

2014 Faculty of Science Annual Report

The Faculty of Science is respected within South Africa, Africa and the international academic arena as an important knowledge-partner that plays an active role in the development of South African society.

The 2014 annual report provides an overview of the Faculty's activities in the fields of research and innovation, teaching and learning and community outreach, followed by research highlights from each of our eight academic departments. Read about our footprint when it comes to collaborating with institutions in Africa and the rest of the world, international recognition for our top researchers and postgraduate students, as well as the eight research chairs and two Centres of Excellence within the Faculty.

- Biochemistry
- Botany and Zoology
- Chemistry and Polymer Science
- Earth Sciences
- Mathematical Sciences (Mathematics, Applied Mathematics, Computer Science)
- Microbiology
- Physics
- Physiological Sciences

Photo: Justin Alberts



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WORD FROM THE DEAN

Welcome to our new look annual report for 2014. We hope this interactive format provides an interesting overview of the activities that took place in the Faculty of Science during 2014.

On the following pages Prof. Terry Robinson, Vice-dean: Research, provides an overview of the Faculty's research achievements for 2014, with a special focus on the quality of our research outputs and the fact that our researchers published a record number of articles during 2014.

The success of our students is a major priority for the Faculty. Prof. Ingrid Rewitzky, Vice-dean: Teaching and Learning, presents the many new approaches and initiatives in this very important activity of the Faculty.

The Faculty's societal impact is reflected in the overview of our outreach activities during 2014. This is followed by the departmental reports with detailed information about the departments' research activities and outputs.

As always, we take great pride in the excellence of our staff and students. Prof. Doug Rawlings, former Acting Dean of the Faculty, and Prof. Terry Robinson, Vice-dean: Research, both received Chancellor's Medals in recognition of their continued contributions to excellence in research. Prof. Robinson was also the recipient of the Havenga Prize for Life Sciences from the *Suid-Afrikaanse Akademie vir Wetenskap en Kuns* (South African Academy for Science and Art).

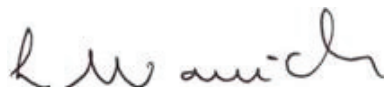
Two staff members, Prof. Dave Richardson and Prof. Guy Midgley, were named by Thomas Reuters as among the most highly cited and influential in their respective fields. Prof. Marina Rautenbach won the Women in Science award, and Prof. Len Barbour received the gold medal for outstanding research from the South African Chemical Institute. Prof. André de Villiers was selected by *The Analytical Scientist* as one of the 'top 40 under 40s' analytical scientists worldwide.

It was certainly an exceptional year for our Computer Science postgraduate students: Mr Rijnard van Tonder was a runner-up in the 'IBM Beat the Mainframe competition' in New York. With Mr Jacques Marais they developed an app which won the student category of the Ericsson Mobile App competition.

Mr Thomas Weighill, a postgraduate student in Mathematics, received the Chancellor's medal from Stellenbosch University for the best final year or postgraduate student at SU in 2014, as well as the S_2A_3 medal for the most outstanding thesis at Masters level.

This is only a glimpse into an annual report packed with information. Enjoy the rest of the report!

Prof. Louise Warnich
Dean: Faculty of Science



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RESEARCH AND INNOVATION

PROF TERRY ROBINSON, Vice Dean:
RESEARCH

The Faculty of Science has a strong research ethos and has been successful in creating highly relevant multidisciplinary research and postgraduate programmes.

Our programmes are supported by two Centres of Excellence and eight research chairs. Nearly 95% of our academic staff hold a PhD and we have partnerships and collaborations with over 700 institutions worldwide.

Research outputs

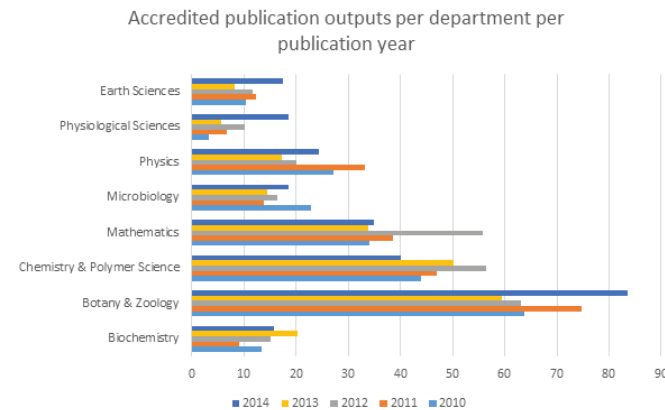
During 2014 researchers, students and other affiliates of the Faculty of Science published a record number of research papers - the accredited publication units for 2014 being 253,35. This is excellent compared with the previous high of 248,81 in 2012. An analysis of the data revealed, among others:

Faculty of Science authors published/co-published most frequently with authors from Germany, the United States, the United Kingdom, Australia, the People's Republic of China and France;

On a national level, the University of Cape Town features as the most frequent collaborating institution, followed by the University of Pretoria and the University of KwaZulu-Natal.



The quality of our publications is a major focus area. A review of publications that appeared in 2013 in the top 20% (or higher) in terms of impact factor within specific subcategories of research as defined in the Web of Science, showed that the Departments of Botany and Zoology and Chemistry and Polymer Science topped the list.



The graph is based on the audited units for the Faculty of Science's research output for publication years 2010-2014, as prescribed by the Policy and Procedures for the Measurement of Research Output of Public Higher Education Institutions (2003) in SA. Only journal articles in accredited journals, peer reviewed books and published conference proceedings are recognised. Source: Division for Research Development (2015) Stellenbosch University

National and international networks

The Faculty continuously seeks to strengthen and renew strategic alliances with entities such as the Council for Scientific and Industrial Research, iThemba LABS and first-rate international universities and institutions to build capacity and provide development opportunities for postgraduate students.



Research and innovation

The Faculty places a high premium on creating a culture of innovation among staff and students. During 2014 the departments of Microbiology, Biochemistry, Botany and Zoology, Physiological Sciences and Chemistry and Polymer Science registered nine declarations with Innovus, Stellenbosch University's technology transfer partner. Of these nine, five progressed to provisional patent applications and three to international (PCT) applications.

Patents	2011	2012	2013	2014
Declarations	14	4	5	9
Provisional patent application	9	2	3	5
International patent application (PCT)	5	2	2	3
Final Patent Application (FP)	14	5	0	0

Centres of excellence and research chairs

The Faculty hosts two Centres of Excellence, supported by the Department of Science and Technology and the National Research Foundation. They are the DST/NRF Centre of Excellence for Invasion Biology and the South African Centre for Epidemiological Modelling and Analysis. Seven of our departments host a research chair and/or national centre of excellence (see table on the right).

Botany & Zoology

- DST/NRF Centre for Invasion Biology (C-I-B)

Earth Sciences

- SARCHI Chair in Experimental Petrology

Biochemistry

- SARCHI Chair in Mechanistic Modelling of Health and Epidemiology

Chemistry & Polymer Science

- SARCHI Chair in Advanced Macromolecular Architectures
- SARCHI Chair in Nano-structured Functional Materials

Physics

- SARCHI Chair in Photonics-Ultrafast & Ultra-intense Laser Science
- National Institute for Theoretical Physics (NITHeP)

Microbiology

- SARCHI Chair in Energy Research
- ERWAT Research Chair in Wastewater Management
- Stellenbosch University Water Institute

Mathematical Sciences

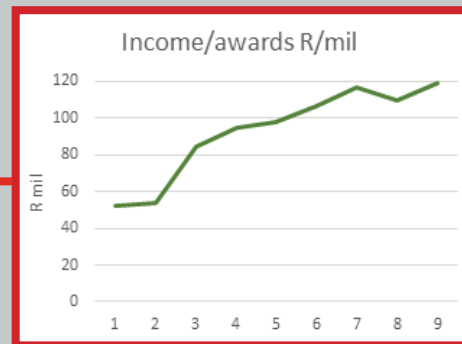
- SARCHI Chair in Mathematical & Theoretical Physical Biosciences
- DST/NRF Centre of Epidemiological Modelling & Analysis (SACEMA)

Funding

An analysis of the major funding agencies during 2013 showed that the National Research Foundation (38.4%) and statutory councils (51%) are the main funders of research in the Faculty. In order to ensure the ongoing financial viability of the Faculty's research activities, an immediate priority will be to secure funding from non-governmental and international funding institutions. This includes seeking out funding opportunities to ensure that we are equipped with state-of-the-art equipment.

Did you know?

- Stellenbosch University has the 2nd highest number of rated researchers in South Africa
- Of the 342 rated researchers at SU, 106 are in the Faculty of Science
- 95% of our academic staff hold a PhD



FOCUS ON POSTGRADUATE STUDIES

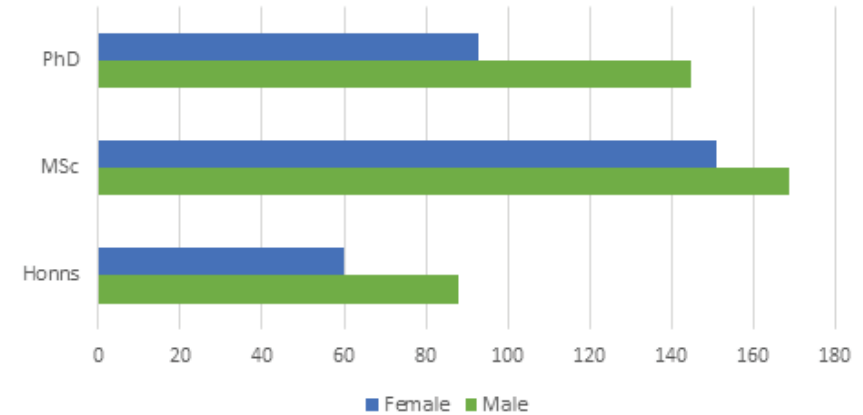
The Faculty offers high-quality training to nearly 700 primarily full-time on-campus postgraduate students. The students are supported by research specialists, extensive infrastructure and state-of-the-art technical facilities.

In 2014, a total of 282 postgraduate students graduated – 128 honours-, 112 MSc- and 42 PhD-students. Nearly 50% of our PhD graduates completed their degree within three years.

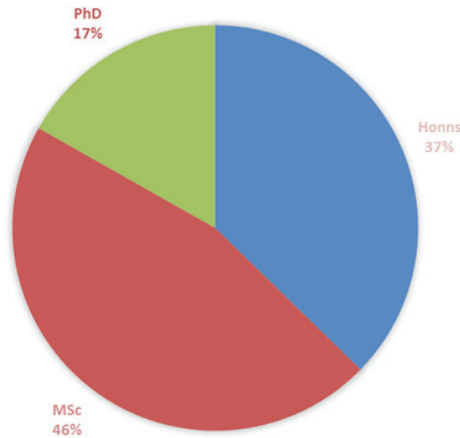
We have been particularly successful in attracting postgraduate students and postdoctoral fellows from other African countries and abroad. The Faculty of Science is currently host to 91 postdoctoral fellows from South Africa (38), Africa (13) and the rest of the world (32).

The total number of postgraduate students has increased by 4% from 618 in 2013 to 678 in 2014. The ratio of white to BCI approximates 60% white to 40% BCI.

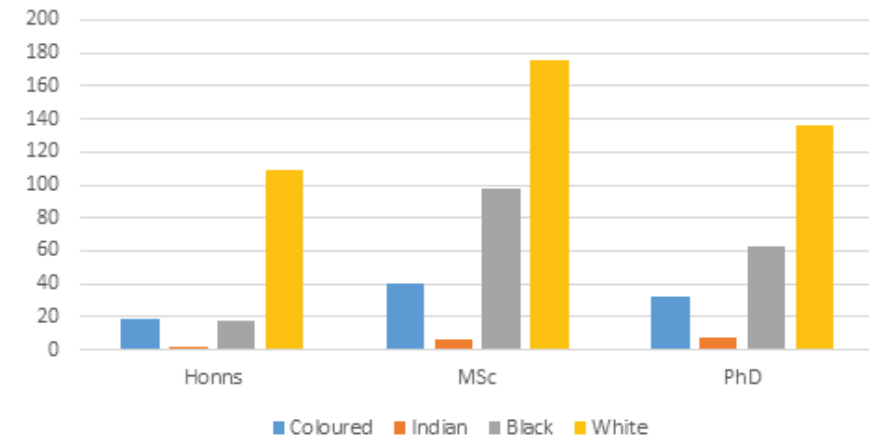
2014 Gender profile of postgraduate students



POSTGRADS GRADUATING IN 2014



2014 Postgraduate students per race



NATIONAL AND INTERNATIONAL RECOGNITION

SEVERAL OF OUR RESEARCHERS AND POSTGRADUATE STUDENTS WERE RECOGNISED FOR THEIR HIGH-QUALITY RESEARCH IN 2014 AT BOTH NATIONAL AND INTERNATIONAL LEVEL.



Prof. Dave Richardson, director of the DST/NRF Centre of Excellence for Invasion Biology (C-IB), and **Prof. Guy Midgley** from the Department of Botany and Zoology were included in the 2014 Thomson Reuters Highly Cited Researchers list of most influential contemporary researchers in their fields of expertise.

[Read more](#)



Prof. André deVilliers from the Department of Chemistry and Polymer Science received the 2014 LCGC Emerging Leader in Chromatography Award for pushing the boundaries in the chemical characterisation of complex mixtures.

[Read more](#)



Prof. Len Barbour, an experimental chemist, received the esteemed Gold Medal award from the South African Chemical Institute (SACI) in recognition of his outstanding contribution to the field. Prof. Barbour also received a DSc degree for twenty years of research focused on unravelling unusual phenomena in crystals.

[Read more](#)



Prof. Marina Rautenbach from the Department of Biochemistry was honoured as an outstanding female scientist in the Natural Sciences and Engineering category of the 2014 South African Woman in Science Awards (WISA).

[Read more](#)



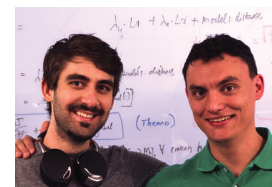
Prof. Terry Robinson from the Department of Botany and Zoology was the recipient of the Havenga Prize for Life Sciences from the *Suid-Afrikaanse Akademie vir Wetenskap en Kuns* (South African Academy for Science and Art). Both Prof. Robinson and **Prof. Doug Rawlings** (left) were awarded the Chancellor's award for sustained research excellence at Stellenbosch University.

[Read more](#)



Dr Sophie von der Heyden from the Department of Botany and Zoology was elected as a Young Affiliate of The World Academy of Sciences (TWAS). The honour is given to developing-nation researchers who are likely to become future leaders in their research field.

[Read more](#)



MSc Computer Science student **Rijnard van Tonder** (right) was a runner-up in the 'IBM Beat the Mainframe' competition in New York. Together with **Jacques Marais** he also developed an app called WorkMode which won the student category of the Ericsson Mobile App competition.

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Thomas Weighill (right), an MSc Mathematics student, received both the coveted Chancellor's medal and the S_2A_3 medal for the most outstanding research thesis at MSc level in the natural, engineering and medical sciences. Weighill sustained an average of 91.1% during six years of study. His MSc thesis, with a final mark of 97%, was accepted without any revisions by three external international examiners. His study leader was **Prof Zurab Janelidze** (left).

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TEACHING AND LEARNING

PROF. INGRID REWITZKY, Vice-dean:
TEACHING AND LEARNING



The Faculty of Science is committed to the education of young scientists in support of the South African Government's initiative to increase the knowledge base of our community, specifically in the fields of science and technology.

Our programmes are designed not only to prepare graduates for the job market as scientific professionals, but also to equip students with the knowledge and skills required to enter postgraduate study programmes. In this regard we have initiated various strategies and plans to improve student success on undergraduate and postgraduate level, to increase student diversity in terms of race and gender, and to employ the latest information technologies to enhance teaching and learning and student engagement.

Thanks to these initiatives, we have experienced a steady upward trend in student diversity and undergraduate student success and retention over the last decade. However, many transformation challenges still remain.

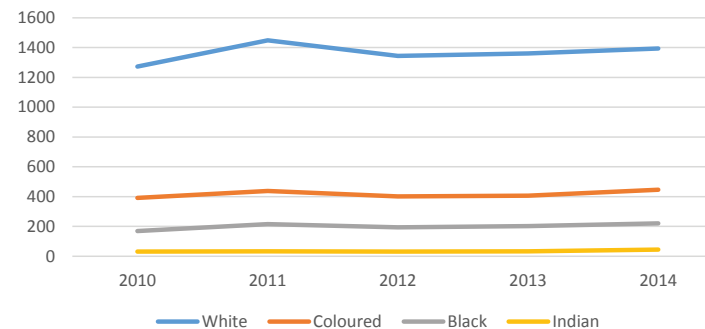
Student diversity

Looking back at 2014, we enrolled the highest percentage ever (34.8%) of first-time entering Black, Coloured and Indian students. This is the result of an initiative, started in 2013, to improve diversity by increasing the number of recruitment bursaries from 41 in 2012 to 181 in 2014. This resulted in 107 recruited diversity students registering in 2014 (compared to 34 in 2012). In 2015 the Faculty will offer 190 recruitment bursaries.

In order to reach our target of 40% diversity students at undergraduate level by 2019, we are exploiting recruitment opportunities in collaboration with the Centre for Student Recruitment and through activities such as the annual Maties Science Winter Week and other departmental outreach activities. On postgraduate level, the percentage diversity students increased from 35.8% in 2010 to 38.7% in 2014.

On gender level we are also showing progress. The total number of female students, undergraduate and postgraduate, has increased from 49.8% in 2009 to 51.7% in 2014.

Undergraduate students demographic profile
2010-2014



Since 2010, the Faculty of Science has experienced a steady upward trend in student diversity.

Student success

An ongoing challenge is ensuring the success of undergraduate students. The average pass rate in the Faculty of Science has improved from 76.6% in 2008 to 82.33% (2013) and 80.67% in 2014. However, we are concerned about the low percentage of students who complete their degree in three years. Significant efforts have been made to improve student success in critical courses, including the appointment of tutors and teaching assistants, and differentiated tutorial support to cater for the varying levels of preparedness of first-year students. The aim is to develop the necessary study and learning skills during the first year to enable students to become independent learners.

Reading skills and comprehension are essential for academic success. In 2013 strategic funding was obtained to investigate the use of a web-based reading programme to improve students' reading, comprehension and writing skills. The reading programme will be implemented in the Scientific Communication Skills course over the next three years, starting in 2015.

The Faculty is working towards implementing the SU's language strategy whereby all our programmes can be taken in English while keeping the percentage of a programme that can be taken in Afrikaans above 60%.

Teaching and learning

The Faculty's Science Teaching and Learning Discussion Forum meets monthly, with an annual workshop to explore a more student-centred learning approach as well as the incorporation of IT and other social media platforms to enhance teaching, learning and assessment activities. Since 2013 the Faculty has obtained a teaching development grant from the Department of Higher Education for identifying potential future academics from the postgraduate cohort and involving them in assessment methodology, blended learning, the use of ICTs, the re-design of modules and the development of new approaches for improving student engagement. [Read more](#)



Group work during Physics tutorials has suddenly become a lot more fun after physics lecturers Profs Brandon van der Ventel and Richard Newman introduced iPads into the equation. Core Group, authorised distributor of Apple products in South Africa, and DigiCape, a local reseller of Apple products, supported the project by making 17 iPads available for the duration of the project. Photo: Wiida Fourie-Basson

Teaching excellence

Several of our lecturers were recognised by top-performing first years for their contribution to their academic success in 2013. The lecturers were then invited to attend the Rector's Dinner for Top-Performing Students, hosted by the First-Year Academy of Stellenbosch University.



Dr Marietjie Lutz (middle) from the Department of Chemistry and Polymer Science were recognised by two students, Ms Maryke Botha (BAgric) (left) and Ms Jana Botha (BSc).

"For the first time I can recall, chemistry has been presented to me in a way that I could understand." – Maryke Botha

"You have an extraordinarily way of explaining and your ability to summarise the text book in solid comprehensive notes, are, in a nutshell, commendable." – Jana Botha



Prof. Ed Jacobs (Department of Chemistry and Polymer Science) with first year engineering student Mr Kwazi Frank Dlamini.

"The humility and the patience you have with a student is all that I needed to be confident in what I do and made me want to do better." – Kwazi F Dlamini

Dr Maritha le Roux
(Department of Chemistry and Polymer Science)

"I believe that the bond between lecturer and student is essential and mutually beneficial...Thanks to your teaching methods, patience, friendliness and approachability, I was able to achieve my objectives and success." – Celeste de Kock

Dr Karin-Therese Howell
(Mathematics Division)

"In our mathematics classes we not only interpreted mathematical limits – you also motivated us to rise above our circumstances and achieve our personal success limit in life." – Aldu Duminy

Prof. Lynette van Zijl
(Computer Sciences Division)

"Your enthusiasm and passion for computer science shown during lectures is contagious and had a big influence on my feelings towards the subject." – Elrich Groenewald

Prof. Alex Valentine
(Department of Botany and Zoology)

"You made me realise that complicated work or terms didn't have to be feared but should rather be seen as an opportunity to challenge yourself and learn something new about the world around us." – Alistair Galloway

Prof. Florian Breuer
(Mathematics Division)

"I think the reason why you stand out above other lecturers is because you very effectively incorporate humour, examples and their relationship with the real world in your lectures." – Chris van der Westhuizen

Dr Gareth Arnott
(Department of Chemistry and Polymer Science)

"In all the lectures presented by Dr Arnott he was always intellectually stimulating and always kept the class involved which I feel is an invaluable quality for a lecturer to have." - Justin Hurst

COMMUNITY OUTREACH



Chemistry outreach initiative

The Stellenbosch University Chemistry Outreach Initiative (SUNCOI) hosted two workshops – the “Practical with Purpose” workshop for Grade 10 to 12 learners and “Teaching the teacher the nuts and bolts of chemistry” workshop for Grade 10 teachers. SUNCOI was initiated in 2013 by Dr Rehana Malgas-Enus and Prof. Klaus Koch to enhance the teaching and learning of chemical practicals at historically disadvantaged schools.

[Read more](#)



Physics annual outreach road trip

Postgraduate students in Theoretical and Nuclear Physics undertook the sixth annual outreach road trip along the Garden Route. The students demonstrated basic principles in physics such as fluorescence and phosphorescence, optical communications and non-Newtonian fluids to nearly 400 children at nine schools. This initiative is sponsored by the Optical Society of America (OSA) Student Chapter. On the photo, from left to right, Ruan Viljoen, Zina Ndlovu, Kevin Li, Erasmus du Toit, Paul Williams, Janusz Meylahn, Vernon Chisapi, Hein Fourie, Catherine Pfukwa, Bart Smit and Rikus Groenewald.



Teaching biodiversity to teachers and high school learners

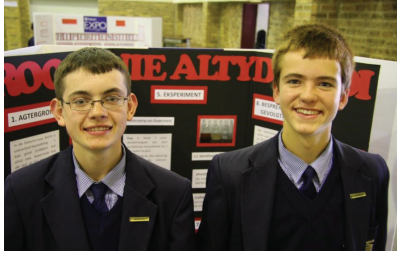
The limbivane project participated in the Western Cape Education Department's Careers Expo at Overberg Primary School in Caledon on 1 August 2014. A competition to identify different ant species under a microscope promoted learner interaction and increased curiosity in insect morphology. limbovane is a long term monitoring project which focuses on ant diversity in different natural and modified landscapes and involves educators and learners from secondary schools. Photo: Dorette du Plessis

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Getting ready for the Mathematics Olympiads

Delegations from South Africa, Botswana and Zimbabwe participated in the annual Mathematics Olympiad Camp and Training, hosted by the Mathematics Division in December 2014. It is the first part of the training and selection procedure for South Africa's teams in the Pan-African and International Mathematical Olympiads. Prof. Stephan Wagner and postgraduate student Ms Desislava Nikolov also offered biweekly classes for interested learners in Stellenbosch, while the Mathematics Division offered training sessions for the Boland teams participating in the South African Mathematics Team Competition on 13 September 2014.



Eskom Expo for Young Scientists

Every year staff and postgraduate students from the Faculty of Science volunteer as judges at the Stellenbosch regionals of the Eskom Expo for Young Scientists. The Centre for Invasion Biology's (C•I•B) book prize for the best junior research project in the environmental sciences at the 2014 Eskom Expo for Young Scientists was awarded to Charl-Henri Schoeman and Henko van Wyk, Grade 9 learners from Curro Private School in Langebaan. Photo: Wiida Fourie-Basson

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Maties Science Winter Week

The Maties Science Winter Week provides learners who are interested in a career in the natural sciences the opportunity to find out more about the study programmes offered in the Faculty of Science and the various disciplines and career opportunities available in these fields. Several of the Faculty's researchers participated in the popular "Date with a scientist" event, where learners meet professional scientists from industry and academia.

Other outreach activities

- The Computer Science Division co-ordinated a one-day Python introduction course for learners from Stellenbosch High School.
- Dr Rehana Malgas-Enus addressed 125 high school learners from 25 previously disadvantaged schools during the Women in Mathematics convention hosted by the Science Learning Centre at the University of the Western Cape.
- Dr Katherine de Villiers and Ms Varia Nikolayenko presented talks on the application of crystallography and synchrotrons in today's science to learners and teachers from the West Coast Education Division during National Science Week.
- Prof. Nox Makunga presented a lecture at the Stellenbosch Forum and a talk on communicating science at Science Fridays @Stellenbosch.
- Prof. Guy Midgley was chair of the session on community interaction during the 2nd Global Change Conference in December, hosted at the Nelson Mandela Metropolitan University. He also gave several media interviews on World Environment Day.
- Mathematics students competed against 200 students from 10 universities in the third South African Tertiary Mathematics Olympiad on 23 August 2014. While the competition was dominated by UCT, SU students Petri-Johan Last (Engineering) came fourth and three Mathematics students were among the top 20.
- The Mathematics Division was closely involved with the International Mathematics Olympiad which, for the first time, took place in South Africa. They are Prof. Florian Breuer (coordinator), Prof. Stephan Wagner (problem selection committee and problem captain) and Prof. Dirk Laurie (head coordinator), as well as several postgraduate students.

DEPARTMENT OF BOTANY AND ZOOLOGY

THE DEPARTMENT OF BOTANY AND ZOOLOGY IS A LEADER IN THE FIELD OF EVOLUTIONARY BIOLOGY, WITH A SPECIFIC FOCUS ON THE UNIQUE OPPORTUNITIES OFFERED BY AFRICA'S BIODIVERSITY.

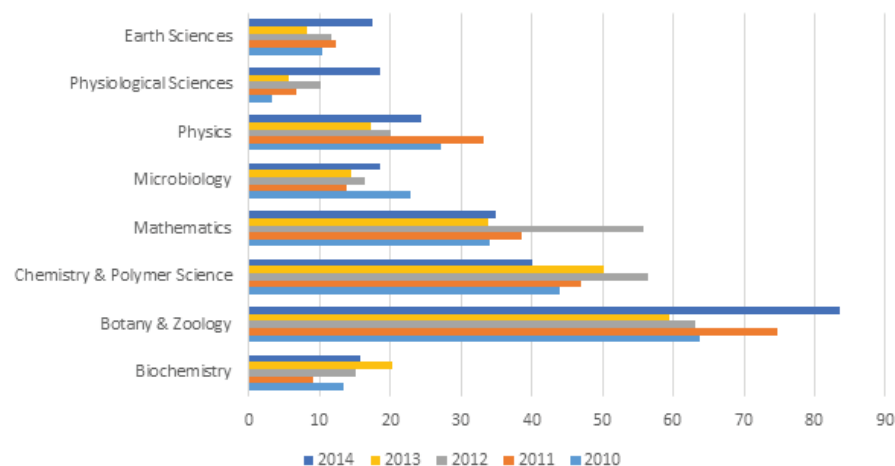
Research interests

Animal evolutionary ecology & physiology	Evolutionary ecology	Animal plant interactions
Behavioural ecology	Cape Flora	Invasion biology
Ecophysiology	Evolutionary genomics	Marine research
Nutritional plant physiology	Vertebrate functional biology & herpetology	Global change ecology
	Medicinal Plant Biotechnology	

Research outputs

The Department significantly increased its research output to 176 articles in accredited journals in 2014, compared to 140 articles in 2013 and 133 in 2012. The Faculty of Science's audited research output for publication years 2010-2014 clearly shows that the Department of Botany and Zoology consistently topped the list.

Accredited publication outputs per department per publication year



[Publication list](#)

[NRF-rated researchers](#)

[Staff list](#)

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DEPARTMENTS:

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[Chemistry and Polymer Science](#)

[Biochemistry](#)

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[Physics](#)

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NRF-rated researchers

More than 70% of our academic staff has been rated by the National Research Foundation – three of them as leading international researchers and five as internationally acclaimed researchers. We have a large group of established researchers and promising young researchers, among them six female researchers. This number includes our research associates, research chairs and retired academics.



National and international collaboration

Collaborating and participating in national and international scientific programmes are one of the Department's priority objectives. During 2014 we collaborated with over 330 institutions from more than 40 countries – this included co-authorship on journal articles, research projects and student and staff exchange.



The Department worked with 52 different institutions in South Africa. Our most significant international collaborators are institutions in the United States (54) and the United Kingdom (37), followed by France (21), Australia (18) and Germany (15).

Bilateral funding

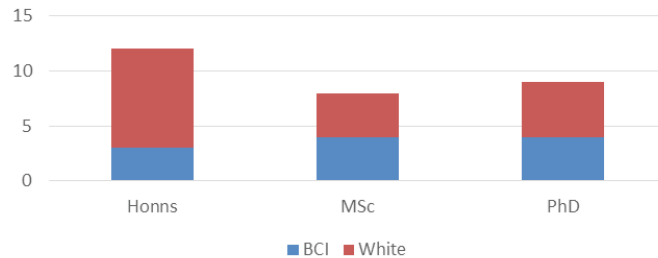
Prof. Conrad Matthee received funding as part of the bilateral agreement between South Africa and France for the Biodiversity and Global Change in Southern Africa project (2013-2015). Dr Tammy Robinson obtained funding through the SA-Angola bilateral agreement for the investigation of coastal sedimentation by means of radioisotope mapping (2013-2015).

Focus on postgraduate students

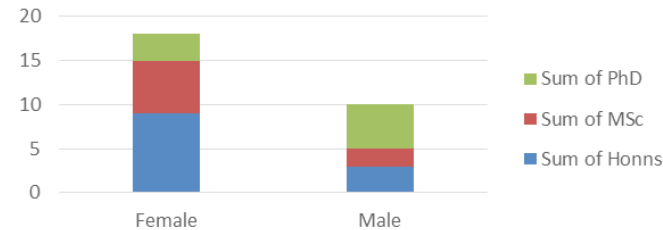
In 2014 we had a cohort of 85 postgraduate students – 18 Hons, 39 MSc and 28 PhD students. By the end of the academic year 12 Honours, eight MSc and eight PhD students graduated. Postgraduate students presented papers and posters at conferences in Uganda, South Africa and Namibia. Three of them walked away with awards:

Mr Chris Broeckhoven	Best PhD presentation, 12 th Conference of the Herpetological Association of Africa
Dr Romina Henriques	Best presentation, SU annual postdoctoral research conference
Ms Sara Andreotti	First prize for the best photograph and shortlisted for best talk and best written article at SU's New Voices in Science competition.

Diversity profile of postgraduate students who graduated in 2014



Gender profile of postgraduate students who graduated in 2014



Postdoctoral fellows

The Department hosted 16 postdoctoral fellows from South Africa and Africa, Europe and the USA.

Service to the scientific community

Our staff regularly serve as external examiners or supervisors to students from other universities and on the advisory panels to various conservation and government bodies and on the editorial boards of several prestigious journals.

Several staff acted as moderators, external examiners for courses or as supervisors and co-supervisors for MSc and PhD students at the Universities of Cape Town (UCT), the Western Cape (UWC), KwaZulu-Natal (UKZN), Pretoria (UP), Rhodes (RU), Free State (UFS), North West (NWU), the Cape Peninsula University of Technology (CPUT) and the University of Zimbabwe.

During 2014 the Department's staff were invited by the National Research Foundation (NRF) to act as reviewers or as panel members of special committees: they were Dr Savel Daniels, Dr Jaco le Roux, Prof Anton Pauw, Dr Rambau Victor, Prof Terry Robinson, Dr Tammy Robinson, Dr Simon Carol, Prof Alex Valentine, Prof Hannes van Wyk and Dr Sophie von der Heyden. Prof Leanne Dreyer is a core member of the DST-NRF Centre of Excellence in Tree Health Biotechnology.

Editorial activities

Prof. Michael Cherry	<i>Emu</i> (associate editor); <i>Folia Zoologica</i> (editorial board member)
Dr Susanne Clusella-Trullas	Editorial boards of <i>Journal of Thermal Biology</i> , <i>Frontiers in Insect Physiology & Austral Ecology</i>
Prof. Allan Ellis	<i>Botanical Journal of the Linnean Society</i> (associate editor)
Dr Jaco le Roux	<i>Conservation Genetics & Biological Invasions</i> (associate editor)
Prof. Guy Midgley	<i>Diversity and Distributions</i> (editorial board)
Prof. Conrad Matthee	Associate editor of <i>Integrative and Comparative Biology</i> , <i>African Journal of Marine Science</i> , <i>Koedoe</i> & <i>Molecular Phylogenetics and Evolution</i>
Prof. LeFras Mouton	<i>African Journal of Herpetology</i> (editorial board)
Prof. Anton Pauw	<i>South African Journal of Botany</i> (subject editor)
Dr Rambau Victor	<i>African Zoology</i> (section editor)
Prof. Dave Richardson	<i>Diversity and Distributions</i> (editor-in-chief); editorial board member of <i>Conservation Biology</i> , <i>AOB Plants</i> , <i>Florist Ecosystems</i> and a book series on biological invasions, published by Cambridge University Press
Prof. Terry Robinson	Editorial board of <i>Chromosome Research & Cytogenetics and Genome Research</i>
Dr Simon Carol	<i>African Zoology</i> (editor-in-chief)
Prof. Valdon Smith	<i>Polar Record</i> (editorial advisor)
Prof. Alex Valentine	<i>Fungal Ecology</i> (subject editor)
Dr Theresa Wossler	<i>African Zoology</i> (editor); <i>African Entomology</i> (associate editor)

Conferences and workshops

Staff members delivered oral and poster presentations at international conferences in Germany, the United States, Canada, Japan, Vietnam, Chile, Namibia, China, Saudi Arabia and Oman.

The Department was also well represented at local conferences such as the 15th Southern African Marine Sciences Symposium and the annual conference of the Southern African Society of Aquatic Scientists. Staff members participated in two international conferences that took place in South Africa: the XXth conference of the Association pour l'Etude de la Taxonomie de la Flore D'Afrique Tropicale (Aetfat) and the XIVth International Symposium on Biological Control of Weeds.

Service to the community

Prof. Michael Cherry	Kalahari Research Trust (trustee) & the Percy Fitzpatrick Institute of African Ornithology (steering committee)
Dr Nox Makunga	SA Association of Botanists (vice-president) & the SA PhD Project (member)
Prof. Guy Midgley	SA National Global Change Research Committee (chairperson); IUCN Scientific Steering Committee Climate Change Specialist group (board member); ICSU SA National Board (board member); National Global Change NRF/DST Conference (co-organiser); IPCC (coordinating lead author); ASSAF (member); Royal Society of South Africa (Fellow); public presentations for the Department of Environmental Affairs on national long term climate change adaptation strategy
Prof. Conrad Matthee	Endangered Wildlife Trust Riverine Rabbit (steering committee)
Prof. LaFras Mouton	International Society of Vertebrate Morphologists (member); Zoological Society of Southern Africa (member); Rooi Cederberg Karoo Park (advisory board); Herpetological Association of Africa (chairperson); 12th Herpetological Association of Africa Conference (chair: organising committee)
Prof. Anton Pauw	Wildflower Conservation Trust (trustee) & Red Hill Conservation Group (member)
Dr Rambau Victor	Zoological Society of Southern Africa (committee member)
Dr Simon Carol	15 th South African Marine Science Symposium (organising committee)
Prof. Alex Valentine	JS Marais Park's management committee (advisory board)
Prof. Hannes van Wyk	Water Research Commission (steering committee); Junior Captain Scott Medal (evaluation panel); 1st African Conference on Health Effects of Endocrine Disruptors (organising committee)
Dr Sophie von der Heyden	15th South African Marine Science Symposium (chair: organising committee)
Dr Theresa Wossler	Helderberg Advisory Committee (member)
Dr Susanna Clusella-Trullas	Insect Invasion Workshop (organising committee)
Prof. Allan Ellis	South African Association of Botanists (board secretary)

National and international recognition

Prof. Dave Richardson & Prof. Guy Midgley	2014 Thomson Reuters Highly Cited Researchers list of most influential contemporary researchers in their fields of expertise
Prof. Terry Robinson	Chancellor's award for sustained research excellence at SU; Havenga Prize for Life Sciences from the <i>Suid-Afrikaanse Akademie vir Wetenskap en Kuns</i> (South African Academy for Science and Art)
Prof. Conrad Matthee & Prof. Guy Midgley	Elected Fellows of the Royal Society of South Africa
Prof. Michael Cherry	Elected Fellow of the African Academy of Sciences
Dr Sophie von der Heyden	Elected Young Affiliate of The World Academy of Sciences (TWAS) & awarded the CV Raman Senior Fellowship for African Scientists to conduct research in India
Dr Marnel Mouton	Lecturer who contributed the most to academic success of top first year student

DEPARTMENT OF EARTH SCIENCES

THE DEPARTMENT OF EARTH SCIENCES IS ONE OF THE OLDEST ACADEMIC DEPARTMENTS AT STELLENBOSCH UNIVERSITY, WITH A HISTORY THAT GOES BACK TO THE TEACHING OF 'ELEMENTARY GEOLOGY' AT THE STELLENBOSCH SCHOOL FROM 1840 TO 1865. TODAY THE DEPARTMENT IS HOME TO 15 RESEARCHERS AND OVER 30 POSTGRADUATE STUDENTS.

Research interests

Environmental geochemistry

- Trace-element and isotope geochemistry
- Marine geochemistry
- Hydro-geochemistry
- Pollution

Applied Geology

- Tectonics and orogenic processes
- Sedimentology and palaeontology
- Petrogenesis of granite rocks
- Metamorphic petrology
- Experimental petrology
- Shear-zone hosted gold deposits
- Massive sulphide deposits
- Heavy mineral placer deposits
- Metallogenesis of mobile belts

Research highlights

The Department significantly increased its research outputs in 2014, while Dr Susanne Fietz became the sixth staff member to be rated by the National Research Foundation:

Accredited publication outputs 2010-2014

[Publication list](#)[NRF-rated researchers](#)[Staff list](#)[Contact us](#)

DEPARTMENTS:

[Botany and Zoology](#)[Earth Sciences](#)[Chemistry and Polymer Science](#)[Biochemistry](#)[Mathematical Sciences](#)[Microbiology](#)[Physics](#)[Physiological Sciences](#)[HOME PAGE](#)

Internationally acclaimed researcher	
Prof. JS Buick	metamorphic petrology, geochronology & isotope geochemistry
Prof. JD Clemens	granite petrogenesis
Prof. A Kisters	structural geology
Prof. G Stevens	experimental petrology
Established researcher	
Dr S Fietz	marine biogeochemistry
Prof. A Roychoudhury	environmental geochemistry & hydrology

National and international collaboration

During 2014 we collaborated with 103 institutions from 27 countries. Our most significant international collaborators are institutions from Germany (16), the United States (10) and France (9), while closer to home we worked with institutions from Cameroon, Namibia and Uganda.



Focus on postgraduate studies

We have a large cohort of Honours students (22), with eight MSc and three PhD students. Nearly a third of our postgraduate students are from the designated BCI groups and the ratio male to female on postgraduate level is about 2:1. During 2014 we hosted two postdoctoral fellows, Dr M. Garcia Arias (Spain) and Dr V van Schijndel (Netherlands).

Science on board the SA Agulhas II

Eight of our postgraduate students were on board the SA Agulhas II's for its roundtrip to Antarctica in December 2014. They tackled research problems such as the link between the growth of algae in the Southern Ocean, the cycling of essential chemical elements and how that impacts on the levels of CO₂ in the ocean and the atmosphere. [Read more](#)



Greenlandic expedition

MSc-student Mr Riaan Bothma and Dr Martin Klausen went on a geological expedition to Southeast Greenland, organised by the Royal Geological Survey of Denmark and Greenland (GEUS). This was the last in a series of six expeditions to remap and investigate the North Atlantic Craton. [Read more](#)



Service to the scientific community

Prof. JD Clemens	Igneous and Metamorphic Studies Group, affiliated with the Geological Society of South Africa (founder member); Earth Sciences Ratings Panel for the National Research Foundation (chair)
Prof. Dirk Frei	European Science Foundation review panel (permanent member)
Prof. Alex Kisters	South African Committee for Stratigraphy – Archaean sequences (member); South African Committee for Stratigraphy – Pan-African sequences (chair)
Dr Jodie Miller	International Mineralogical Association International Convention (organising committee); Geological Society of South Africa (regional council); Western Cape branch of the Geological Society of South Africa (chair); external moderator for the University of Cape Town (UCT) & Nelson Mandela Metropolitan University (NMMU)
Prof. A Roychoudhury	GEOTRACES programme (South African representative & steering committee member); Council for the International Association of GeoChemistry (member); Africa Earth Observatory Network (AEON) (founder member); Marine Research Institute, University of Cape Town (member); Applied Centre for Climate and Earth Systems Science (ACCESS) (steering committee); National Oceanographic Equipment and Planning Committee
Prof. Gary Stevens	Western Cape Expensive Equipment Programme (REEP) (member); Central Analytical Facility (CAF), Stellenbosch University (director); SARCHi chair for Experimental Petrology

Editorial activities

Prof. Alex Kisters	<i>South African Journal of Geology</i> (editorial board)
Prof A Roychoudhury	<i>Frontiers in Environmental Sciences: Groundwater Resources and Management</i> (associate editor); <i>Frontiers in Marine Science: Ocean Observation</i> (review editor)
Prof. Gary Stevens	Editorial board member of <i>Lithos</i> , <i>Terra Nova</i> & <i>Metamorphic Geology</i>

Research and conferences

Dr Martin Klausen attended the Nordic Geological Winter meeting in Sweden and the Geological Society of America's meeting in Canada. Prof Roychoudhury was host to the ninth meeting of the **GEOTRACES** Scientific Steering Committee; he also did field and experimental work on nanoparticles, funded by the South African National Antarctic Programme (SANAP). Prof Alex Kisters was involved with projects in Namibia which involved field work, structural mapping, sampling and student supervision (NRF-funded Donkerhuk project, Omitiomire Cu project for Craton Mining and Holland's Dome U project for Swakop Uranium). Prof Gary Stevens is the grant-holder for the bilateral SA-France CNRS project on the origin and recycling of the Kaapvaal craton felsic crust (2013-2015).

Awards to staff and students

Dr M Klausen, Dr Jodie Miller and Prof. A Roychoudhury received the SU's Rector's award for general performance. Ms Swana Kelley was awarded the Best Student Poster at the congress of the International Association of Hydrogeologists in Morocco.

Staff matters

The Department welcomes Dr R Tucker as the new lecturer in sedimentology and takes leave of Prof. Abraham Rozendaal who retired after nearly 25 years at SU.

DEPARTMENT OF CHEMISTRY AND POLYMER SCIENCE

THE DEPARTMENT OF CHEMISTRY AND POLYMER SCIENCE IS ONE OF THE PRE-EMINENT RESEARCH DEPARTMENTS IN CHEMISTRY IN SOUTH AFRICA. WE ARE ENGAGED IN A WIDE RANGE OF RESEARCH AREAS, INCLUDING THE LARGEST RESEARCH EFFORT IN POLYMER SCIENCE IN THE COUNTRY.

Research interests

Organic chemistry & medicinal chemistry

Inorganic chemistry & organometallic chemistry

Analytical chemistry

Polymer science

Physical & computational chemistry

Supramolecular chemistry & materials

Research outputs

During 2014 we continued to publish research articles in high-impact journals, some of them among the top 1% of the world's leading scientific journals such as *Chemical Communications*, *Analytical Chemistry*, *Angewandte Chemie International Edition* and *Inorganic Chemistry*. Seven primary research papers from our Department were included in Nature Index 2015 – a unique database that tracks down which institutions made the biggest absolute contribution to high-quality scientific research in a field, region or globally. In Africa, Stellenbosch University leads the chemistry field in terms of outputs per institution:

Institution ▼	AC ▼	FC ▼	WFC ▼
1. Stellenbosch University (SU)	7	6.27	6.27
2. University of Cape Town (UCT)	5	1.50	1.50
3. University of the Free State (UFS)	4	1.39	1.39
4. Cape Peninsula University of Technology (CPUT)	2	1.27	1.27
5. University of KwaZulu-Natal (UKZN)	5	1.01	1.01
6. University of the Western Cape (UWC)	2	0.90	0.90
7. University of Johannesburg (UJ)	1	0.88	0.88
8. Nelson Mandela Metropolitan University (NMMU)	1	0.80	0.80
9. Université Constantine 1	2	0.57	0.57
10. University of Carthage (UCAR)	2	0.44	0.44

[Publication list](#)

[NRF-rated researchers](#)

[Staff list](#)

[Contact us](#)

DEPARTMENTS:

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[Earth Sciences](#)

[Chemistry and Polymer Science](#)

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[Mathematical Sciences](#)

[Microbiology](#)

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[Physiological Sciences](#)

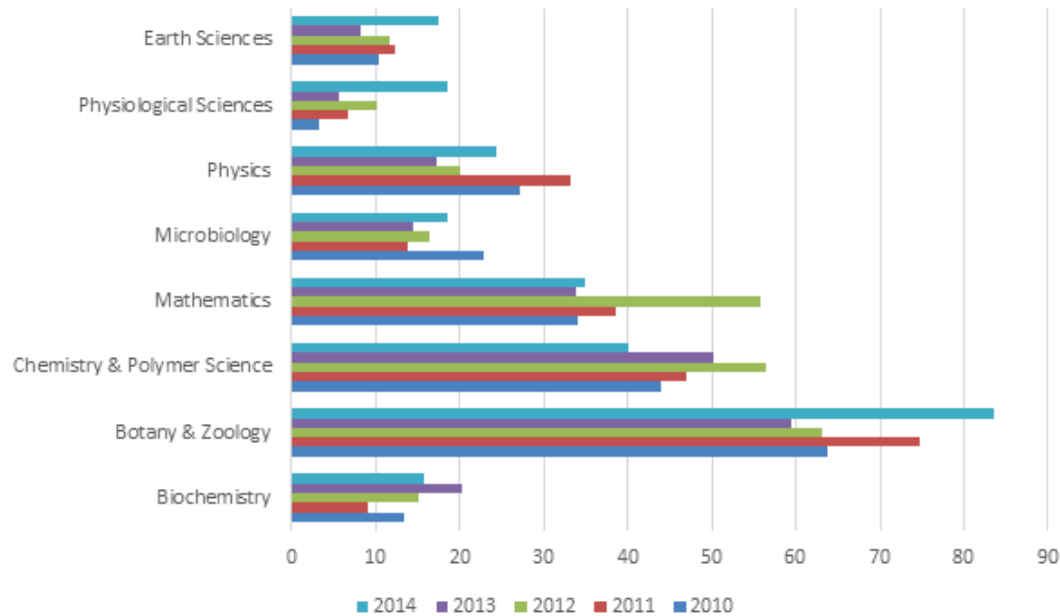


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Research profile

The Faculty of Science's audited research output for publication years 2011 to 2014 shows that we are among the top three departments in the Faculty in terms of audited research outputs. A review of publications that appeared in 2013 and which qualified as being in the top 20% (or higher) in terms of impact factor within specific subcategories of research as defined in the Web of Science, also shows our Department among the top two.

Accredited publication outputs per department per publication year



Currently 18 (60%) of our academic staff members hold NRF-ratings and we are home to two of the four A-rated scientists in chemistry in South Africa – Prof. Bert Klumpermann and Prof. Len Barbour. Prof. Klumpermann and Prof. Barbour also hold two of the eight research chairs in the Faculty – the South African research chairs (SARChI) in Advanced Macromolecular Architectures and in Nano-structured Functional Materials.



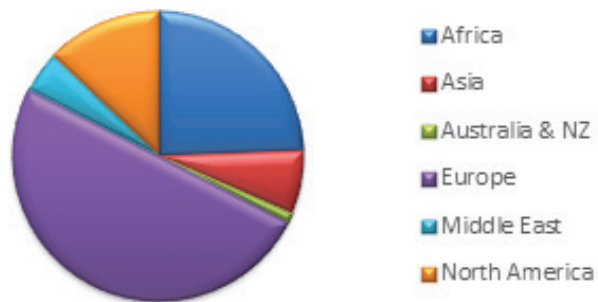
The average age of our academic staff is only 46 years, which indicates that we are a relatively “young” department. All but one of our academic staff members hold a PhD degree.

Age profile of academic staff

Post level	Average age
Professor	55.8
Associate Professor	45.6
Senior Lecturer	43.2
Lecturer	41.1
Departmental average	46

During 2014, the Department hosted 17 postdoctoral fellows from South Africa (5), India (7), Libya (2), Lesotho (1), Poland (1) and China (1).

Proportion of collaborators per region 2014



Collaboration

During 2014 we collaborated with 87 institutions from 25 countries – this includes co-authorship on research papers, research visits, staff and postgraduate student exchanges and other projects resulting from several bilateral agreements. While our footprint in South Africa (16) is large, we most often collaborated with institutions in Germany (14) and the United States of America (9). Click on the map below for a comprehensive list of all our collaborators.



Editorial activities

Prof. Len Barbour	<i>Comprehensive Supramolecular Chemistry, a proposed nine volume reference work (Elsevier) (Co-editor in chief); New Journal of Chemistry (editorial board)</i>
Prof. Willem van Otterlo	<i>South African Journal of Chemistry (editor)</i>
Prof. Bert Klumperman	<i>European Polymer Journal (editor); Transactions of the Royal Society of South Africa (editor-in-chief & editorial advisory board)</i>
Prof. Harald Pasch	<i>International Journal of Polymer Analysis and Characterization (IJPAC) (editorial board); Polymer International (PI) (editorial board); Springer Laboratory book series (editor)</i>

Conferences and workshops

Our researchers presented at 23 national and international conferences during 2014 and we were well-represented at African and international activities to celebrate the International Year of Crystallography. Most notable are the number of plenaries, keynote lectures and invited lectures presented by our researchers: Prof. Harald Pasch delivered four invited and two keynote lectures, while Prof. Bert Klumpermann delivered two invited and two plenary lectures. Other staff members who were invited as keynote speakers or guest lecturers are Prof. Len Barbour, Prof. André de Villiers, Prof. Catharine Esterhuysen and Prof. Peter Mallon.

During 2014 the Department hosted two international conferences:

- South African Chemistry Institute and American Chemical Society Bi-National Organic Chemistry Conference (BOCC 2014) and
- 22nd World Forum on Advanced Materials (POLYCHAR22)



Prof. Selwyn Mapolie delivered the prestigious P.D. Hahn Memorial Lecture at the University of Cape Town.

Service to the scientific community

Dr GE Arnott	Western Cape Branch of the South African Chemical Institute (committee member); National Research Foundation Thuthuka and Blue Skies panel member; NRF Competitive Programme for Rated Researchers panel; NRF Competitive Support for Unrated Researchers panel; 2014 Frank Warren Conference (vice-chair)
Prof. AJ de Villiers	Western Cape Board of the Chromatographic Society of South Africa (ChromSA) (chair)
Prof. C Esterhuysen	South African Crystallography Society (SACrS) (president); International Union of Crystallography Congress (South African representative)
Prof. KR Koch	International Conference on Coordination Chemistry (SA representative on executive planning committee)
Prof. L Klumperman	Royal Dutch Chemical Society (member); American Chemical Society (member); South African Chemical Institute (member); International Society for Biomedical Polymers and Polymeric Biomaterials (member); Council of the Royal Society of South Africa (member); Nanotechnology/drug and vaccine development at the African Cancer Institute (focus area champion)

Dr R Malgas-Enus	National Research Foundation Innovation and Free-standing PhD and Postdoc applications (panel)
Prof. PE Mallon	Western Cape Section of the South African Chemical Institute (chair); 22nd World Forum on Advanced Materials POLYCHAR 22 (chair of the organising committee); National Council of the South African Chemical Institute (SACI) (member); International Scientific Committee of the World Forum on Advanced Materials (POLYCHAR) (member); NRF Blue Skies review panel (member)
Prof. SF Mapolie	Catalysis Society of South Africa (executive committee)
Prof. H Pasch	International Symposium on Polymer Analysis and Characterization (governing board)
Dr R Pfukwa	National Research Foundation Doctoral Scholarship Program (panel); National Research Foundation SA-Romania Research Cooperative (panel); South Africa-United Kingdom Scientific Seminar (organiser)
Prof. AJ van Reenen	World Forum on Advanced Materials Conference POLYCHAR 22 (local organiser)

National and international recognition

Stellenbosch University recognised two of our researchers for research excellence: Prof. Harald Pasch and Prof. Bert Klumperman were honoured with the title Distinguished Professor, and Prof. Pasch and Prof. Klaus Koch received the Vice-Rector's award for research excellence. On a national and international level we also performed well:

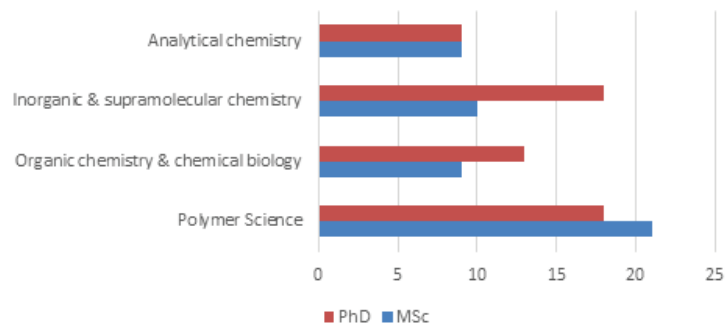
Prof. Len Barbour	2014 South African Chemical Institute's Gold Medal for outstanding research
Prof. André de Villiers	LCGC Emerging Leader in Chromatography Award; One of the 'Top 40 under 40' analytical scientists worldwide, selected by <i>The Analytical Scientist</i>
Prof. Harald Pasch	Elected Fellow of the Royal Society of South Africa
Dr Pfukwa Rueben	Jürgen Springer Prize for a Young Scientist, POLYCHAR-22 World Forum on Advanced Materials
Prof. Klaus Koch	Fellowship & Life Member of the South African Chemical Institute
Dr Rehana Malgas-Enus	Higher Education Consortium/Western Cape Government Special University Fund awarded in support of community interaction projects
Prof. Delia Haynes	Royal Society of Chemistry Journals international authors travel grant



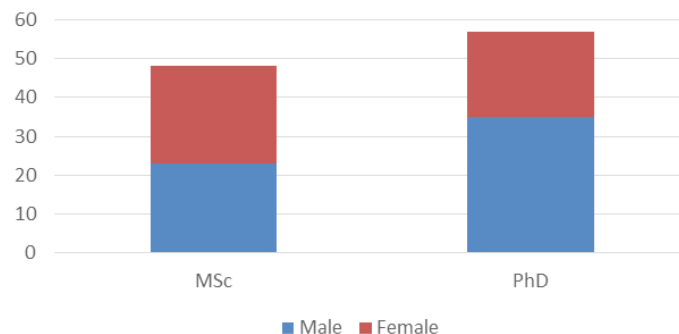
Focus on postgraduate students

THE DEPARTMENT HAS A LARGE COHORT OF 107 FULL-TIME POSTGRADUATE STUDENTS – 49 MSc AND 58 PHD STUDENTS. DURING 2014 WE DELIVERED 15 MSc AND SEVEN PHD GRADUATES.

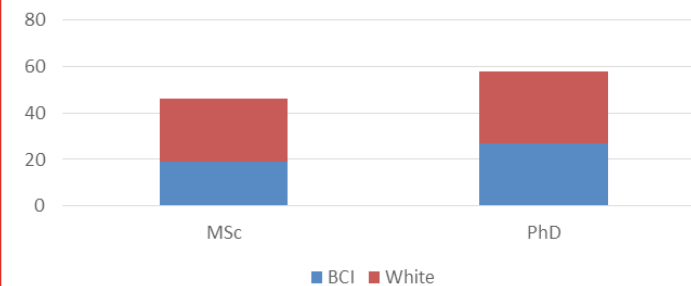
Distribution of postgraduate students per main supervisors



Gender profile of postgraduate students



Diversity profile of postgraduate students 2014



The AlchemUS society, established in 2011, again presented their annual magic show to much amusement

[View here](#)

Our postgraduate students did exceptionally well at several national and international conferences:

Ms Chandré Willemse	Best Oral presentation: Chromatography, Analytika 2014
Ms Shani Barkhuysen	Royal Society of Chemistry Best Student Poster Prize (spectroscopy), Analytika 2014
Ms Varia Nikolayenko	Best oral presentation, SACI/RSC Western Cape Student Symposium 2014
Ms Leandi van der Westhuizen	Wilhelm Frank PhD Scholarship

Staff matters

Three Research Career Advancement Fellows (RCA) joined the Department in 2014 – they are Dr Nonjabulo Gule, Dr Vincent Smith and Dr Andreas Tredoux. Mr EJ Lukhele and Ms C Hendrickse joined our technical staff.

DEPARTMENT OF BIOCHEMISTRY

OUR RESEARCH IS POSITIONED AT THE INTERSECTION OF CHEMISTRY AND BIOLOGY, MOVING FROM MOLECULAR STRUCTURES VIA MACROMOLECULAR ACTIVITY TO BIOLOGICAL FUNCTION. RESEARCH TOPICS RANGE FROM APPLIED STUDIES IN WASTE WATER TREATMENT, POTATO VIRUS SPREAD, CONTRACEPTIVES, DRUG DISCOVERY AND MALARIA TO FUNDAMENTAL WORK IN SYSTEMS BIOLOGY AND P450 FUNCTION.

Research interests

Systems biology

Steroids research

Drug & biocide
discovery

Plant bioinformatics &
molecular systematics

Immunology, pathology
& pathogen detection

Research profile

Prof. Marina Rautenbach registered a new patent via Innovus, Stellenbosch University's technology partner. The patent, Antimicrobial cyclic peptide compositions for plants, aims to reduce the microbial infection of fresh produce and is now available for licensing. This is a novel technology to meet the growing demand for natural biocontrol agents as the world moves to more natural and organic farming practices.

Research outputs per publication year
2010-2014

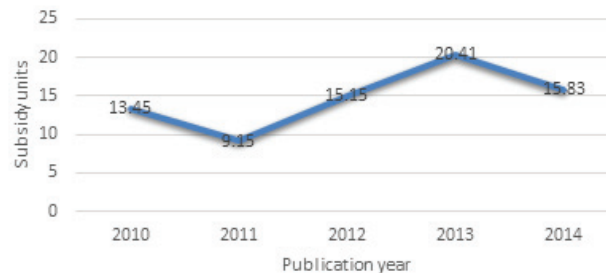



Figure 1 The graph above is based on the audited units for the Department of Biochemistry's research output for publication years 2010-2014.

NRF-rated researchers

Eight of our 14 staff members are rated by the National Research Foundation. The Department is also home to the South African Research Chair (SARCH) in Mechanistic Modelling of Health and Epidemiology, held by Prof. Jackie Snoep.

NRF-RATED RESEARCHERS

1 
Leading international researcher

4 
Internationally acclaimed researchers

3 
Established researchers

[Publication list](#)

[NRF-rated researchers](#)

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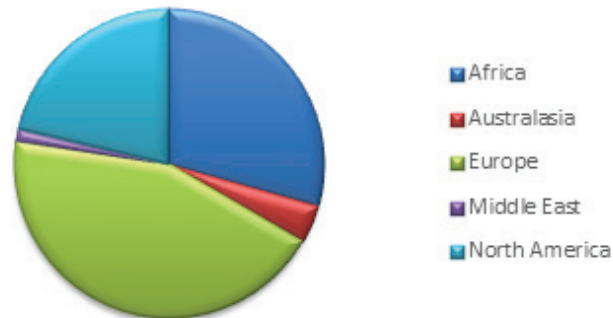
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National and international collaboration

The Department has a large footprint in South Africa, specifically working with agricultural research institutes and food companies such as:

- Elsenburg Agricultural College
- Grootfontein Agricultural Development Institute
- Human Sciences Research Council (HSRC)
- Karl Bremer Hospital
- Klein Karoo Group: Research and Development
- Medical Research Council (MRC)
- Mohair South Africa: Research and Development
- Potatoes South Africa: Research and Development
- Rhodes Food Group: Research and Development
- SABMiller: Research and Development
- South African Rooibos Council: Research and Development

Geographic distribution of collaborators in 2014



On an international level, the Department collaborated with 75 institutions from 14 countries, but most often with institutions from the United States (13) and Germany (11). Click on the map below for a comprehensive list of all our collaborators.



Focus on postgraduate students

The Department has 80 full-time postgraduate students – 20 Honours-, 37 MSc- and 23 PhD-students – and we hosted 13 postdoctoral fellows from South Africa (12) and the United Kingdom (1).

Three of the four PhD-students who graduated in 2014 came from Prof. Marina Rautenbach's research group. During 2014 our postgraduate students and postdocs presented at 16 local and nine international conferences.

Conferences and workshops

The Department hosted two major international conferences in 2014. Prof. Erich Straus delivered a plenary address at the South African Chemical Institute (SACI) and the American Chemical Society (ACS) Bi-national Organic Chemistry Conference (BOCC 2014), held at the Stellenbosch Institute for Advanced Studies (STIAS).

Prof. Dirk Bellstedt was secretary general and chair of the conference organising secretariat for the annual conference of the Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale (AETFAT). This was the largest botanical conference ever held in South Africa with a total of 270 oral and 205 poster presentations.



The Department had a busy year, with staff presenting at nine local and 17 international conferences. Several of our staff members were invited to present their research at workshops or international universities. Prof. Pieter Swart and Dr Donita Africander were invited speakers at the Toxicology Society of South Africa (TOXSA) Workshop. Dr Karl Storbeck was invited to present lectures at the Department of Molecular and Integrative Physiology and Medicine, University of Michigan, and at the Centre for Endocrinology, Diabetes and Metabolism, University of Birmingham. Prof. Johann Rohwer was an invited speaker at the 24th Congress of the South African Society of Biochemistry and Molecular Biology (SASBMB).

Other national and international conferences where our staff members presented their research include:

5th Cold Spring Harbor Laboratory Meeting on Nuclear Receptors and Disease, United States

Potatoes South Africa Annual Research Conference

20th Congress of the International Organization for Mycoplasma, Brazil

Biochemical Society Focused meeting: Coenzyme A and its Derivatives in Cellular Metabolism and Disease, London

4th International Symposium on Antimicrobial Peptides, France

International Study Group for Systems Biology (ISGSB) 16th Meeting, United Kingdom

ERASysApp and Infrastructure for Systems Biology Europe data management meeting, Germany

Computational Modelling in Biology Network's Harmony meeting, United Kingdom

15th International Conference on Systems Biology (ICSB), Australia

TheWorldAcademy of Sciences (TWAS) food biotechnology course, China

XVIth Congress on the Adrenal Cortex (ADRENAL 2014), United States

Gordon Research Conference on Bioorganic Chemistry, United States

19th World Congress on Advances in Oncology and 17th International Symposium on Molecular Medicine, Greece

Editorial activities

Prof. DU Bellstedt

Phytotaxa (associate editor)

Prof. Ann Louw

Steroids (editorial board)

Prof. M Rautenbach

Journal of Microbiological Methods (editorial board)

Prof. JM Rohwer

BioMedCentral Systems Biology (associate editor); *Frontiers in Plant Systems Biology* (review editor)

Prof. JL Snoep

Federation of European Biochemical Society Journal (editor); *Microbiology* (editor); *IET Systems Biology* (editor); *Metabolomics* (editor)

Prof. Amanda Swart

Scientific Reports (editorial board)

Service to the scientific community

Dr D Africander

South African Society of Biochemistry and Molecular Biology (treasurer)

Prof. DU Bellstedt

Technology and Human Resources in Industry Programme (THRIP), Animal Sciences (evaluation panel)

Prof. M Rautenbach

Biochemistry Department, Nelson Mandela Metropolitan University (external examiner)

Prof. JM Rohwer

International Standards for Reporting Enzymology Data Commission (STREND) (member)

Dr Karl Storbeck

South African Society of Biochemistry and Molecular Biology (council member)

Prof. E Strauss

National Research Foundation (evaluation panel)

Prof. Amanda Swart

1st International Rooibos Conference (organising and scientific committee member)

Awards

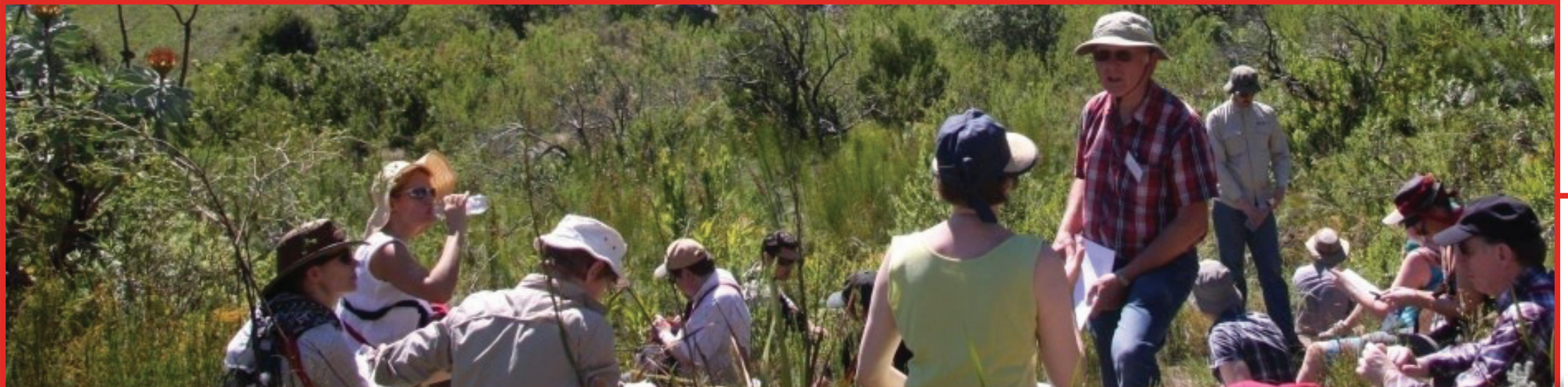
This was an exceptional year for Prof Marina Rautenbach. She was the recipient of the [South African Distinguished Woman Scientist Award](#) (winner in the engineering and physical sciences category) and the Vice-Rector's award for research excellence. Prof. Rautenbach and Prof. Ann Louw were also promoted to full professors.

Staff matters

The Department welcomes Dr M de Villiers, who has been appointed as part of the Research Career Advancement Fellowship Programme (RCA) at Stellenbosch University. The RCA programme provides opportunities for postdoctoral fellows to pursue a career in research and to be mentored for research leadership and academic positions. Our former Departmental Head, Prof. Pieter Swart, was appointed as Vicedean: Research in the Faculty of Science.

Science communication and media

Prof. Dirk Bellstedt (below right) hosted a group of 23 German science journalists, all members of the Wissenschaftspressekonferenz (WPK). He introduced them to the evolution and diversity of African flora during a guided walk in Jonkershoek Nature Reserve. [Read more](#)



DEPARTMENT OF MATHEMATICAL SCIENCES

(Mathematics, Applied Mathematics, Computer Science)

TOGETHER THE DIVISIONS OF MATHEMATICS, APPLIED MATHEMATICS AND COMPUTER SCIENCE FORM THE DEPARTMENT OF MATHEMATICAL SCIENCES AT STELLENBOSCH UNIVERSITY. THE DEPARTMENT HAS 48 ACADEMIC STAFF MEMBERS AND SIX EXTRAORDINARY PROFESSORS AND ASSOCIATE PROFESSORS, A RESEARCH CHAIR AND ONE DST/NRF CENTRE OF EXCELLENCE.

Research interests

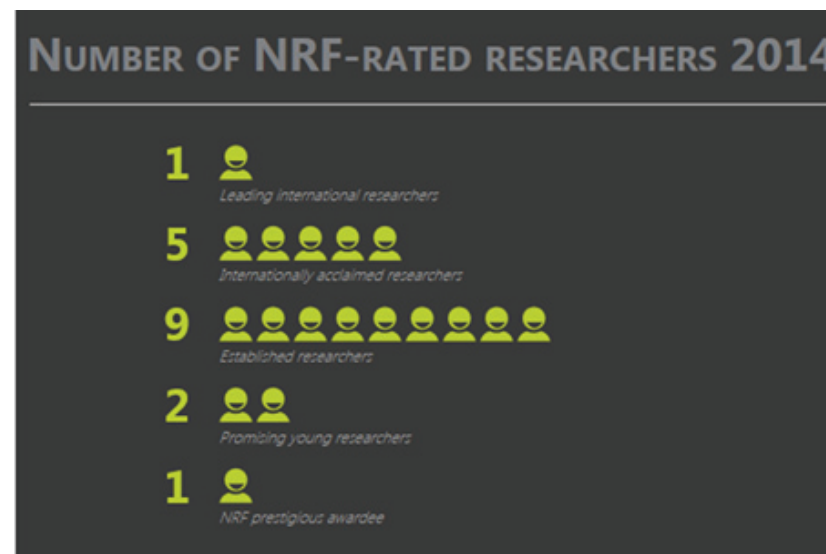
Mathematics	Applied Mathematics	Computer Science
<ul style="list-style-type: none">•Algebra & number theory•Analysis & topology•Foundations of mathematics•Discrete mathematics•Mathematics & computational biology	<ul style="list-style-type: none">•Computer vision, pattern recognition, machine learning•Fluid dynamics & modelling•Numerical analysis & scientific computing•Applied Discrete Mathematics	<ul style="list-style-type: none">•Program verification•Software engineering•Machine learning & computer vision•IP networks•Automata theory & formal languages

Research highlights

Research outputs in Mathematics, Applied Mathematics and Computer Science have been strengthened over the past year. This is reflected by the increased number of publications in journals of high standing, research presentations at national and international conferences, and particularly the strengthening of collaborations with internationally recognised researchers at leading research institutions and industry.

Research profile

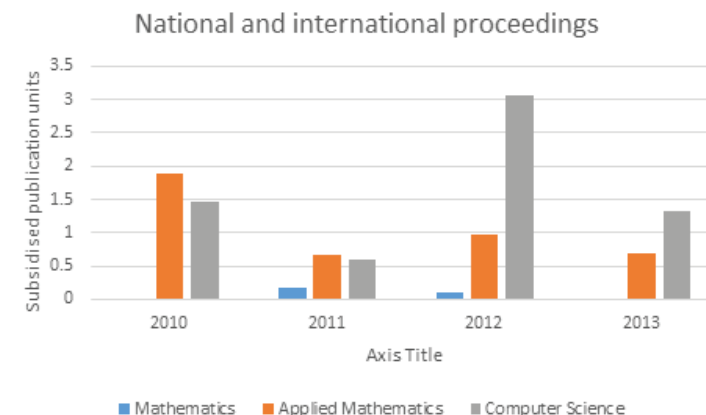
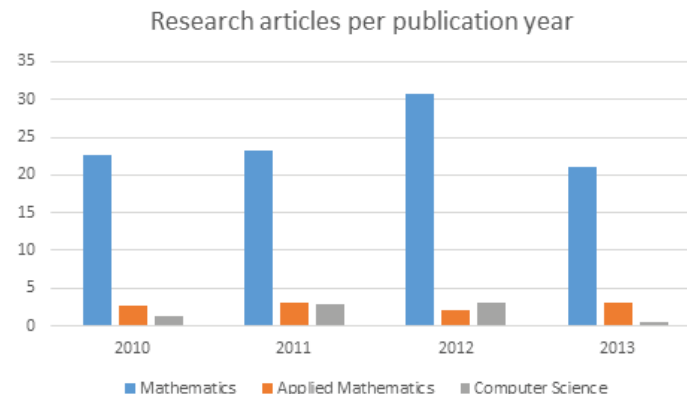
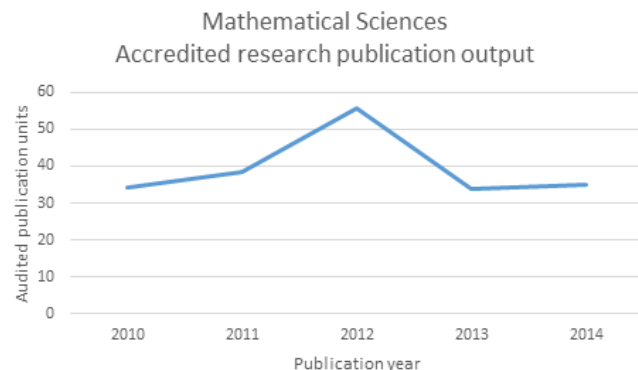
The Department has 18 staff members, including three female scientists, who have been rated by the National Research Foundation. We are home to the DST/NRF Centre of Excellence – the South African Centre for Epidemiological Modelling and Analysis (SACEMA). Together with the African Institute for Mathematical Sciences (AIMS), we co-host the South African research chair (SARCHI) in Mathematical and Theoretical Physical Biosciences, currently held by Prof. Cang Hui.

[Publication list](#)[NRF-rated researchers](#)[Staff list](#)[Contact us](#)

DEPARTMENTS:

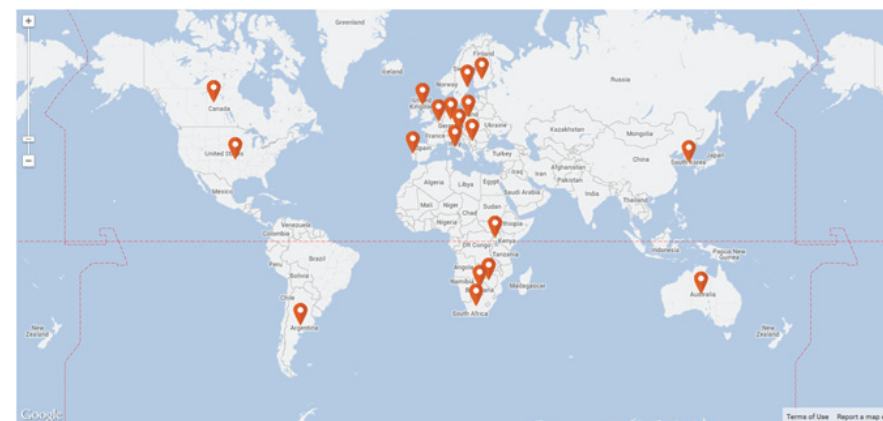
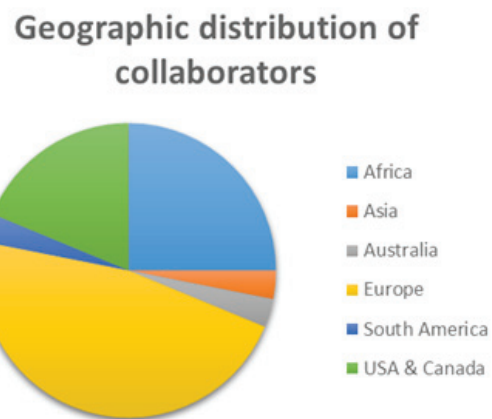
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Research outputs



National and international collaboration

Collaboration with top international universities and institutions significantly enhances our international visibility and the quality of our research. During 2014 we collaborated with over 30 institutions from 19 countries, most notably with institutions from Europe (15), the United States and Canada (6) and South Africa and Africa (8). These collaborations include research visits, co-authoring of research papers, student and staff exchange programmes and co-presenting of workshops and seminars. Click on the map for a comprehensive list of all our collaborators



Local and international recognition for research excellence

Three of our staff members were recognised by top performing first years at Stellenbosch University for their contribution to their academic success in 2013 – they are Dr Karin-Therese Howell, Prof. Lynette van Zijl and Prof. Florian Breuer. Other awards are:

Prof. Stephan Wagner	Stellenbosch University Vice-Rector: Research and Innovation award (research) for staff member with highest number of publications in 2014
Prof. Willem Visser	Most Influential Paper in 2014 award, International Conference on Automated Software Engineering. See Visser et al. Model Checking Programs. Automated Software Engineering, April 2003 Vol 10 (2):203-23
Prof. Bernd Fischer	Gold Medals for Csqe (Certified Software Quality Engineering) and ESBMC (Efficient SMT-Based Context-Bounded Model Checker) in the 3rd International Competition on Software Verification (SV-COMP14), 20th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2014)

Editorial activities

Prof. Ingrid Rewitzky	<i>Quaestiones Mathematicae</i> (associate editor)
Dr Hennie de Villiers	<i>IET Computer Vision</i> (reviewer); <i>Journal of Universal Computer Science</i> (reviewer, machine learning)
Prof. Helmut Prodinger	<i>Theoretical Computer Science</i> (editorial board)
Prof. Brink van der Merwe	<i>Journal of Universal Computer Science</i> (editorial board)
Prof. Lynette van Zijl	<i>Journal of Universal Computer Science</i> (editorial board)
Prof. Willem Visser	<i>Association for Computing (ACM) Transactions on Software Engineering and Methodology (TOSEM)</i> (associate editor)

Service to the scientific community

Prof. Ingrid Rewitzky	African Institute for Mathematical Sciences (AIMS) (executive team member)
Dr Willie Brink	Consortium for Mathematics and Its Applications: Mathematical Contest in Modelling (team advisor)
Prof. Sonja Mouton	Workshop on ordered Banach algebras, Lorentz International Center for Workshops in the Sciences, Leiden (scientific organising committee)
Prof. Bernd Fischer	13th International Conference on Generative Programming: Concepts & Experiences & Automated Software Engineering (steering committee); International Federation for Information Processing Working Group 2.1 Algorithmic Languages and Calculi (member)
Dr Hennie de Villiers	National Research Foundation rating panel for machine learning (reviewer)
Dr Karin Howell	American Mathematical Society (reviewer)
Dr Jaco Geldenhuys	2014 Annual Conference of the South African Institute of Computer Scientists and Information Technologists (programme committee); International Symposium on Software Testing and Analysis (ISSTA 2014) (programme committee); 19th International Symposium on Formal Methods (programme committee); FormaliSE 2014 2nd FME Workshop on Formal Methods in Software Engineering (programme committee)
Prof. Ben Herbst	European Union Framework 7 Program: computer vision (coordinator); EDH-CERN (consultant)
Dr Steve Kroon	1st International Conference on the Use of Mobile ICT in Africa (programme committee)
Dr Milton Maritz	Bureau for Industrial Mathematics (BIMUS), Stellenbosch University (director)
Prof. Farai Nyabadza	Southern Africa Mathematical Sciences Association (SAMSA) (vice-president); Africa Society for Biomathematicians (ASB) (secretary general); Canon Collins Trust (board member)
Prof. Brink van der Merwe	1st International Conference on the Use of Mobile Information and Communications Technology in Africa (UMICTA 2014) (conference organiser); 19th International Conference Implementation and Application of Automata (CIAA) (programme committee member)
Prof. Lynette van Zijl	25th International Workshop on Combinatorial Algorithm (IWOCA) (IWOCA) (programme committee)
Prof. Willem Visser	Association for Computing (ACM) Special Interest Group on Software Engineering (SIGSOFT) (executive team member)

Conferences and seminars

During 2014 staff presented at more than 25 national and international conferences. This included a plenary address by Prof. Ingrid Rewitzky at the Workshop on Information and Uncertainty in the Czech Republic. Prof. Sonja Mouton also delivered a plenary address at the Workshop on Ordered Banach Algebras in The Netherlands. Two staff members were invited to present lectures: Prof. Leon van Wyk at the University of Louisiana at Lafayette in the USA and Prof. Stephan Wagner at Graz University of Technology in Austria. Prof. Wagner also hosted the 3rd Stellenbosch Workshop on Discrete Mathematics, dedicated to Prof. Helmut Prodinger on the occasion of his 60th birthday.

Staff members also presented at the following national and international conferences:

Computer Science Division

Prof. Bernd Fischer	Delivered papers at the 7th International Symposium on High-Level Parallel Programming and Application; the International Conference on Computer-Aided Verification; and the Research Tool Demonstrations Track of the 22nd ACM SIGSOFT International Symposium of the Foundations of Software Engineering
Prof. Brink van der Merwe	Conference presentation at the 14th International Conference on Automata and Formal Languages
Prof. Willem Visser	Conference presentations at the 22nd ACM SIGSOFT International Symposium on Foundations of Software Engineering and the 29th IEEE/ACM International Conference on Automated Software Engineering

Mathematics Division

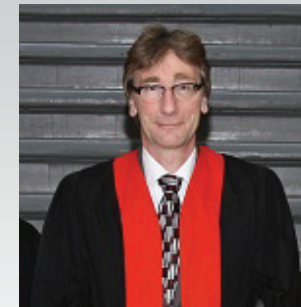
Dr Bruce Bartlett	Sabbatical at the University of Oxford, United Kingdom
Prof. Zurab Janelidze	Contributed talk at Category Theory Conference 2014
Prof. Farai Nyabadza	Sabbatical at the University of Zimbabwe and the Mathematical Biosciences Institute, Ohio State University
Dr Naina Ralaivaosaona	Contribution at the 25th International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA'14); Talk entitled 'The order distribution of subtrees of a tree' at a seminar series in the Department of Mathematics, Heriot-Watt University, Edinburgh; Talk on 'Les représentations en base multiple des nombres entiers' at the Université de Lorraine, Nancy
Prof. Leon van Wyk	Poster presentation, International Congress of Mathematicians (ICM 2014)
Prof. Stephan Wagner	Conference presentation at the 57 th annual conference of the South African Mathematics Society

Three of our staff members delivered their inaugural lectures:

Prof. Stephan Wagner – on "Advanced bean counting - the many facts of enumerative combinatorics"

Prof. Lynette van Zijl – "Computer Science is more than just programming".

Prof. Bernd Fischer – "Seeing Things in the Clouds: Browsing Semi-Structured Data with Tag Clouds over Concept Lattices"



Focus on postgraduate students

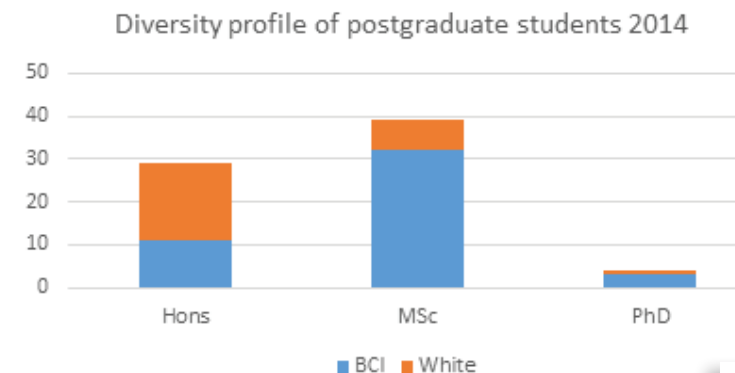
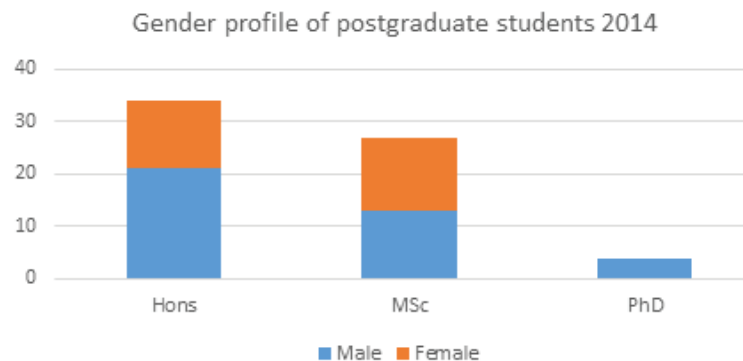
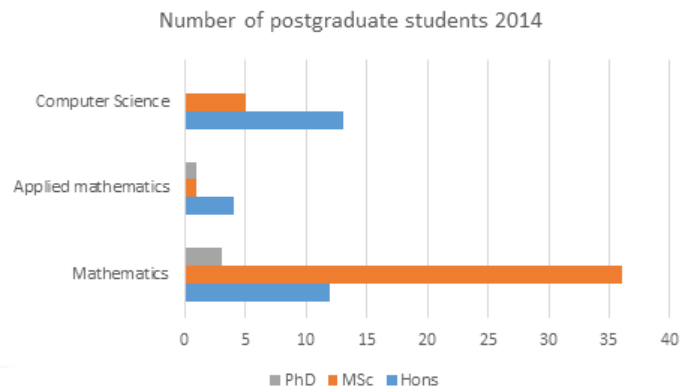
During 2014 the Department had a cohort of over 50 postgraduate students, with another 21 students enrolled at Stellenbosch University through the African Institute for Mathematical Studies (AIMS). Of these, 18 were in the Computer Science Division, six in the Applied Mathematics Division and 51 in the Mathematics Division.

While the gender profile of our postgraduate students remain a challenge, we are confident about their diversity and thereby continue to support institutes such as AIMS. This is evident from the number of our staff members who lectured or acted as supervisors for MSc and PhD students at the institute:

Lecturers: Prof. Stephan Wagner and Dr Dimbinaina Ralaivaosaona (mathematical problem solving); Dr Gareth Boxall (model theory) and Prof. Johan de Villiers (wavelets and subdivision).

Supervisors: Prof. Florian Breuer, Prof. Zurab Janelidze, Prof. Stephan Wagner, Prof. Arnold Keet, Prof. Francois Smit, Dr Hardus Diedericks and Prof. Mapundi Banda.

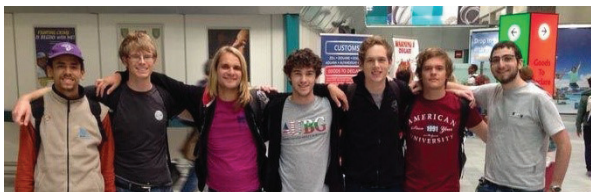
We also hosted five postdoctoral fellows from South Africa (3), Madagascar (1) and the United Kingdom (1).



National and international recognition

Participation of undergraduate and postgraduate students in national and international contests were encouraged by Prof. Stephan Wagner, Dr Steve Kroon and Dr Willie Brink. Two MSc computer science students performed particularly well: Mr Rijnard van Tonder was the runner-up in the 'IBM Beat the Mainframe' competition in New York. Together with Mr **Jacques Marais** he also developed an app called WorkMode which won the student category of the Ericsson Mobile App competition. [Read more](#)

Our Mathematics students performed well at the International Mathematics Competition (IMC) which took place in Bulgaria, as well as the third South African Tertiary Mathematics Olympiad. The Mathematics Division was closely involved with the International Mathematics Olympiad which, for the first time, took place in South Africa. They are Prof. Florian Breuer (coordinator), Prof. Stephan Wagner (problem selection committee and problem captain) and Prof. Dirk Laurie (head coordinator), as well as several postgraduate students.



Taking part in the International Mathematics Competition in Bulgaria From the left, the team members were Liam Baker (Team Leader), Mark Chimes (US), Dylan Nelson (UCT), Petri-Johan Last (US), Elrich Groenewald (US), Michael Hoefnagel (US) and Robert Spencer (UCT).

Students from the Mathematics Division participated in the International Mathematics Competition (IMC) which took place in Blagoevgrad (Bulgaria) from 29 July to 4 August 2014. Mark Chimes, Elrich Groenewald, Michael Hoefnagel and Petri-Johan Last, accompanied by Liam Baker (MSc student and former IMC gold medallist), competed against 324 students from 73 universities. The team almost tripled last year's score (from 28 to 77) and earned three honourable mentions.

Mathematics student Mr Thomas Weighill was the recipient of the prestigious Chancellor's Medal awarded to the most deserving student to obtain a degree at Stellenbosch University, as well as the S2A3 Medal, awarded by the Southern Africa Association for the Advancement of Science to commend outstanding South African science research students graduating at the Masters level.

Dr Dirk Basson received a postdoctoral fellowship from Leiden University.

Staff matters

During 2014 Dr MA Muller retired and Prof M Banda and Dr Stefan van der Walt resigned. We welcome two new appointments, Dr J Brink and Dr R Roux.



DEPARTMENT OF MICROBIOLOGY

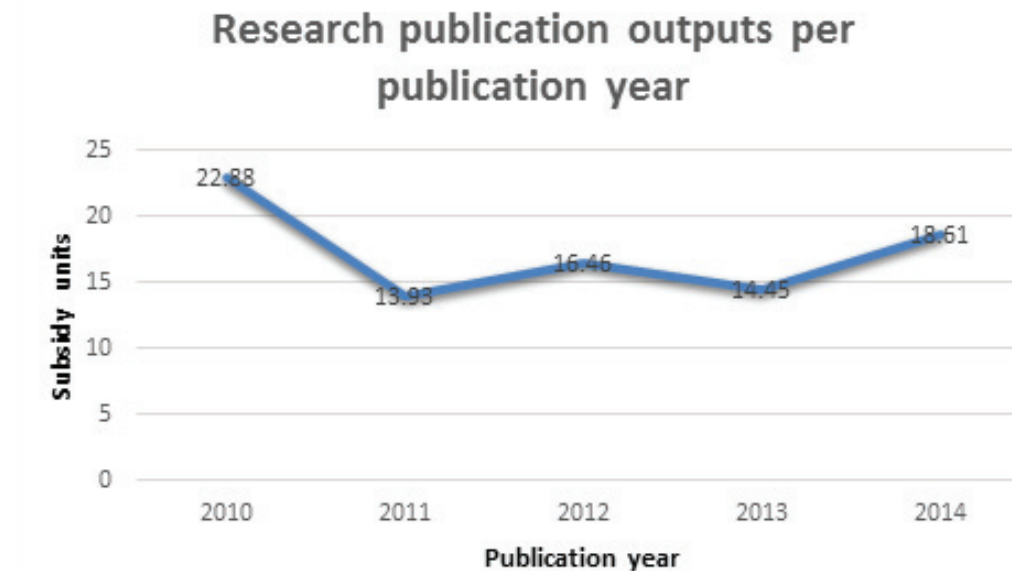
THE DEPARTMENT OF MICROBIOLOGY'S HISTORICAL ROOTS CAN BE TRACED BACK TO 1918 WHEN PLANT PATHOLOGY WAS RECOGNISED AS A FIELD OF EXPERTISE IN THE THEN FACULTY OF AGRISCIENCES. TODAY, THE DEPARTMENT HAS AN ACADEMIC STAFF COMPLEMENT OF 16 FULL-TIME RESEARCHERS, EXTRAORDINARY PROFESSORS AND RESEARCH ASSOCIATES, WORKING IN NINE RESEARCH GROUPS WITH THEIR OWN STATE-OF-THE-ART LABORATORIES.

Research interests

Biological processing of plant material	Taxonomy of lactic acid bacteria
Taxonomy of ascomycetes fungi	Environmental microbiology
Bioprospecting	Microbial ecology
Waste water treatment technologies	Energy research: biofuels

Research outputs

The Department increased the number of research articles published in accredited journals from 30 in 2013 to 34 in 2014 with an average JCR impact factor of 2.9.



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New research chair

Prof. Gideon Wolfaardt, a recognised expert and leading researcher in the biological and engineering aspects of water research, is the first research professor to hold the new Research Chair in Wastewater Management, hosted at the Stellenbosch University Water Institute (SUWI). The focus of the chair will be on scientific and technical advances in wastewater management, water quality, water use and demand, and fostering partnerships to improve the water research and management skills of scientists, engineers and technical personnel. Photo: Anton Jordaan

[Read more](#)

Research and innovation

Two projects originating from the research by postgraduate students in the labs of Prof. Heinrich Volschenk and Prof. Leon Dicks were registered with Innovus, Stellenbosch University's technology partner:

- Improved beta-fructofuranosidase enzyme variant for short-chain fructooligosaccharide (sFOS) production
- A nanowire-array biosensor for the detection and quantification of antigens from pathogenic microorganisms and antibodies directed towards specific antigens – [read more](#)

Collaboration

Nationally, the Department collaborated with Rhodes University, the Cape Peninsula University of Technology and the Universities of KwaZulu-Natal and the Western Cape, as well as industry partners such as the East Rand Water Care Company (ERWAT) and Eskom. On an international level, research groups collaborated mostly with institutions from North America and Europe.



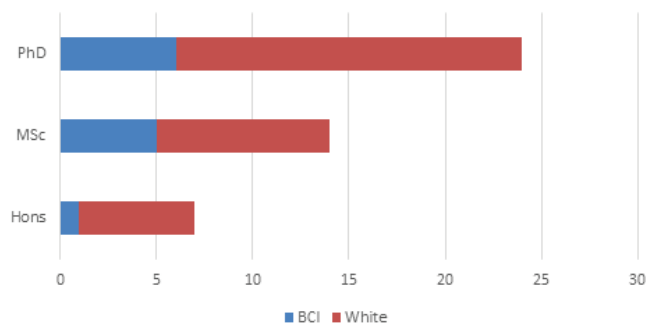
NRF-rated researchers

Most of our academic staff have been rated by the National Research Foundation as internationally acclaimed (4) or established researchers (3).

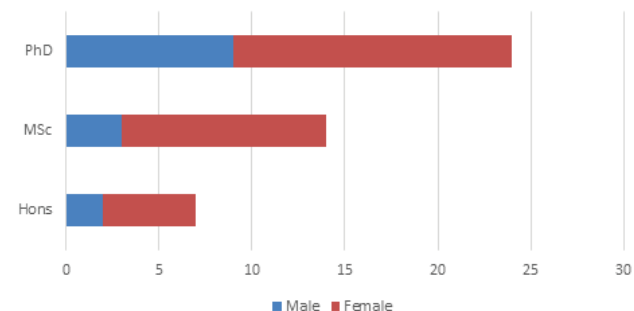
Focus on postgraduate students

During 2014 the Department had a cohort of 45 postgraduate students – seven Honours, 14 MSc and 24 PhD students. Of this group, three MSc and two PhD students graduated, while our former head of department and acting dean, Prof. Douglas Rawlings, earned the much coveted Doctor of Science degree. The Department also hosted six postdoctoral fellows from South Africa (5) and India (1).

Diversity profile of postgraduate students



Gender profile of postgraduate students



Conferences and workshops

Staff and postgraduate students presented at a number of conferences, such as the:

- First Global Soil Biodiversity Conference, France
- Bioenergy Workshop, South Africa
- 4th International Conference on Novel Enzymes, Belgium

PhD student Mr Ferdinand Postma attended an Advanced Course on Environmental Biotechnology at Delft University of Technology in The Netherlands.

Editorial activities

Prof. A Botha	<i>Canadian Journal of Microbiology</i> (editorial board); <i>FEMS Yeast Research</i> (editorial board);
Prof. LMT Dicks	<i>Probiotics and Antimicrobial Proteins</i> (editorial board); <i>Beneficial Microbes</i> (editorial board); <i>Annals of Microbiology</i> (editorial board); <i>Bioscience of Microbiota, Food and Health</i> (editorial board); <i>South African Journal of Enology and Viticulture</i> (editor-in-chief)
Prof. K Jacobs	<i>Mycology</i> (editorial board)
Prof. GM Wolfaardt	<i>Canadian Journal of Microbiology</i> (assistant-editor); <i>Applied and Environmental Microbiology</i> (editorial board)

Service to the scientific community

Prof. A Botha	Water Research Commission projects (reference group member); Materials Research Group (MRG) Users Advisory Board of the BioImprove Programme in Sweden (member); South African Academy of Science (member)
Prof. TE Cloete	Water Research Commission (member); Council for Scientific and Industrial Research (board member)
Prof. LMT Dicks	South African Academy of Science (member)
Dr W Kahn	Royal society of Chemistry (member)
Prof. B Prior	South African Academy of Science (member)
Prof. DE Rawlings	South African Academy of Science (member)
Prof. WH van Zyl	20th International Symposium on Alcohol Fuels (ISAF) (chair); BioImprove Programme Sweden (advisory board); South African Academy of Science (member)
Dr H Volschenk	South African Society for Microbiology (SASM) (member & publications secretary)
Prof. G Wolfaardt	Stellenbosch University Water Institute (director)

Funding

The Department secured international funding from the University of Antwerpen (Belgium), the British Council (United Kingdom), Nuclear Waste Management Organization (Canada) and the Natural Sciences and Engineering Research Council of Canada. On a national level, major new funders from the private sector includes Eskom, Exxaro, FlowCentric and the East Rand Water Care Company (ERWAT).

DEPARTMENT OF PHYSICS

THE DEPARTMENT OF PHYSICS AT STELLENBOSCH UNIVERSITY HAS A PROUD HISTORY IN PHYSICS, PRODUCING OUTSTANDING RESEARCH AND MANY EXCELLENT GRADUATES SINCE 1903. WE OFFER FOCUSSED STUDY PROGRAMMES IN NUCLEAR, RADIATION AND HEALTH PHYSICS, THEORETICAL PHYSICS AND LASER PHYSICS ON UNDERGRADUATE AND POSTGRADUATE LEVEL.

Research interests

Theoretical physics

- Condensed matter
- Complexity

Nuclear physics

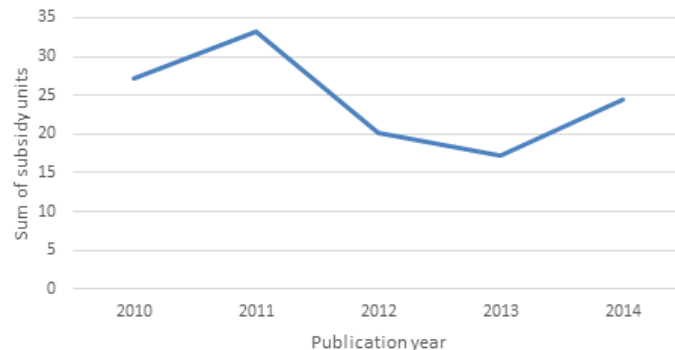
- Nuclear structure
- Nuclear reaction mechanisms
- Radiation and health physics
- Applied nuclear physics
- Physics education

Laser physics

- Spectroscopy
- Ultrafast science

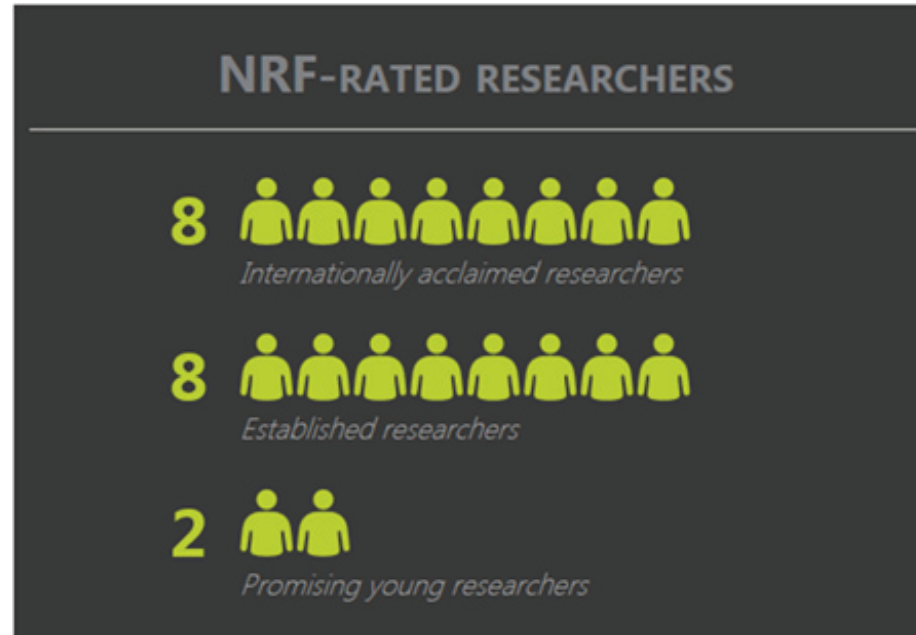
Research activities

Accredited publication outputs



NRF-rated researchers

In 2014 four staff members were newly rated by the National Research Foundation – they are Prof. H Touchette, Dr F Cinti, Dr JJ van Zyl and Dr Pieter Neethling.



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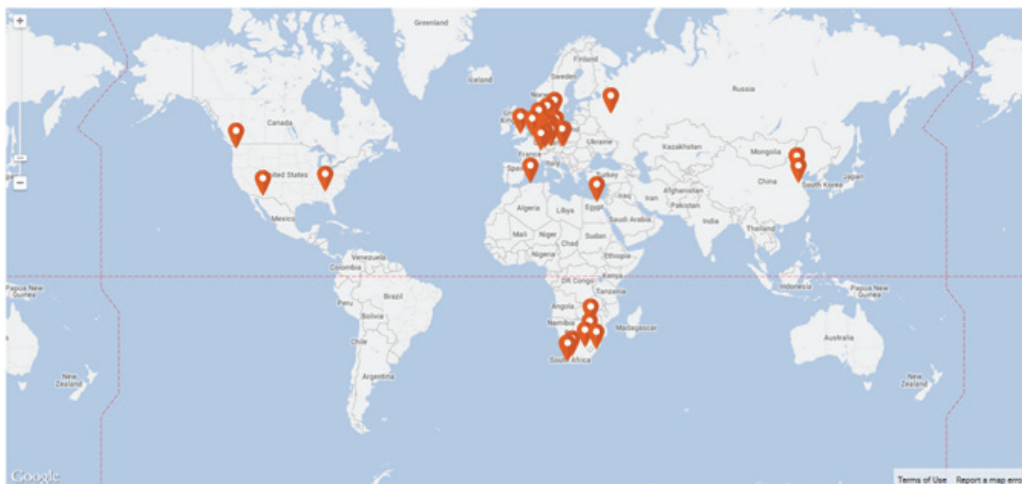
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Collaboration

On a national level the Department collaborated with the universities of the Free State, Cape Town, Western Cape and Zululand. Further in Africa we have ties with the University of Science and Technology in Zimbabwe, the Centre for Advanced Technology Development in Algeria, and the National Institute of Laser Enhanced Sciences in Egypt. Click on the map below for a comprehensive list of all our collaborators.



Service to the scientific community

Staff members were closely involved with several national councils, organisations and schools, as well as with the organising of local and international conferences.

Prof. EG Rohwer	South African Institute of Physics (SAIP) Photonics Division (chair); Photonics Initiative of South Africa (PISA) (steering committee)
Prof. HB Geyer	Stellenbosch Institute for Advanced Studies (STIAS) (director)
Dr H Kriel	African Institute for Mathematical Sciences (executive team)
Prof. KK Müller-Nedebock	South African Institute of Physics (SAIP) (board member); SAIP Computational and Theoretical Physics Division (chair); School on Geometry and Topology in Soft Matter, Optics and Biological Systems, South Africa (local organiser)
Prof. RT Newman	Physics Advisory Committee for the Separated Sector Cyclotron Facility at iThemba LABS (member); Workshop: Towards a South African Underground Laboratory, hosted by Stellenbosch University and iThemba LABS (co-organiser)
Prof. FG Scholtz	National Institute for Theoretical Physics (NITheP) (director); South African Institute of Physics (SAIP) (board member); SAIP Theoretical Physics Division (chair)
Prof. HPH Schwöerer	Laser Research Institute SU (director); Workshop on New Trends and Phases II: Spectroscopy of Organic Matter, South Africa (chair); Lecture series at Femtosecond Laser Spectroscopy workshop, African Laser Centre (program chair)
Prof. Hubertus von Bergmann	African Laser Centre (director)
Prof. BIS van der Ventel	Workshop: Relativistic description of scattering reactions from stable and unstable nuclei, South Africa (organiser)
Prof. H Weigel	Chris Engelbrecht Summer School, South Africa (principal organiser)
Prof. SM Wyngaardt	Towards a South African Underground Laboratory Workshop, South Africa (co-organiser)





Dr Christine Steenkamp was the principle organiser for the Women in Physics in South Africa (WiPiSA) 'Women in Physics Lunch' held at Stellenbosch University in September 2014. Photo: Wiida Fourie-Basson



Prof. Erich Rohwer was chair of the African Laser Centre's workshop on femtosecond laser spectroscopy, hosted at the Department of Physics at SU.

Conferences and other research activities

Prof. HC Eggers	Received research visits from Prof. Thomas Trainor, Center for Experimental Nuclear Physics and Astrophysics, University of Washington (USA) and Dr P Lipa from Nielsen Consulting
Prof. KK Müller-Nedebock	Invited speaker at the 14th Dresden Polymer Discussion: Understanding of Reinforcement in Polymer Networks and Melts, Leibniz-Institut für Polymerforschung, Dresden (Germany); attended the Physics of Soft and Biological Matter Conference, European Physical Society (United Kingdom)
Dr Pieter Neethling	Presented at the South African Institute of Physics Annual Conference (South Africa)
Prof. RT Newman	Journal of Environmental Radioactivity (Elsevier) (editorial board)
Prof. HPH Schwoerer	Presented at Physikalische Chemie, Fritz-Haber Institut der Max-Planck Gesellschaft (Germany); Physikalisches Institut, University of Würzburg (Germany); L'Institut de Physique, Université de Rennes (France); Gordon Research Conference on Ultrafast Dynamics in Cooperative Systems (USA); Department of Chemistry, McGill University (Canada)
Prof. H Weigel	Presented paper at the annual conference of the South African Institute of Physics

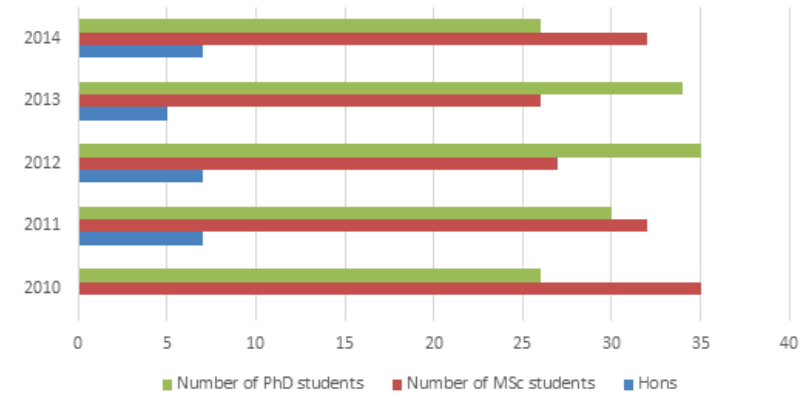
Focus on postgraduate students

During 2014 the Department produced 12 MSc and eight PhD graduates from a large cohort of 65 postgraduate students registered (seven Honours, 32 MSc and 26 PhD students). In a first for South Africa, Dr Melanie McLaren (29) produced the first quantum entanglement experiment in Africa as part of her research into quantum optics.

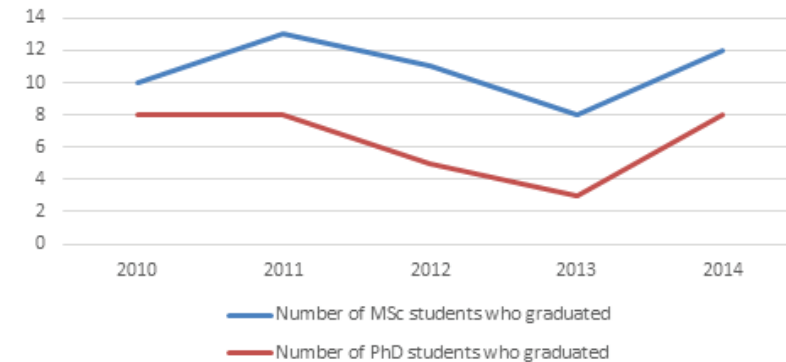
[Read more](#)



Number of postgraduate students 2010-2014



Number of PhD & MSc students who graduated 2010-2014



Our postgraduate students had a particularly good year, with 17 presentations and posters at three international and four local conferences. PhD student Ms Ntombizikhona B Ndlovu also visited the Frank Laboratory for Neutron Physics at the Joint Institute for Nuclear Research in Russia for her research on using nuclear physics techniques to provide data on air pollution levels.

Awards

Twelve staff members received recognition from Stellenbosch University for excellent performance when they were awarded the SU Rector's Performance Award for 2014. They are C April, SH February, JN Kriel, GJ Louwrens, Prof. KK Müller-Nedebock, Dr PH Neethling, Prof. P Papka, H Randall, Prof. EG Rohwer, Dr CM Steenkamp, JJ van Zyl en Prof. H Weigel.

Our postgraduate students walked away with nearly all the major awards in photonics at the annual conference of the South African Institute for Physics:



Mr L Makathini	Best oral presentation by a PhD student in Nuclear Physics
Mr L Maweza	Best technology development by PhD student
Ms M McLaren	Best poster & publication by PhD student in Photonics
Ms I Minda	Best oral presentation by a MSc student in Photonics
Mr D Naidoo	Best oral presentation by a PhD student in Photonics
Mr D Spangenberg	Best oral presentation & publication by PhD student in Photonics
Mr J van Zyl	Best oral presentation by a doctoral student in theoretical and computational physics

Other awards

Mr H Fourie	Most outstanding research in the radiation dosimetry field for his oral presentation, 52nd SA Association for Physicists in Medicine (SAAPMB) congress, South Africa
Ms A Suleiman	First Prize, SPIE Winter College on Optics at the International Centre for Theoretical Physics (ICTP), Italy

Meiring Naudé medal

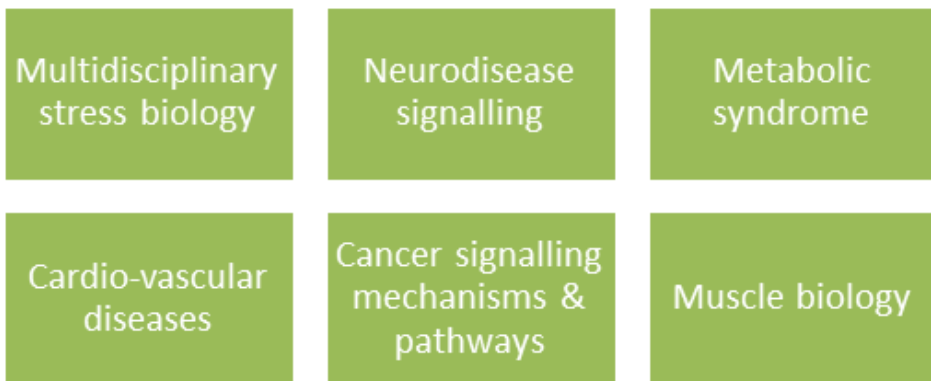
The Meiring Naudé medal for the top student in physics was awarded to Mr Zander Lee. The medal is awarded annually to the top student who obtained at least 80% in his or her BSc Honours programme as well as an average of at least 60% for each module in the programme. Mr Lee was also the recipient of the Dean's award for 2014 for continuous excellent performance. The solid silver medal is awarded annually to a BSc Honours student who scores the highest average percentage throughout both the BSc and the BSc Honours programmes.



DEPARTMENT OF PHYSIOLOGICAL SCIENCES

AT THE DEPARTMENT OF PHYSIOLOGICAL SCIENCES WE INVESTIGATE AND DEVELOP INNOVATIVE SOLUTIONS TO HEALTH ISSUES THAT POSE A SERIOUS CHALLENGE TO SOCIETY. WE FOLLOW AN INTEGRATIVE APPROACH THAT SPANS ALL LEVELS OF ORGANISATION, FROM THE MOLECULE TO THE WHOLE ORGANISM.

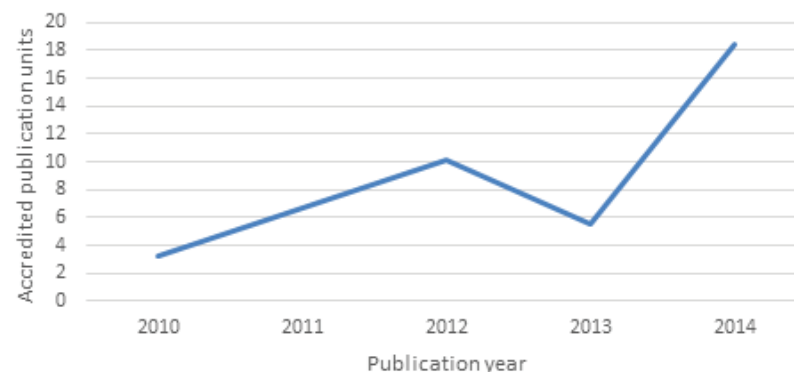
Research interests



Research output

During 2014 the Department reached an all-time high with 27 research articles published in accredited journals. This is nearly double our research output from 2012 and is the result of a strategic realignment of research activities and groupings.

Accredited publication units per publication year
2010-2014



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NRF-rated researchers

Five of our eight academic staff members are rated by the National Research Foundation:

Internationally acclaimed researcher	
Prof. Kathy Myburgh	skeletal muscle biology
Established researcher	
Prof. Faadiel Essop	cardiac metabolism
Prof. Carine Smith	stress biology
Prof. Anna-Mart Engelbrecht	cell-death and signalling
Promising young researcher	
Dr Ben Loos	neuro-disease signalling

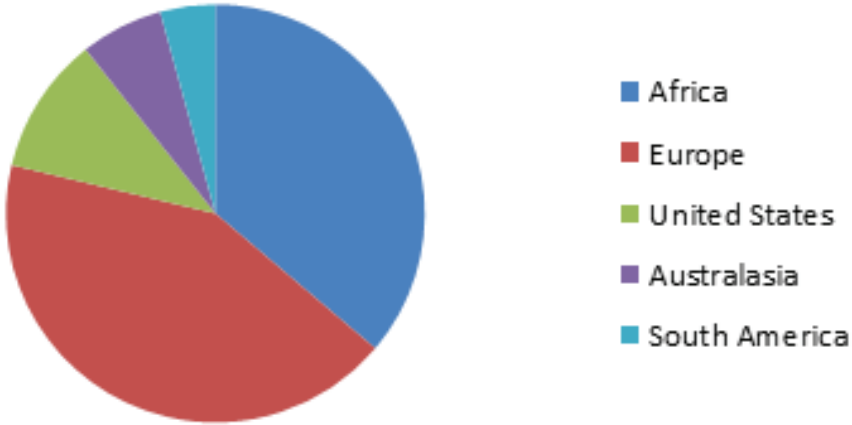
Collaboration

Researchers collaborated with 47 institutions from 21 different countries. Our strongest international collaborations are with researchers and institutions in the United Kingdom and the United States and with multinational companies such as Janssen Research and Development and Pfizer. We also increased our footprint in Africa, working with institutions in Zimbabwe, Botswana and Nigeria.

Other significant collaborations include Prof. Faadiel Essop’s appointment as a visiting professor at the University of La Réunion (France) and his election as a member of the Council of the South African Society for Cardiovascular Research. Dr Ben Loos visited Prof. Hiromi Imamuri at the Hakubi Center for Advanced Research and Graduate School of Biostudies at Kyoto University (Japan) and Prof Esther Wong at Nanyang Technological University (Singapore).

Click on the map for a comprehensive list of our collaborators worldwide.

Geographic distribution of collaborators 2014



Service to the scientific community

Prof. Faadiel Essop	Physiological Society of Southern Africa (president); Cardiovascular Section of the American Physiological Society (fellow); International Committee of the American Physiological Society (elected member); African Association of Physiological Sciences (elected council member)
Prof. A-M Engelbrecht	South African Society for Cardiovascular Research (executive committee); Muscle Biology Center, Kentucky University, USA (associate member)
Prof. KH Myburgh	Euro-Mediterranean Institute for Science and Technology (associate and division leader); Institute of Human Performance, Rehabilitation and Technology at the Centre for Research and Technology (CERETETH), Greece (external mentor)
Dr Ben Loos	South African National Committee of the International Union of Physiological Sciences - SANC-IUPS (capacity building delegate); Physiology Society of Southern Africa (treasurer and secretary); Microscopy Society of Southern Africa annual conference proceedings 2014 (conference convenor and co-editor)
Dr Theo Nell	NRF DAAD/PhD/MSc Panels Member; SU Research Ethics Board Member

Conferences and workshops

Prof. Faadiel Essop	Experimental Biology 2014, Symposium on cardiac diseases (chair); South African Hearth Association annual congress (plenary speaker)
Prof. Anna-Mart Engelbrecht	20 th International congress on Cell Death in Diseases (organiser)
Dr Ben Loos	Microscopy techniques: Cell and Developmental Biology Symposium (presenter); 20 th International Congress on Cell Death in Diseases (keynote speaker); Key Stone Symposia – Autophagy: Fundamentals to Disease (presenter)
Prof. KH Myburgh	Hellenic Society for Biochemistry and Exercise Physiology (keynote speaker); Cell and Developmental Biology Symposium (presenter); South African Society for Biochemistry and Molecular Biology Conference (invited speaker); American College of Sports Medicine (poster); Advances in Skeletal Muscle Biology in Health and Disease Conference (poster)
Dr Theo Nell	2014 Experimental Biology Conference (poster presentation)
Dr Bali Sishi	20th annual ICDS conference on Cell Death and Diseases (invited speaker); 42nd Physiological Society of Southern Africa; 22nd European Cell Death Organisation (ECDO) Euroconference on Apoptosis (poster presentation)

Editorial activities

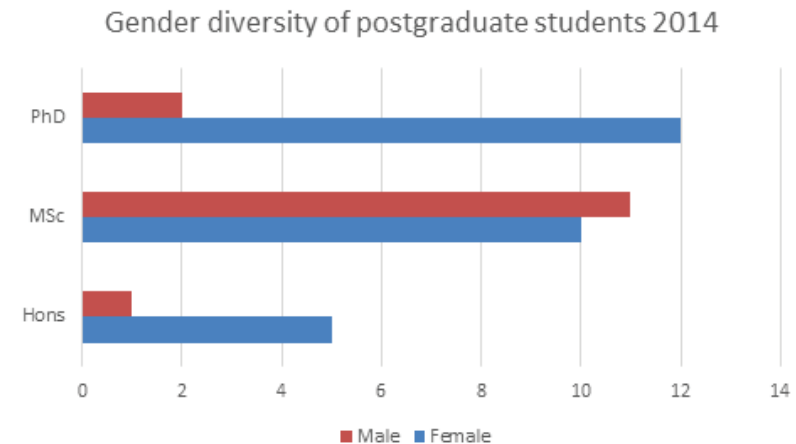
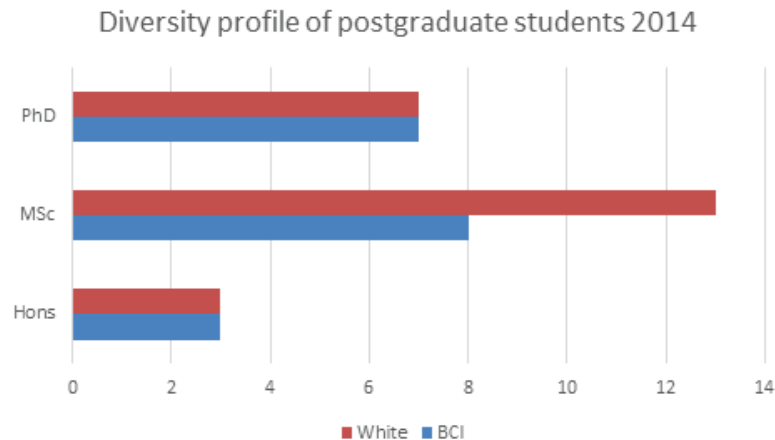
Prof. Faadiel Essop	<i>Journal of African Association of Physiological Sciences</i> (editorial board); <i>International Journal of Clinical and Experimental Physiology</i> (editorial board); <i>PLoS One journal</i> (academic editor); <i>American Journal of Physiology Heart and Circulatory Physiology</i> (editorial board); <i>Advanced Biomedical Research</i> (editorial board)
Prof. A-M Engelbrecht	<i>International Journal of Biomedical Sciences</i> (editorial board)
Prof. KH Myburgh	<i>Biomed Central Physiology</i> (section editor); <i>Medicine and Science in Sports and Exercise</i> (editorial board); <i>Inflammopharmacology</i> (editorial board)
Prof. Carine Smith	<i>Inflammopharmacology</i> (editorial board)

Awards

Prof. Kathy Myburgh was one of seven researchers in the Faculty of Science who has been honoured with the title Distinguished Professor by Stellenbosch University.

Focus on postgraduate students and postdocs

The Department has 41 full-time postgraduate students on Honours (6), MSc (21) and PhD (14) level and we are doing well in terms of our diversity profile – 40% of our postgraduate students are from designated groups (Black, Coloured and Indian) and 55% are female. During 2014 we hosted three postdoctoral students from South Africa, Zimbabwe and Ireland.



Our postgraduate students also performed well at several national and international conferences:

Ms Liz Louw	Best Microscopy Images award, annual congress of the Microscopy Society of South Africa
Mr Yigael Powrie	Award for most promising upcoming microscopist, annual congress of the Microscopy Society of South Africa
Ms Toni Goldswain	Second place for best oral presentation, 20th annual ICDS conference on Cell Death and Diseases
Ms Natasha Driescher	Best poster, annual congress of the Physiology Society of Southern Africa
Ms Caleigh Opperman	Second place for best oral presentation, annual congress of the Physiology Society of Southern Africa
Ms Megan Mitchell	Third place for best oral presentation, annual congress of the Physiology Society of Southern Africa



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Central Analytical Facility (CAF)	Sentrale Analitiese Fasiliteit (SAF)

BIOCHEMISTRY / BIOCHEMIE

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MACUAMULE C. Coenzyme A biosynthesis and utilization in *Plasmodium falciparum*: drug targets for antimalarial chemotherapy. PhD(Bioch), 2014. 178 pp. Promotor: Strauss E. Co-promoter: Saliba KJ.

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Masters completed / Magister afgehandel

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CENTRAL ANALYTICAL FACILITY / SENTRALE ANALITIESE FASILITEIT

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Department of Biochemistry		
Leading international researcher	Prof Jannie Hofmeyr	systems biology and complexity studies
Internationally acclaimed researcher	Prof Johann Rohwer	systems biology
	Prof Jacky Snoep	systems biology
	Prof Erick Strausss	mechanistic enzymology and inhibitor development
	Prof Pieter Swart	adrenal steroidogenesis, affinity separation and protein immobilisation
Established researcher	Prof Dirk Bellstedt	molecular systematics and immunology
	Prof Ann Louw	steroid receptors, bioactivity of honeybush
	Prof Amanda Swart	bioactivity of rooibos and <i>Sutherlandia frutescens</i>
Department of Botany and Zoology		
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	Prof Terry Robinson	evolutionary genetics and phylogenomics of mammals
Internationally acclaimed researcher	Prof Conrad Matthee	molecular systematics and phylogeography
	Prof Guy Midgley	Global Change Biology
	Prof Valdon Smith	Antarctic and Southern Island biology and ecology
	Prof Michael Cherry	behaviour ecology
	Prof Bruce Anderson	plant-animal interaction
Established researcher	Dr Savel Daniels	molecular systematics, phylogeography and conservation of invertebrata
	Prof Leanne Dreyer	evolution of Cape Flora
	Prof LeFras Mouton	evolutionary ecology of lizards
NRF Prestigious Awardee	Prof Alex Valentine	molecular physiology of host-microbe interactions of legumes in phosphorus deficient soils

Promising Young Researcher	Dr Susanne Clusella-Trullus	thermal adaptation of ectotherms and implications for climate change
	Prof Allan Ellis	evolutionary ecology of plants and insects
	Dr Jaco Le Roux	evolutionary biology and ecology of plant invaders
	Dr Nox Makunga	medicinal plant biotechnology
	Prof Anton Pauw	evolutionary ecology of plants and their pollinators
	Dr Carol Simon	marine invertebrate reproduction and polychaete worm taxonomy
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Internationally acclaimed researcher	Prof Ben Burger	chemical communication in living organisms
	Prof Harald Pasch	analytical polymer science, multidimensional chromatography
	Prof Willem van Otterlo	organic synthesis and medicinal chemistry
	Prof Helgard Raubenheimer	ligand design aimed at applications in homogeneous catalysis; gold chemistry
	Prof Klaus Koch	multinuclear NMR spectroscopy and platinum group metals chemistry

Established researcher	Prof Peter Mallon	complex polymer materials and polymer nano-composites
	Prof Delia Haynes	crystal engineering, chemistry of main group elements
	Prof Selwyn Mapolie	homogeneous catalysis via dendrimeric complexes
	Prof Catharine Esterhuysen	intermolecular interactions
	Prof Ivan Green	small molecules syntheses for medicinal application
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	Prof Albert van Reenen	structure-property relationships
	Prof Robbie Luckay	ligand design for metal ion coordination in industrial and medical applications
Promising Young Researcher	Prof André de Villiers	separation science fundamentals and applications
	Dr Gareth Arnott	inherently chiral calixarenes; asymmetric methodology
	Dr Stephan Pelly	medicinal chemistry

Department of Earth Sciences

Internationally acclaimed researcher	Prof IS Buick	metamorphic petrology, geochronology and isotope geochemistry
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Established researcher	Dr S Fietz	marine biogeochemistry
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Department of Mathematical Sciences

Leading international researcher	Prof Helmut Prodinger	analysis of algorithms, number theory and combinatorics
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Internationally acclaimed researcher	Prof Ben Herbst	computer vision and machine learning
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	Prof Stephan Wagner	Graph theory and combinatorics
	Prof Willem Visser	software failure, software engineering and software development
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Established researcher	Prof MK Banda	numeral methods for vlow and transport processes
	Prof Florian Breuer	number theory
	Prof Bernd Fischer	software engineering
	Dr Jaco Geldenhuys	software engineering, specifically model checking and process algebra
	Prof Sonja Mouton	banach algebras and spectral theory
	Dr Farai Nyabadza	mathematical biology
	Prof Ingrid Rewitzky	mathematics of computer science
	Prof Brink van der Merwe	automata theory
	Prof Lynette van Zijl	theoretical computer science and asisstive technologies
Promising young researcher	Dr Karin-Therese Howell	algebra
	Dr Zurab Janelidze	category theory and universal algebra
	Dr Gareth Boxall	model theory, logic
NRF Prestigious Awardee	Prof Cang Hui	invasion biology, mathematical ecology

Department of Microbiology

Internationally acclaimed researcher	Prof Eugene Cloete	water biotechnology
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	Prof Emile van Zyl	bioethanol from plant material and expression of foreign proteins in yeast and fungi
Established researcher	Prof Marinda Bloom	fungal bioprocessing
	Prof Karin Jacobs	microbial ecology
	Dr Heinrich Volschenk	bioprospecting for enzymes and expression of foreign proteins in yeast
Promising young researcher	Prof Alf Botha	yeast and fungal ecology

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NEW APPOINTMENTS

Mr EJ Lukhele
Ms C Hendrickse

DEPARTMENT OF EARTH SCIENCES

ACADEMIC

Prof IS Buick
Prof JD Clemens
Dr S Fietz
Dr R Heyn
Prof A Kisters
Dr M Klausen
Dr J Miller
Prof A Roychoudhury Departmental chair
Prof A Rozendaal
Prof G Stevens
Dr R Tucker

EXTRAORDINARY PROFESSORS

Dr I Basson
Prof D Frei
Prof A Gerdes

SUPPORT STAFF

Ms L Conradie
G Olivier
F Timney

NEW APPOINTMENTS

Dr R Tucker

RETIRED

Prof A Rozendaal

**DEPARTMENT OF MATHEMATICAL SCIENCES
(MATHEMATICS, APPLIED MATHEMATICS, COMPUTER SCIENCE)**

ACADEMIC STAFF

Prof IM Rewitzky	Professor and Executive head: Mathematical Sciences
Prof MK Banda	Professor
Dr B Bartlett	Lecturer
Mr W Bester	Junior Lecturer
Dr G Boxall	Lecturer
Prof F Breuer	Professor and Head: Mathematics division
Dr WH Brink	Senior Lecturer
Dr J Brink	Senior Lecturer
Ms EJ Burger	Junior Lecturer
Dr J Coetzer	Senior Lecturer
Dr H de Villiers	Lecturer
Dr GH Diedericks	Senior Lecturer
Dr S Fidler-Woudberg	Senior Lecturer
Prof B Fischer	Professor of Computer Science
Prof A Fransman	Associate Professor
Prof J Geldenhuys	Associate Professor
Mr I Govender	Lecturer
Dr J Gray	Lecturer
Prof BW Green	Professor seconded to AIMS-SA
Dr PJP Grobler	Senior Lecturer
Ms HA Haroldt	Lecturer
Prof BM Herbst	Professor of Applied Mathematics
Dr K-T Howell	Senior Lecturer
Prof Cang Hui	Research Chair
Dr CP Inggs	Senior Lecturer
Prof Z Janelidze	Associate Professor
Dr AP Keet	Senior Lecturer
Dr RS Kroon	Senior Lecturer
Dr MF Maritz	Senior Lecturer
Prof S Mouton	Associate Professor
Dr MA Muller	Senior Lecturer
Dr NL Muller	Senior Lecturer
Dr CG Naude	Senior Lecturer
Prof F Nyabadza	Associate Professor
Dr PJP Ouwehand	Senior Lecturer
Prof H Prodinger	Professor of Mathematics
Dr NL Ralaivaosaona	Lecturer
Dr R Roux	Lecturer
Prof GJF Smit	Associate Professor and Head: Applied Mathematics Division
Mr JP Swanepoel	Junior Lecturer
Prof AB van der Merwe	Associate Professor
Dr S van der Walt	Senior Lecturer

	Prof L van Wyk	Professor of Mathematics
	Prof L van Zijl	Professor of Computer Science and Head: Computer Science Division
	Prof W Visser	Professor of Computer Science
	Prof S Wagner	Professor of Mathematics
	Ms L Wessels	Lecturer
	Prof M Wild	Professor of Mathematics

EXTRAORDINARY PROFESSORS

Prof JM de Villiers	Mathematics
Prof MB Dwyer	Computer Science
Prof T Krzesinski	Computer Science
Prof HE Porst	Mathematics
Prof JW Sanders	Mathematical Sciences

EXTRAORDINARY ASSOCIATE PROFESSOR

Prof K Scheffler	Computer Science
Prof A Welte	Mathematical Sciences

SUPPORT STAFF

Mrs HA du Plessis	Computer Science
Ms L Adams	Mathematics
Ms W Isaacs	Mathematics
Mr B Jacobs	Mathematics
Mrs OM Marais	Mathematics
MS Rabie	Mathematical Sciences
Mrs MM Rhoda	Applied Mathematics
Mr AL Roman	Applied Mathematics
Mr D Stephanus	Computer Science
Mrs M van Niekerk	Applied Mathematics
Dr N Hale	Applied Mathematics

POSTDOCS

RETIRED ACADEMICS

Dr MA Muller	Senior Lecturer
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NEW APPOINTMENTS

Dr J Brink	Senior Lecturer
Dr R Roux	Lecturer

RESIGNATIONS

M Banda	Professor of Applied Mathematics
S van der Walt	Senior Lecturer

DEPARTMENT OF MICROBIOLOGY

ACADEMIC STAFF

Prof Marinda Bloom	
Prof A Botha	
Prof TE Cloete	Vice-rector: research and innovation
Prof LM Dicks	Distinguished Professor
Prof K Jacobs	
T Jansen	
Dr W Khan	
Prof DE Rawlings	
Prof WH Van Zyl	Departmental chair, Distinguished Professor Biofuels Research Chair
Dr H Volschenk	
Prof GM Wolfaardt	Director, Stellenbosch University Water Institute and ERWAT Chair in Water Research

EXTRAORDINARY PROFESSORS

Prof Axcell
Prof L Lynd
Prof BA Prior
Prof J Thevelein
Prof D Toerien

SUPPORT STAFF

J Daniels
LJ Daniels
J de Kock
M Gey van Pittius
MH Koopman
M Stuurman
T van der Merwe
L van der Westhuizen
W Wentzel

DEPARTMENT OF PHYSICS

ACADEMIC STAFF

Prof EG Rohwer
Dr L Boonzaaier
Dr GW Bosman
Dr A du Plessis
Prof HC Eggers
Mr D Geduld
Prof HB Geyer
Dr H Kriel
Prof KK Müller-Nedebock
Prof PH Neethling
Prof RT Newman
Prof P Papka
Prof FG Scholtz
Prof HPH Schwoerer
Dr JA Stander
Dr CM Steenkamp
Prof BIS van der Ventel
Dr JJ van Zyl
Prof H Weigel
Prof SM Wyngaardt

Executive head

EXTRAORDINARY PROFESSORS

Prof AA Cowley
Prof CA Dominguez
Prof A Forbes
Prof WD Heiss
Prof J Meng
Prof T Parker
Prof H Stafast
Prof Z Vilakazi
Prof HM von Bergmann

PROFESSORS EMERITUS

Prof PR de Kock
Prof PE Walters

SUPPORT STAFF	Ms C April
	Mr DP Pool
	Ms H Randall
	Ms C Ruperti
TECHNICAL STAFF	Mr MC Botha
	Mr J Burns
	Mr SH February
	Mr JM Germishuizen
	Mr GJ Louwrens
	MR DP Pool
	EJ Shields

DEPARTMENT OF PHYSIOLOGICAL SCIENCES

ACADEMIC STAFF	Prof MF Essop	Departmental chair
	Prof A-M Engelbrecht	
	Dr B Loos	
	Prof KH Myburgh	
	Dr T Nell	
	Dr B Sishi	
	Prof C Smith	
	Dr JA de Wet Strauss	
SUPPORT STAFF	Mr J Isaacs	
	Ms S Martins	
	Ms GA Simon	
TECHNICAL STAFF	Mr A Isaacs	
	Dr A Krygsman	
	Dr L Lacerda	
POSTDOCS	Dr A Brand	
	Dr P Durcan	
	Dr D Joseph	
	Dr M Kruger	
	Dr R Mapanga	