategies*. Paper presented at the Pacific Association of Quantity Surveyors (PAQS) 13th Annual Congress, Equatorial Hotel, Kuala Lumpur, Malaysia. 17-18 August.

Contact details

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Staff

Professor: Prof. Basie Verster

Contract Professor: Prof. Dries Hauptfleisch (Midrand)

Senior Lecturers: Dr Hendrik Marx, Mr Frank Berry

Lecturers: Messrs Ben Swart, Hendrik van Vuuren, Stephan Ramabodu, Ms Benita Zulch

Contract Lecturers: Messrs Carl van Zyl, Pierre Oosthuizen, Mss Esti Jacobs, Mart-Marie Archer



07 Urban and Regional Planning

Overview

The Department of Urban and Regional Planning experienced a number of changes during 2009, not least the retirement of Prof. Das Steyn, who had been Departmental Chairperson since 2001. Prof. Verna Nel was appointed to take over the reins of the department.

During departmental planning workshops held in the course of the year, it was agreed to modify both the Honours and Master's programmes of the department to strengthen the theory and research components of our programmes. These changes have been approved and will be implemented in 2012.

During 2009 the department had 73 postgraduate students, of which 20

students registered for their dissertation. Eight students graduated with a master's degree, while 26 obtained their honours degrees.

Activities and achievements

One of the department's master's students, Mr Owethu Pantswa, was selected to represent South Africa as young professional representative of the South African Institute of Planners at the Commonwealth Foundation's Youth Study Tour to Ahmadabad, India to collaborate on developmental issues during July/August 2009.

Master's student in Land and Property Development Management, Mr Simeon



“Our department can make a significant contribution regarding informational and indigenous knowledge as we have pursued research linking rural and local economic development and indigenous knowledge for several years.”

– Prof. Verna Nel





Hlungwani, was awarded the South African Housing Foundation prize for his dissertation.

The department's biennial study tour was to the Eastern Free State at the invitation of a former student who is currently a senior planner in the area. The tour included stops at Kroonstad, Kestell, Verkykerskop, Eskom's hydro-electric scheme in the Drakensberg, Clarence, Ladybrand and an extremely informative visit to Harrismith.

Dr Maléne Campbell was external assessor for a Ph.D. thesis from the of North-West University (NWU), Potchefstroom Campus. She was also external examiner for two theses in respect of Magister Art. Et Scien. (Planning) at the NWU Potchefstroom Campus in 2009.

Networking

The department hosted a representative from the Association of African Planning Schools, a network of town and regional planning schools across the African continent that serves as a forum for information exchange between planning schools through on-line forums, workshops, conferences and staff exchanges for sabbaticals. Among the key themes of research are infor-

mality and indigenous knowledge. This department can make a significant contribution regarding the latter as the department has pursued research linking rural and local economic development and indigenous knowledge for several years.

Community service

The department makes a substantial contribution to the Faculty of Natural and Agricultural Sciences' service learning programme. One of these involves

the Peoples' Housing Process (PHP) Mashakane Project in Botshabelo led by Dr Maléne Campbell. Students of the environmental planning module have been working on the rehabilitation of the Langenhoven Park stormwater channel, with a specific focus in 2009 on a waste management plan. Other areas of community service learning are a tourism plan for the Khula Xhariep area and a business plans for communities using indigenous knowledge.

Staff matters

Although retired, Prof. Steyn continues to be associated with the department. Mr Yandisa Mashalaba, a former student, joined the department in February 2009 and promptly proceeded to make an extremely valuable contribution with his knowledge, insight and experience. It is with sadness that the department learned of the death of Prof. Wallace van Zyl who founded the department some 30 years ago.



Students during a tour to the Eastern Free State.

Research outputs

Research articles

Nel, V.J. 2009. Complex adaptive systems as a theoretical tool in urban planning. *Town and Regional Planning* 55: 24-30.

Steenkamp, G.M. 2009. The impact of stormwater on Langenhoven Park: An integrated approach can make a difference. *Acta Stuctilia* 16(1): 143-161.

Book

Stejn, J.J. (ed). 2009. *Hendrik M Goudappel 'reader' over de urbanistiek en planologie*. Stellenbosch: Sunmedia.

Report

Stejn, D., Smit, P. & Bosman, G. 2009. *A South African Renaissance: Acceptability of sustainable, high quality, earth constructed public and private buildings to support local sustainable economic development*. Report about SANPAD research project.

Conference contributions

Campbell, M.M., Hauptfleisch, A.C. & Marx, H.J. 2009. *The impact of*

the Maputo Development Corridor on Socio-economic development: A review of the legislative and regulatory framework. Paper presented at the TG59 People in Construction Conference of the International Council for Research and Innovation in Building and Construction and the Construction Industry Development Board (CIDB), Southern African Built Environment (SABERG) Research Centre, Port Elizabeth, South Africa. 12-14 July.

Campbell, M.M., Maritz, J. & Hauptfleisch, A.C. 2009. *The impact of the Maputo Development Corridor on wealth creation within the region it serves*. Paper presented at the Regional Studies Association (RSA) Annual International Conference: Understanding and Shaping Regions – Spatial, Social and Economic Futures, Katolieke Universiteit, Leuven, Belgium. 6-8 April.

Campbell, M.M., Pienaar, J.J. & Visser, G.E. 2009. *The consequences of second-home development on town and regional planning in South*

Africa: The case of Overstrand Local Municipality. Paper presented at the ISA RC43 International Housing Conference of the International Sociological Association's Research Committee on Housing and Built Environment (ISA RC43), University of Glasgow, Scotland. 1-4 September.

Jansen van Rensburg, J.D. & Campbell, M.M. 2009. *The management of urban sprawl by applying an urban edge strategy: The case of Bitou Local Municipality (Plettenberg Bay)*. Paper presented at the South African Housing Foundation (SAHF) International Conference, Exhibition & Housing Awards, Cape Sun, Cape Town, South Africa. 11-14 October.

Nel, V.J. 2009. *Can the South African land use management system be an effective tool in creating low(er) carbon cities?* Paper presented at the 45th International Society of City and Regional Planners (ISOCARP) International Congress: Low Carbon Cities, Faculty of Engineering, University of Porto, Porto, Portugal. 18-22 October.

Contact details

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Website: www.ufs.ac.za/urpl

Staff

Professor: Prof. Verna Nel

Senior Lecturer: Dr Malene Campbell

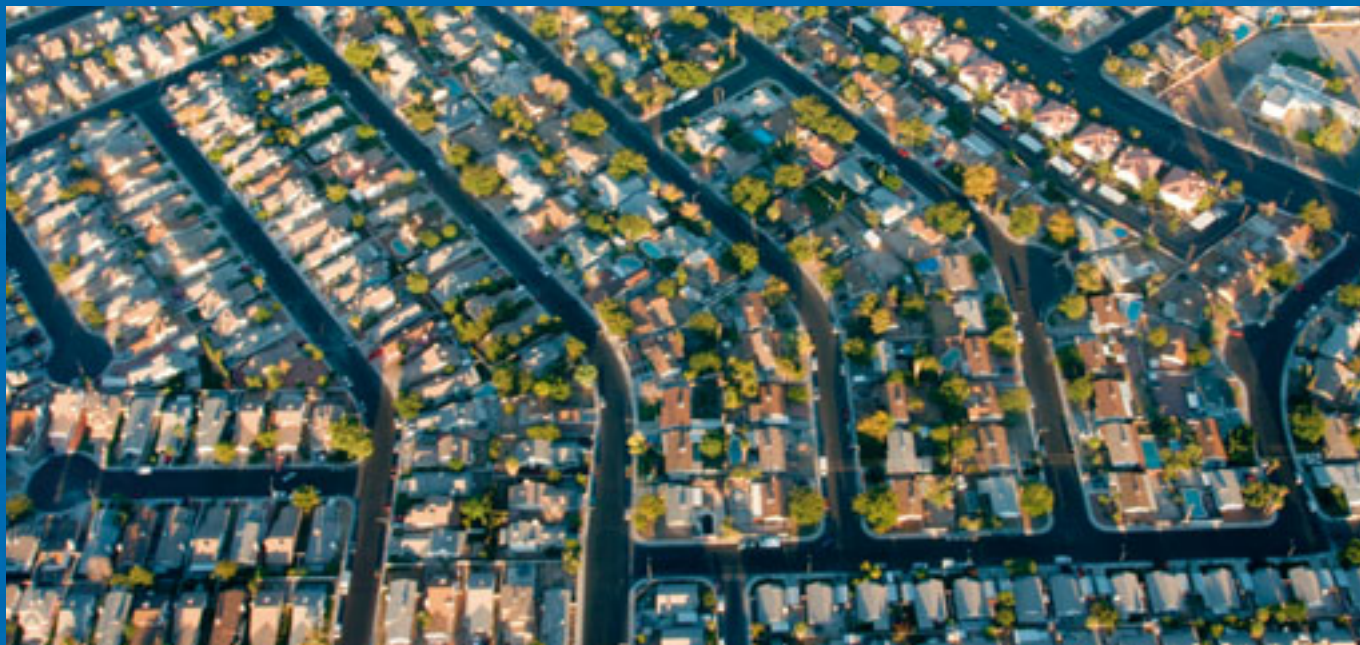
Lecturers: Pieter Potgieter, Lize Barclay, Yandisa Mashalaba

Part-time Lecturers: Prof Das Steyn, Prof Wynand Senekal, Mr Neil Devenish, Mr Piet de Bie

Senior Professional Officer: Ms Dienie Steenkamp

Typist/Clerk/Departmental Secretary: Ms Riana Hugo

Assistant Officer: Ms Antoinette Nel



The background features a light blue-toned image of a document with a bar chart. A silver pen is positioned diagonally across the chart. The chart has several vertical bars of varying heights. A dark blue horizontal band with a white dot pattern is located at the top right of the image.

25

Statistical Data

Faculty of Natural and Agricultural Sciences

Student figures: 2008-2009

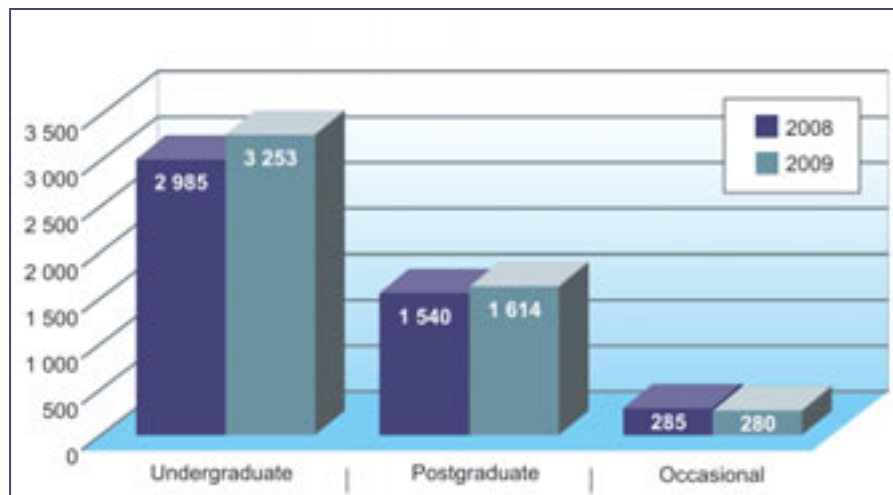
| Year | Description | Female | | | | | Male | | | | | Total | | | | |
|---------------|---------------|--------|----------|-------|-------|-------|-------|----------|-------|-------|-------|-------|----------|-------|-------|-------|
| | | Black | Coloured | Asian | White | Total | Black | Coloured | Asian | White | Total | Black | Coloured | Asian | White | Total |
| 2008 | Undergraduate | 806 | 30 | 16 | 448 | 1300 | 860 | 21 | 22 | 782 | 1685 | 1666 | 51 | 38 | 1230 | 2985 |
| | Postgraduate | 298 | 19 | 24 | 257 | 598 | 458 | 21 | 19 | 444 | 942 | 756 | 40 | 43 | 701 | 1540 |
| | Occasional | 128 | 4 | 0 | 9 | 141 | 132 | 1 | 1 | 10 | 144 | 260 | 5 | 1 | 19 | 285 |
| TOTAL | | 1232 | 53 | 40 | 714 | 2039 | 1450 | 43 | 42 | 1236 | 2771 | 2682 | 96 | 82 | 1950 | 4810 |
| 2009 | Undergraduate | 980 | 34 | 14 | 465 | 1493 | 901 | 27 | 19 | 813 | 1760 | 1881 | 61 | 33 | 1278 | 3253 |
| | Postgraduate | 304 | 13 | 21 | 268 | 606 | 494 | 20 | 25 | 469 | 1008 | 798 | 33 | 46 | 737 | 1614 |
| | Occasional | 116 | 2 | 0 | 16 | 134 | 125 | 1 | 0 | 20 | 146 | 241 | 3 | 0 | 36 | 280 |
| TOTAL* | | 1400 | 49 | 35 | 749 | 2233 | 1520 | 48 | 44 | 1302 | 2914 | 2920 | 97 | 79 | 2051 | 5147 |

*2009 Final HEMIS figures not yet available

International students

| Nationality | Year | |
|----------------------------------|------------|------------|
| | 2008 | 2009 |
| Asian countries | 24 | 21 |
| Botswana | 23 | 26 |
| Democratic Republic of the Congo | 1 | - |
| European countries | 12 | 11 |
| Lesotho | 146 | 151 |
| Malawi | 5 | 5 |
| Mauritius | 3 | 3 |
| Mozambique | 7 | 5 |
| Namibia | 65 | 83 |
| North America | 5 | 7 |
| Other African countries | 71 | 72 |
| Swaziland | 6 | 8 |
| Zambia | 8 | 8 |
| Zimbabwe | 62 | 64 |
| Total | 438 | 464 |

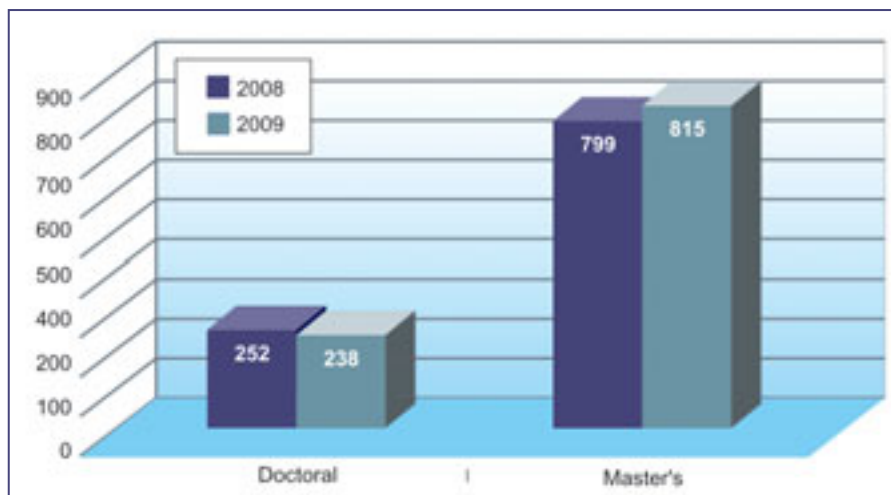
Comparison for the Faculty of Natural and Agricultural Sciences: 2008-2009



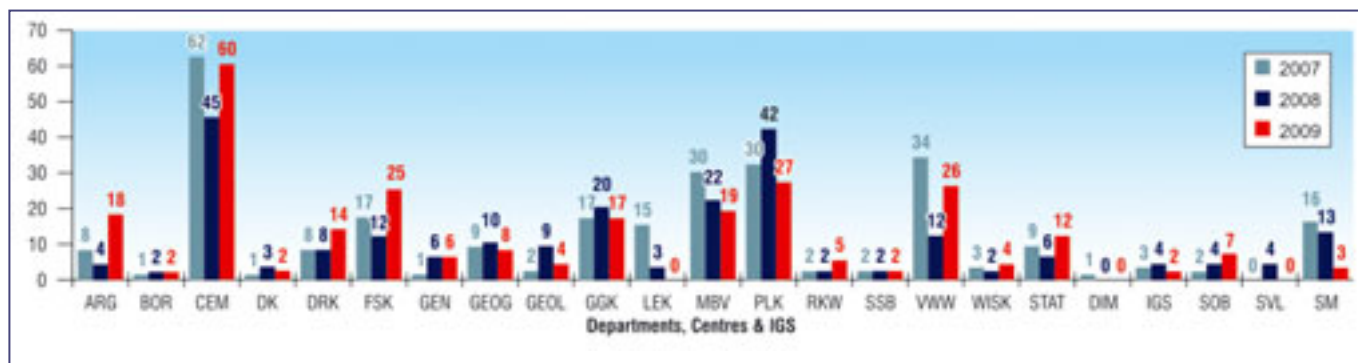
Student figures Post-/Undergraduates

| | 2008 | 2009 |
|----------------------|-------------|-------------|
| Undergraduate | 2985 | 3253 |
| Postgraduate | 1540 | 1614 |
| Occasional | 285 | 280 |
| Total | 4810 | 5147 |
| | | |
| | 2008 | 2009 |
| Doctoral | 252 | 238 |
| Master's | 779 | 815 |
| Total | 1031 | 1053 |

Comparison for the Faculty of Natural and Agricultural Sciences: 2008-2009



Accredited articles



List of abbreviations

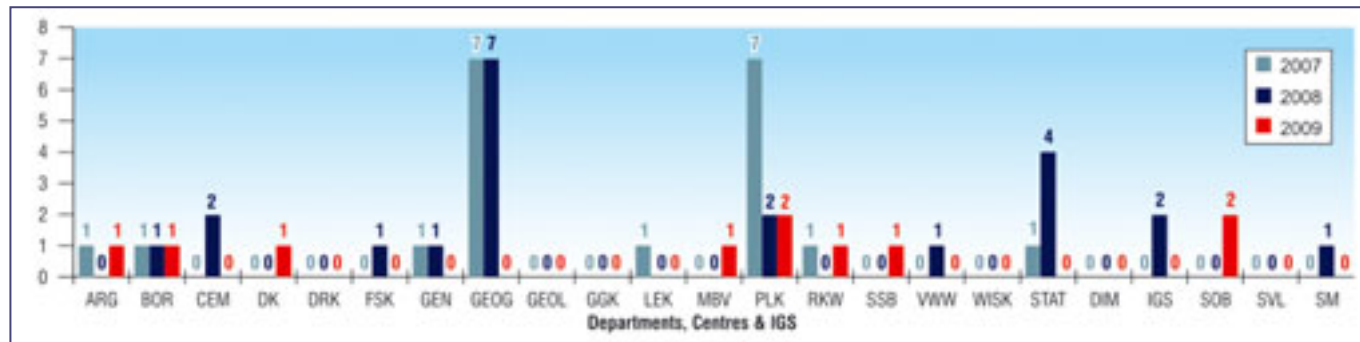
ARG Department of Architecture
 BOR Department of Quantity Surveying and Construction Management
 SOB Centre for Environmental Management
 CEM Department of Chemistry
 SM Centre for Microscopy
 SVL Centre for Sustainable Agriculture and Rural Development

DK Dean's Office
 DRK Department of Zoology and Entomology
 FSK Department of Physics
 GEN Department of Genetics
 GEOG Department of Geography
 GEOL Department of Geology
 GGK Department of Soil, Crop and Climate Sciences
 IGS Institute for Groundwater Studies

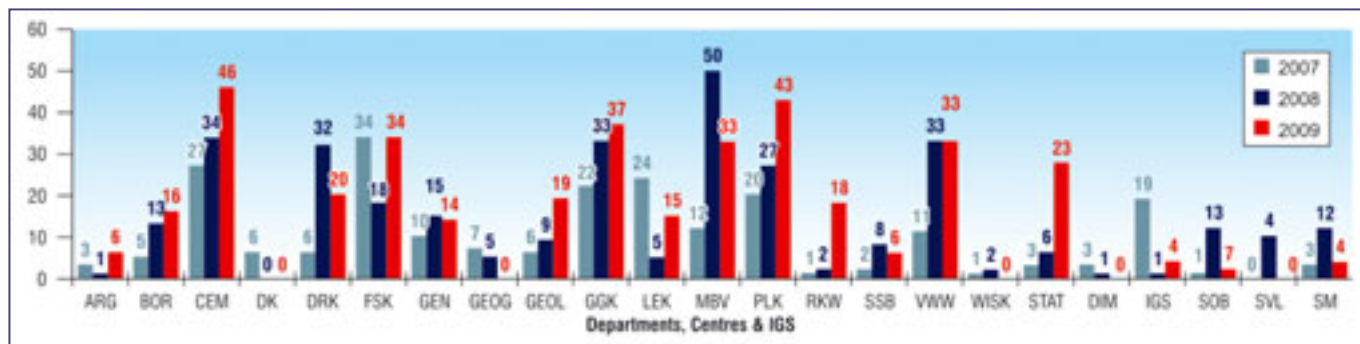
LEK Department of Agricultural Economics
 MBV Department of Microbial, Biochemical and Food Biotechnology
 PLK Department of Plant Sciences
 RKW Department of Computer Science and Informatics
 SSB Department of Urban and Regional Planning

SRB Disaster Management Training and Education Centre for Africa (DiMTEC)
 VWW Department of Animal, Wildlife and Grassland Sciences
 STAT Department of Mathematical Statistics and Actuarial Science
 WISK Department of Mathematics and Applied Mathematics

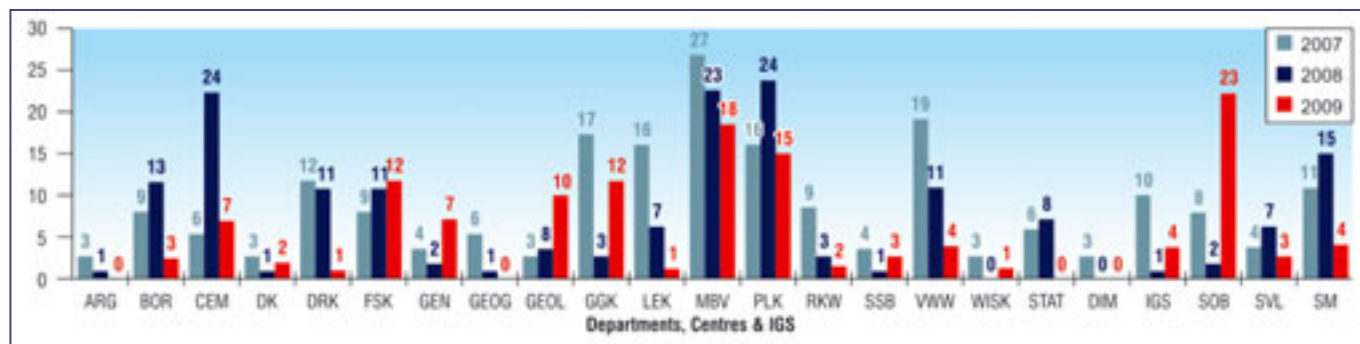
Books



Local conferences



Overseas conferences contributions





26 Glossary

Glossary

A

| | |
|----------|---|
| ADF - | Amsterdam Density Functional Programme |
| ADSARD - | Advanced Diploma in Sustainable Agriculture and Rural Development |
| AGM - | Annual General Meeting |
| AI - | Artificial Insemination |
| ARC - | Agricultural Research Council |
| ASQAQs - | Association of South African Quantity Surveyors |
| ASOCSA - | Association of Schools of Construction of Southern Africa |
| ASSA - | Actuarial Society of South Africa |
| ASSA - | Astronomical Society of Southern Africa |
| ASSAf - | Academy of Science of South Africa |

B

| | |
|-------|----------------------------------|
| BGR - | German Federal Survey of Geology |
|-------|----------------------------------|

C

| | |
|-----------|---|
| CANSA - | Cancer Association of South Africa |
| CCEM - | Centre for Confocal and Electron Microscopy |
| CCTC - | Center for Theoretical and Computational Chemistry |
| CEE - | Council for Economic Education |
| CENSARD - | Centre for Sustainable Agriculture and Rural Development |
| CePHMa - | Centre for Plant Health Management |
| CHESD - | Centre for Higher Education and Studies and Development |
| CHPC - | National Centre for High Performance Computing |
| CIDB - | Construction Industry Development Board |
| CIIFAD - | Cornell International Institute for Food, Agriculture and Development |
| CIOB - | Chartered Institute of Building |
| CLSM - | Confocal laser scanning microscope |
| CMW - | Cape Mohair and Wool |
| CNRS - | French National Centre for Scientific Research |
| COE - | Centre of Excellence |
| COLA - | Conference on Laser Ablation |
| CPU - | Central Processing Unit |

| | |
|--------|---|
| CSIR - | Council for Scientific and Industrial Research Organisation |
| CUT - | Central University of Technology |

D

| | |
|----------|--|
| DFG - | Deutsche Forschungsgemeinschaft |
| DiMTEC - | Disaster Management Training and Education Centre for Africa |
| DMISA - | Disaster Management Institute of Southern Africa |
| DRR - | Disaster Risk Reduction |
| DSC - | Differential Scanning Calorimetry |
| DST - | Department of Science and Technology |
| DWAF - | Department of Water Affairs and Forestry |

E

| | |
|--------|--|
| EAAP - | European Association for Animal Production |
| ECA - | European Crystallographic Association |
| EPWP - | Expanded Public Works Programme |

F

| | |
|--------|------------------------------------|
| FAO - | Food and Agricultural Organisation |
| FFSC - | Farm Financial Standard Council |
| FLIP - | Facilitation Learning in Practice |
| FMP - | Facilities Management Programme |
| FP7 - | European Funding Program Seven |

G

| | |
|--------|----------------------------------|
| GIS - | Geographical Information Systems |
| GMI - | Groundwater Management Institute |
| GOOT - | Grow our Own Timber |
| GOL - | Government of Lesotho |

H

| | |
|---------|--|
| HPC - | High Performance Computing |
| HRTEM - | High Resolution Transmission Electron Microscopy |

I

| | |
|-------------|---|
| IBREAM SA - | Institute for the Breeding of Rare and Endangered African Mammals |
| ICARD - | International Conference on Acid Rock Drainage |
| ICEC - | International Cost Engineering Council |
| ICPOES - | Inductively Coupled Plasma Optical Emission Spectroscopy |
| ICSU - | International Council for Science |
| ICY - | International Yeast Commission |
| IDC - | Industrial Development Corporation |
| IDP - | Internationally Displaced Persons |
| IFMA - | International Farm Management Association |
| IGS - | Institute for Groundwater Studies |
| INTSORMIL - | International Sorghum and Millet Research Support Programme |
| IPMP - | Intensive Project Management Programme |
| IRDP - | Institutional Research and Development Programme |

K

| | |
|--------|---|
| KIST - | Korea Institute of Science and Technology |
|--------|---|

L

| | |
|--------|--|
| LRAD - | Land Redistribution for Agricultural Development |
|--------|--|

M

| | |
|---------|---|
| MANIT - | Maulana Azad National Institute of Technology |
| MCA-L - | Millennium Challenge Account-Lesotho |
| MCC - | Millennium Challenge Corporation |
| MNS - | Material and Nanosciences Cluster |
| MOU - | Memorandum of Understanding |
| MS - | Mass Spectrometry |
| MSA - | Masters degree in Sustainable Agriculture |
| MSDN - | Microsoft Developer Network |
| MUCPP - | Mangaung University Community Partnership Programme |

N

| | |
|---------|---|
| NAMC - | National Agricultural Marketing Council |
| NECSA - | South African Nuclear Energy Corporation |
| NEP - | National Equipment Programme |
| NGO - | Non-Governmental Organisation |
| NIRS - | Infrared Spectrophotometer |
| NMMU - | Nelson Mandela Metropolitan University |
| NNSCF - | National Nano-Surface Characterisation Facility |
| NRF - | National Research Foundation |
| NSTF - | National Science and Technology Forum |
| NUFU - | Norwegian Council of Universities Committee for Development, Research and Education |
| NWS - | New World Sanitation |

P

| | |
|--------|------------------------------------|
| PEGG - | Primate Ecology and Genetics Group |
| PHP - | Peoples' Housing Process |
| PRT - | Protein Research Trust |

R

| | |
|--------|--|
| RICS - | Royal Institute of Chartered Surveyors |
| RPO - | Red Meat Producers' Organisation |

S

| | |
|-----------|---|
| SA - | South Africa |
| SAAWK - | South African Academy of Sciences |
| SAB - | The South African Breweries Limited |
| SACAP - | South African Council for the Architectural Professions |
| SACLA - | Southern African Computer Lecturers Association |
| SACPCMP - | South African Council for the Project and Construction Management Professions |
| SACPVP - | South African Council for the Property Valuation Profession |
| SACQSP - | South African Council for the Quantity Surveying Profession |

| | |
|----------|--|
| SADC - | Southern African Development Community |
| SAFEFE - | South African Foundation for Economic and Financial Education |
| SAFOI - | South African Fryer Oil Initiative |
| SAGA - | South African Geophysical Association |
| SAIA - | South African Institute of Architects |
| SAIP - | South African Institute of Physics |
| SAJAH - | South African Journal of Art History's |
| SANBI - | South African National Biodiversity Institute |
| SANPAD - | South Africa-Netherlands Research Programme on Alternatives in Development |
| SAPOA - | South African Property Owners' Association |
| SAQA - | South African Qualifications Authority |
| SASAS - | South African Society for Animal Science |
| SASAS - | South African Society of Atmospheric Sciences |
| SASCP - | South African Society of Crop Production |
| SASHS - | Southern African Society for Horticultural Sciences |
| SASPP - | Southern African Society for Plant Pathology |
| SASQUA - | Southern African Society for Quaternary Research |
| SASS - | South African Scoring System |
| SAWMA - | South African Wildlife Management Association |
| SEM - | Scanning Electron Microscope |
| SIDA - | Swedish International Development Cooperation Agency |
| SIFE - | Students in Free Enterprise |
| SKA - | Square Kilometre Array |
| SOI - | Southern Oscillation Index |
| SSSSA - | Soil Science Society of South Africa |

T

| | |
|-------|------------------------------------|
| TAD - | Teaching Astronomy for Development |
| TEM - | Transmission Electron Microscope |

| | |
|---------|---|
| TGA - | Thermal Gravimetric Analysis |
| THRIP - | South African National Research Foundation Thrust for Industry-Related Projects |
| TRAC - | Trans African Concessions (Pty) Ltd |
| TUT - | Tshwane University of Technology |

U

| | |
|-----------|--|
| UACH - | Autonomous University of Chapingo |
| UCT - | University of Cape Town |
| UEC - | Unit for Earth Construction |
| UFS - | University of the Free State |
| UJ - | University of Johannesburg |
| UK - | United Kingdom |
| UKZN - | University of KwaZulu-Natal |
| UMN - | University of Minnesota |
| UN - | United Nations |
| UNU - | United Nations University |
| UNU-EHS - | United Nations University's Institute for Environment and Human Security |
| UP - | University of Pretoria |
| UPS - | Uninterrupted Power Supply |
| US - | United States |
| USA - | United States of America |
| USGS - | United States Geological Survey |
| UWC - | University of the Western Cape |
| UWM - | University of Milwaukee-Wisconsin |

V

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|-------|--------------------------|
| ViE - | Vice-Rectorate in Europe |
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W

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| WCAP - | World Conference on Animal Production |
| WITS - | University of the Witwatersrand |
| WRC - | Water Research Commission |
| WSSSA - | Weed Science Society of South Africa |
| WVI - | World Vision International |
| WWU - | Muenster University |

X

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|-------|---------------------------|
| XPS - | X-ray photon spectroscope |
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