Stellenbosch University actively positions itself as a leading higher education institution on the African continent with, amongst others:

• National and international research leaders in their respective fields
• A dynamic postgraduate student body and postdoctoral fellows from all over the world
• A significant number of peer-rated researchers (second highest in the country), 26 research chairs and seven Centres of Excellence
• A Central Analytical Facility (CAF) with state-of-the-art analytical research equipment, serving clients from the academic world and industry (www.sun.ac.za/caf)
• The highest number of weighted research outputs per permanent academic staff member in South Africa
• Numerous strategic research partnerships with, amongst others, national science councils, industry, national and international research institutions
• A strong ethos of research integrity, and well-established research-related policies and procedures promoting responsible conduct

Stellenbosch University, through its dedicated and committed cohort of academic researchers, produces research outputs that are excellent and relevant to society. Globally we are acknowledged as a leading research university in Africa, and locally we are building strong partnerships with strategic community, government and industry partners to ensure that our research outputs enhance the quality of life of ordinary citizens.

Our core functions – robust research (in support of evidence-based policy), quality teaching and learning, and community engagement – ensure that the benefits of the academic enterprise reach society. Stellenbosch University is a highly significant and effective role player in addressing strategic priorities such as the eradication of poverty, improvement of social services, building sustainable communities, improvement of South Africa’s health profile, and growing an increasingly inclusive economy for the benefit of all South Africans as well as the citizens of Africa.

Our vision is to be an innovative, future-focused and inclusive institution. This vision is realised through excellence in innovative research, by making a positive impact on our society and on the environment, and by being accessible to students and staff in a welcoming environment.

The research community of Stellenbosch University comprises more than 10 000 postgraduate students, approximately 4 000 international students of more than 100 different nationalities, around 240 postdoctoral fellows, and 975 members of the academic staff.


diverse ideas
relevant outcomes
real impact
Stellenbosch University recognises the importance of research, development and innovation in developing human capital for a growing knowledge economy. Whilst it continues to make a significant contribution towards a skilled and capable workforce and continues to provide high-level occupational-directed postgraduate programmes, it has actively prioritised postgraduate research. Doctoral degrees awarded in 2013, show an increase of 112% since 2002, with a total of 240 – one of the highest number of postdoctoral research fellow cohorts in South Africa. There is thus a research-active and productive postgraduate student body at the University.

Our commitment to research and development can be seen in the following:

**RESEARCH FOCUS**
- 26 Research Chairs and seven Centres of Excellence
- 347 peer-rated researchers in 2014
- 62% of our staff members have doctoral degrees
- Ranked in 2014 for the fourth year in a row in two top international rankings – the QS World University Rankings and the Times Higher Education World University Rankings

**ACADEMIC OUTPUT**
- 112% increase in the number of PhD graduates since 2002
- 11% of the total accredited research outputs in SA in 2012
- Average annual growth of 8.9% in research outputs since 2008
- The highest weighted research output and publication output per permanent academic staff member in the country

**RESEARCH COLLABORATION**
- Approximately 2 500 active research contracts, of which most are with industry partners
- More than 50 active EU projects
- More than 330 registered active collaborative projects in 38 African countries with 513 African collaborators
- More than 70 joint projects with national science councils
- Approximately 4 000 international students of more than 100 different nationalities
- A postgraduate student body that comprises 35% of the total student body of SU
SA RESEARCH CHAIR IN ENGINEERING ELECTROMAGNETICS
This Chair, entitled Electromagnetic Systems and Electromagnetic Interference Mitigation for the SKA, focuses on the electromagnetics underlying the design of antennas and radio frequency ‘front end’ systems. SU has long had a tradition of excellence in training postgraduate students in electromagnetics, radio-frequency and microwave engineering, and this Chair will provide a strong focus for future research in this field.

Projects in this Chair include work on both the analogue ‘front end’ and digital ‘back end’ of radio telescopes, as well as electromagnetic interference mitigation (EMI) and work on appropriate enabling technologies.

Prof. David Davidson – davidson@sun.ac.za

SCATEC SOLAR CHAIR IN PHOTOVOLTAIC (PV) SYSTEMS
The Chair is supported by Norwegian global solar energy provider Scatec Solar – the first company to supply electricity to South Africa’s national grid under the country’s Renewable Energy Independent Power Producer Programme. This Chair will enable SU to expand its role in renewable energy research focusing on optimising electricity generation from PV plants, and will provide support to the PV industry. The Chair will form partnerships with other research institutions in the general field of PV systems.

Prof. Wikus van Niekerk – wikusvanniekerk@sun.ac.za
Prof. Thomas Jones – jones@sun.ac.za

SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED (SANRAL) CHAIR IN PAVEMENT ENGINEERING
The SANRAL Chair in Pavement Engineering is located in the Geotechnical and Transportation Division of the Department of Civil Engineering. The incumbent of this Chair (which is sponsored by the National Roads Agency), Prof. Kim Jenkins, carries out his research within the Institute for Transport Technology. He has a particular interest in recycled materials, road rehabilitation, sustainable technologies and environmental considerations, including energy measurements.

The pavement research group in the Department of Civil Engineering is currently undertaking projects in the fields of materials performance research, numerical modelling and sustainable practices.

The research group has active international collaboration with the Technische Universiteit Delft (Netherlands) and Wuhan University (China), amongst others.

Prof. Kim Jenkins – kjenkins@sun.ac.za

SA RESEARCH CHAIR IN NANO-STRUCTURED FUNCTIONAL MATERIALS
This Chair encompasses the study of structure-property relationships in synthetic crystals. The research involves the design of molecules that pack in the solid state such that their relative arrangements give rise to interesting and useful functionality. It also focuses on the design and assembly of these materials, and studies their structures at the molecular level with a view to understanding the direct link between form and function.

Prof. Leonard Barbour – ljb@sun.ac.za

SA RESEARCH CHAIR: PHOTONICS – ULTRAFAST AND ULTRA-INTENSE LASER SCIENCE
The central research topic of this Chair is the experimental investigation of photo-induced reactions of atoms and molecules in matter with microscopic resolution in time and space. In simple words: making a real time movie of atoms moving in matter.

The group is trying to understand and control the interaction of light and matter by observing microscopic dynamics such as charge and energy transfer reactions in organic molecules, solids and novel light harvesting devices as for example organic solar cells, and photo-induced structural phase transitions in inorganic and organic crystals in the context of molecular electronics.

Researchers strive to pursue a balanced mixture of methodology development, application of established techniques, and challenging and slightly more adventurous new projects. Femtosecond laser-based spectroscopy and electron diffraction is applied with temporal resolution of better than a millionth of a millionth of a second.

Prof. Heinrich Schwoerer – heso@sun.ac.za

SA RESEARCH CHAIR IN POSTTRAUMATIC STRESS DISORDER (PTSD)
This Chair has a strong gene-brain-behaviour research focus, and aims to identify through state-of-the-art genetic and brain imaging methods, genetic, biological and environmental factors that contribute to increasing or decreasing a person’s risk for developing PTSD once he or she has been exposed to trauma.

Prof. Soraya Seedat – sseedat@sun.ac.za
SA RESEARCH CHAIR IN GENETIC TAILORING OF BIOPOLYMERS
The focus of this Chair is on gene discovery for the biosynthesis of polymers, and the use of those genes in different biological expression systems to synthesise novel biomaterials for all kinds of industrial applications.

In addition to optimising biopolymer synthesis through reverse genetics in crops to make cell wall or starch more suitable as advanced bio-materials or as substrates for bio-ethanol production, the group also seeks to produce novel polysaccharides with diverse (including pharmaceutical) applications from simple disaccharides. Furthermore, they aim to establish structure-function relationships between genes, respective encoded enzymes and the resulting biopolymer in biofilms which are causing human disease such as periodontitis or cardiovascular diseases. The aim is to develop diagnostic or therapeutic tools based on functional screening of metagenomic bacterial libraries and in depth characterisation of biopolymer producing enzymes encoded by isolated genes.

Prof. Jens Kossmann – kossmann@sun.ac.za

SA RESEARCH CHAIR ON ADVANCED MACROMOLECULAR ARCHITECTURES
The focus of the Chair is the synthesis and characterisation of advanced macromolecular architecture and the control of morphology and functionality on the nanometer length scale. The kinetics and mechanisms of polymerisation reactions are also investigated.

One of the new research directions within the Chair is the study of polymer-peptide conjugates for targeted treatment of specific diseases. Recent work on the delivery of an antimicrobial peptide to red blood cells has shown very promising results. The active component of the conjugate is only released upon infection with the malaria parasite, which seems to cause a (temporary) immunisation of the red blood cells against (re)infection with malaria. These promising results have led to ideas for the treatment of other diseases including cancer. Specific studies in this field will include methods of targeting and methods of triggered release of active components. The research is at the interface among polymer science, chemistry, biochemistry, physiology and in some cases microbiology. Links with Tygerberg Hospital are currently being established in order to closely collaborate with the relevant clinicians.

Prof. Bert Klumperman – bklump@sun.ac.za

SA RESEARCH CHAIR IN HUMAN RIGHTS LAW
Prof. Sandra Liebenberg is the third incumbent of the HF Oppenheimer Chair in Human Rights Law based at the Faculty of Law. The Chair was endowed by the Oppenheimer Foundation with the aim to contribute to deepening a human rights culture in South Africa through high quality research and contributing to public debate and advocacy on human rights.

Prof. Sandra Liebenberg – sliebenb@sun.ac.za

SA RESEARCH CHAIR IN EXPERIMENTAL PETROLOGY
This Chair studies the processes that shape the Earth via experimentation on rock materials at the extremes of pressure and temperature found deep within the crust and mantle of the planet. The work is performed using a variety of special autoclaves in the experimental petrology laboratory in the Department of Earth Sciences, the only laboratory of this kind in Africa. The main research aims for 2014/15 are to understand the origin and recycling of the continental crust and to understand the geological processes that have shaped some of South Africa’s mineral deposits that are linked with magmas. PhD projects currently available include an investigation of the genesis of volatile-bearing melts from upper mantle assemblages, and their relationship to diamond formation, mantle metasomatism and mantle-derived ore magma generation.

Prof. Gary Stevens – gs@sun.ac.za

HF OPPENHEIMER CHAIR IN NATIONALLY CENTRED RESEARCH CHAIR IN AERONAUTICAL DYNAMICS AND CONTROL, CENTRE OF EXPERTISE IN AUTONOMOUS SYSTEMS
The goal of this Chair, situated in the Department of Electrical and Electronic Engineering, is to promote the development of skills and technology in automatic flight control of aircraft for the benefit of the South African aerospace industry.

The research group performs research on the flight control of aircraft ranging from unmanned aerial vehicles to large passenger airliners. The research on passenger airliners is performed in collaboration with Airbus and includes topics such as automatic in-flight refuelling, automatic upset recovery, and automatic formation flying. The research on unmanned aerial vehicles focuses on automatic take-off and landing, fault-tolerant and damage-adaptive flight control, automatic collision prediction and avoidance, and autonomous navigation using intelligent onboard sensor systems. Various opportunities are available for students who are interested in master’s or doctoral studies.

Prof. Louw Hoffman – lch@sun.ac.za

SA RESEARCH CHAIR IN ENERGY RESEARCH
This Chair aims to establish second-generation technologies for the production of biofuels, specifically through microbial hydrolysis and fermentation, pyrolysis and gasification of lignocellulose. The Chair has initiated interaction with role players in SA to develop partnerships to strengthen the South African biofuels initiative.

Prof. Emile van Zyl – whvz@sun.ac.za

SA RESEARCH CHAIR IN MEAT SCIENCE: GENOMICS TO NUTRINOMICS
This Chair works on the interaction between three focus areas: production/animal, fresh meat and processed meat/products. This research not only has the potential to produce higher quality meat products for the average consumer but will also focus on lower socio-economic groups. The Chair is co-hosted by the University of Fort Hare.

Prof. Louw Hoffman – lch@sun.ac.za

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Prof. Louw Hoffman – lch@sun.ac.za

SA RESEARCH CHAIR IN THE ECONOMICS OF SOCIAL POLICY
This Chair is held by Prof. Servaas van der Berg, where researchers study aspects of social policy and provide policy advice in the South African and wider African contexts, with a strong emphasis on quantitative, policy relevant research, focusing also on the economics of education.

Prof. Servaas van der Berg – svdb@sun.ac.za

SA RESEARCH CHAIR IN PROPERTY LAW
The research focus of this Chair is the development of a new property law for South Africa. Work is aimed particularly at exploring the role of property law in the new constitutional dispensation, a reconsideration of the implications of common law property law, and the building of academic capacity in this legal field.

Prof. André van der Walt – ajdwalt@sun.ac.za

SA RESEARCH CHAIR IN POSTHARVEST TECHNOLOGY
The main aim of this Chair is to do innovative research and human capacity development to support South Africa’s agricultural and horticultural postharvest sectors. The Chair also provides a platform for interaction and multi-disciplinary research.

Prof. Linus Opara – opara@sun.ac.za
SA RESEARCH CHAIR IN INTEGRATED WINE SCIENCES
The Chair, linked to the Institute for Wine Biotechnology, focuses on a better understanding of the microbiological transformation of natural raw materials into value-added products such as wine. The Chair uses an extensive international network of collaborators to support a multidisciplinary research programme. This programme is more specifically tuned to the needs of the SA wine industry, but also investigates fundamental cellular and molecular processes of relevance to the broader life sciences. The Chair furthermore conducts research into the assessment and exploitation of natural microbial biodiversity, the understanding of population dynamics within natural and industrial ecosystems, and the application of evolutionary engineering to individual organisms or ecosystems. Such data provide novel insights into evolutionary processes, as well as directly applicable innovative tools for the wine industry.

Prof. Florian Bauer – fb2@sun.ac.za

ANTON MOSTERT CHAIR OF INTELLECTUAL PROPERTY
The Chair will make a unique contribution – particularly in relation to the implementation and functioning of intellectual property law in the international context and the challenge posed by a borderless world of internet-based digital communication to traditional views on intellectual property.

The Chair has close links with the South African Institute of Intellectual Property Law (SAIILI), the professional body that regulates the practice of IP law, and Spoor & Fisher, one of the leading IP law firms in South Africa.

Persons wishing to qualify as specialist trade mark practitioners through SAIILIPL are required to complete a qualifying course which comprises various IP modules. Negotiations are taking place between the Chair and SAIILIPL to have the latter grant exemption from doing certain of these modules to candidates who have attained postgraduate IP qualifications from Stellenbosch University.

Prof. Owen Dean – odean@sun.ac.za

AGRICOL CHAIR IN AGRONOMY
This Chair will address the shortage in talented plant breeders and agriculturists in South Africa and on the continent. Prof. Nick Kotzé, former managing director of the seed company Agricol, holds the Chair which is based in the Department of Agronomy. The Chair will help expand research and development in the seed industry, and increase product knowledge and opportunities for further training.

Prof. Nick Kotzé – tnkotze@agricol.co.za

SOUTH AFRICAN RESEARCH CHAIR IN TB BIOMARKERS
The main focus of research is to identify immune biomarkers that can be taken forward into future trials for novel diagnostics and vaccines. Focus areas within immunology are those of Mycobacterium tuberculosis (MTB) infection and in particular host biomarkers, including diagnostic markers, markers of TB treatment response and markers of protective immunity against MTB. The group is part of several international consortia and conduct together with several US, European and African partners, large cohorts of participants with well-characterised MTB infection and disease phenotypes to search for biomarkers of TB. The laboratory work entails a range of modern immunological and molecular biology techniques. It spans the divide between clinical and basic sciences in a high TB prevalence area.

The group has worked as an immunology specialist laboratory on subcontracts for IMPACT and ACTG networks studies, and is performing the immunology tests for the phase IIa TB vaccine trials in infants.

Prof. Gerhard Walzl – gwalzl@sun.ac.za

SA RESEARCH CHAIR IN ANIMAL TUBERCULOSIS (TB)
This Chair leads the Animal TB Group in investigating various aspects of animal tuberculosis affecting livestock and wildlife. The research programme aims to increase knowledge and develop tools to understand comparative disease pathogenesis and host immune responses, identify novel biomarkers for detection of infection and disease to improve diagnostic techniques, and explore the diversity, epidemiology, and the implications and role of TB in ecosystems and at animal-human interfaces.

One major focus is the development of molecular and cellular techniques that can detect infection and disease in animals. Strategies to effectively prevent spread of disease are lacking for most species and require advanced accurate diagnostic tools. For example, our research has identified cytokines that show promise for detecting bovine TB in buffalo and cattle. Using advanced molecular techniques, a unique species of mycobacteria (Mycobacterium suricattae), that infects meerkats, has been discovered in this laboratory. Gene expression and detection of immunological markers in BTB-infected lions are also being explored as techniques for diagnosis and understanding disease risks. These are a few examples of the opportunities for cutting-edge research in the field of animal TB.

Prof. Michele Miller – michelemiller128@gmail.com

ERWAT RESEARCH CHAIR IN WASTEWATER MANAGEMENT
The Stellenbosch University Water Institute hosts the ERWAT Chair in Wastewater Management. The goal of this five-year research programme, which started in 2013, is to foster partnerships in water research utilisation and training. This Chair presents the opportunity to work towards scientific and technical advances against the backdrop of environmental and socio-economic realities.

Prof. Gideon Wolfaardt – gmw@sun.ac.za

SA RESEARCH CHAIR IN SCIENCE COMMUNICATION
Stellenbosch University is hosting Africa’s first research chair in the field of science communication. It creates the opportunity for SU to develop this academic field across the continent and to provide new training and research niches for African students and scholars – ranging from online short courses and on-site seminars to postgraduate and postdoctoral studies with a focus on science communication.

The Chair’s research portfolio will focus on the strategic value of science communication in contributing to a robust and resilient knowledge society where science plays a key role to improve people’s lives and livelihoods.

The Chair is housed within the Centre for Research on Evaluation, Science and Technology (CREST) and held by Prof. Peter Weingart, a world leader in the field of science, technology and society studies.

Prof. Peter Weingart – weingart@uni-bielefeld.de

SA RESEARCH CHAIR IN MECHANISTIC MODELLING OF HEALTH AND EPIDEMIOLOGY
The focus of this Chair, linked to the South African Centre for Epidemiological Modelling and Analysis (SACEMA) is to provide a mechanistic modelling approach with more predictive strength to pharmaceutical drug and intervention steps for individual and public health.

Prof. Jacky Snoep – jls@sun.ac.za

SOUTH AFRICAN RESEARCH CHAIR IN MYCOBACTOMICS
The research aim of this Chair is to perform in-depth characterisation of clinical strains of M. tuberculosis and other mycobacterial species isolated from humans and animals on the African continent. Knowledge gained will support the goal of an improved understanding of mycobacterial biology aiding the design of effective tuberculosis vaccines, diagnostics and therapeutics.

Prof. Samantha Sampson – ssampson@sun.ac.za
CENTRES OF EXCELLENCE

NATIONAL INSTITUTE FOR THEORETICAL PHYSICS (NITEHP)
NITEHP leads and coordinates research programmes and fosters education in theoretical physics. Its mission is to provide a stimulating national and African user facility for theoretical physics that links South Africa and the continent to an international family of institutes for theoretical physics.
NITEHP is situated at three nodes namely, Stellenbosch University (main node) as well as the University of the Witwatersrand and the University of KwaZulu-Natal.
Research is conducted mainly in the following fields:
• statistical and condensed matter physics
• quantum information and computation
• high energy physics namely string theory and matrix models as well as phenomenology
NITEHP is internationally linked with SISSA (International School for Advanced Studies) and the ICTP (International Centre for Theoretical Physics).
Prof. Frederik Scholtz – fgs@sun.ac.za
www.nithep.co.za

DST-NRF CENTRE OF RENEWABLE AND SUSTAINABLE ENERGY (CRSES)
The objective of CRSES is to develop and enhance national capacity in renewable and sustainable energy in support of accelerated and shared economic growth within the area of sustainable energy. CRSES is sponsored by the South African National Energy Research Institute and the Central Energy Fund. It involves interested parties in talks on energy provision in collaboration with the University of the Witwatersrand and the Stellenbosch University (main node) as well as the University of KwaZulu-Natal.
Research is conducted mainly in the following fields:
• statistical and condensed matter physics
• quantum information and computation
• high energy physics namely string theory and matrix models as well as phenomenology
DST-NRF CENTRE OF EXCELLENCE FOR BIOMEDICAL TB RESEARCH (CBTBR)
The CBTBR combines clinical grassroots investigations into TB with sophisticated laboratory research that involves various departments and disciplines within and beyond the university campus. Whereas much of the work of the CBTBR entails the development of accurate diagnosis and appropriate therapy for MDR and XDR-TB, the centre has also played an active and ongoing role in community outreach and awareness to prevent and treat TB.
The CBTBR research focus areas are:
• biomarkers (identifying biomarkers for protective efficacy and identification)
• drug resistance (causes and spread)
• drug discovery and development (identification of new molecules, clinical trials to evaluate new compounds)
• host-directed therapy (studying fully protective innate immune responses to TB with the aim of producing host-directed therapies)
Prof. Paul van Helden – pvh@sun.ac.za
www.tuberculosis.org.za

THE DST-NRF CENTRE OF EXCELLENCE FOR INVASION BIOLOGY (C-I-B)
The C-I-B is an inter-institutional Centre of Excellence. Its members undertake research on the biodiversity consequences of biological invasions, largely through postgraduate student training, postdoctoral research projects and long-term biodiversity monitoring. The principal aims of the Centre’s work are to reduce the rates and impacts of biological invasions by furthering scientific understanding and predictive capability, and by developing research capacity.
Prof. Dave Richardson – rich@sun.ac.za
academic.sun.ac.za/cib

STELLENBOSCH UNIVERSITY WATER INSTITUTE (SUWI)
The SUWI is a multidisciplinary research collective that recognises the complex nature of water management and supply in a water-scarce country such as South Africa. Drawing from the expertise of leading researchers from almost all faculties at SU, the Institute offers an ideal environment for students and young water professionals to get involved in projects funded by government, industry and international funding agencies, in both fundamental studies and research aimed at solving our industry and public partners’ problems.
Prof. Gideon Wolfaardt – gmwi@sun.ac.za
www0.sun.ac.za/water

DST-NRF CENTRE OF EXCELLENCE IN SCIENTOMETRICS AND SCIENCE, TECHNOLOGY AND INNOVATION POLICY
The CoE is a virtual centre hosted by the Centre for Research on Evaluation, Science and Technology (CREST). The aim is to measure performance and to monitor the effective implementation of science, technology and innovation (sti) policies by developing indicators for knowledge production, innovation, development and networking. Four main thematic areas have been identified: science, technology and innovation indicators; sti policy for development; human development for sti; and science communication, evaluation and impact.
Prof. Johann Mouton – jm6@sun.ac.za
www.sun.ac.za/crest

SOUTH AFRICAN CENTRE FOR EPIDEMIOLOGICAL MODELLING & ANALYSIS (SACEMA)
SACEMA specialises in the mathematical modelling of diseases prevalent in South Africa. The work is multidisciplinary, combining biological, medical, statistical, mathematical and computing skills to study patterns of disease progression, in space and time, at population and within-host levels. The aim of this modelling is to identify the principal causes of diseases and their transmission, and the likely outcomes of various interventions, and so to provide a sound scientific basis for health policy.
In surveillance of chronic conditions like HIV, the limitations of existing methods, and the nuances of their correct application, are considerable, and frequently not appreciated. In the modelling of outcomes arising from possible interventions, there is even less consensus on appropriate technical approaches and interpretation into the policy sphere. SACEMA is very much on the cutting edge on the epidemiological surveillance and projection fields, within a variety of cross disciplinary projects that afford ample scope for advanced degree training.
Included within the training programme are several short courses offered each year, provided by SACEMA and international partners, designed to generate meaningful modelling of real data related to pressing human needs.
Although the underlying mathematical ideas are ultimately abstract, and transferable between contexts defined by various demographic profiles and diseases, the defining epidemiological context which dominates SACEMA’s work is the locally evident joint HIV/TB epidemic. We expect, over time, to see considerable broadening of applications.
Prof. Alex Welte – alexwelte@sun.ac.za
www.sacema.org
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Read more on the interesting research being done at Stellenbosch University
http://www.myvirtualpaper.com/doc/stellenbosch-University/research-2013/2014060201/