

TTO NEWS

Introducing the TTO
Bridging the gap
between research and
commercialisation
Award-winning
innovations



UNIVERSITEIT VAN PRETORIA
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Newsletter of the Technology Transfer
Office of the University of Pretoria

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Editorial

The value of innovation support



At the University of Pretoria, we recognise that research and innovation can strengthen our role in national development, as well as our contribution to addressing the major challenges our developing region and the global community face.

The central theme of the University of Pretoria's research strategy is to position locally relevant research on the international stage and to increase our visibility and impact, locally, regionally and internationally. Relevance is therefore a critical part of sustainable research, and bridging the gap between research and commercialisation is a key element in the research process, as is the drive for sustainable innovation.

The Innovation Support Division within the University's Department of Research and Innovation Support provides excellent support to researchers in conducting invention disclosures, patent applications, license agreements, trademarks and designs. It also encourages good practice in managing and exploiting the University's intellectual property.

The Technology Transfer Office (TTO) in the Division is dedicated to identifying, protecting and exploiting intellectual property for the benefit of all. The recent increase in the TTO's activity proves the value of support services at the University.

This newsletter provides the reader with insight into the University's various innovation and technology transfer activities. I would like to thank the Division, and particularly the TTO team, for their important contribution to the University.

Prof Stephanie Burton
[Vice-Principal: Research and Postgraduate Studies](#)

“Relevance is a critical part of sustainable research.”

Editorial

Linking research, innovation and knowledge transfer



The role of universities in strengthening countries and regions is well recognised, not only through the contributions of graduates in the workplace and society, but in the research that generates the hybrid spin-offs needed for development.

The University of Pretoria has a long history of linkages with public and private institutions across several sectors in society. We therefore take great pride in the services that the TTO offers to the University's researchers and innovation partners.

UP 2025, the University's long-term strategic plan, emphasises the importance of making a difference to the world in which we live.

This also means addressing development problems through research and moving forward with the most promising solutions.

The examples presented here illustrate the importance of linking research, innovation and knowledge transfer – from finding environmentally responsive solutions, to improving the quality of life for individuals and ordinary citizens.

The examples further illustrate the importance of protecting intellectual property through invention disclosures and patent applications and license agreements.

Dr Carol Nonkwelo

Director, Department of Research and Innovation Support

“It is important to protect intellectual property.”

Editorial

Transforming discoveries into marketable products



With the promulgation of the Intellectual Property Rights from Publicly Financed Research and Development Act, there is now a Technology Transfer Office (TTO) in almost every research institution, dedicated to identifying, protecting and exploiting intellectual property for the benefit of all people.

The University of Pretoria (UP) supports and funds various breakthrough developments. Over the last couple of years, it has seen more research contracts, patent filings, South African and foreign patents granted, and patent licences than ever before. This signifies the many ways in which UP collaborates with other research institutions.

Industry plays a vital role in the creative process: industry partners work with researchers to pilot their technologies and transform their discoveries into public goods and marketable products. The TTO nurtures these relationships, working hand-in-hand with researchers.

In the spirit of assisting South Africa to build a sustainable economy, UP nurtures a culture of creativity that ensures that our research output continues to address some of the country's challenges.

This publication illustrates some of our successes. We hope that our activities will make a meaningful contribution to the growth of the economy and the lives of the people of South Africa.

Adv Lawrence Baloyi

[Head: Contract Research and Innovation Support](#)

“UP has seen more research contracts, patent filings, granted patents and patent licences than ever before.”

Introducing the TTO

The Technology Transfer Office (TTO) of the University of Pretoria resides within the Innovation Support Division of the Department of Research and Innovation Support (DRIS).



Innovation Support staff members are willing to assist with any queries (from left): Stanley Ehlers, John Visagie, Simon Thanyani, Khangwelo Rathogwa, Refilwe Ngoato, Musa Masia, Lawrence Baloyi and Phumuza Langa.

The Innovation Support division comprises the following staff members:

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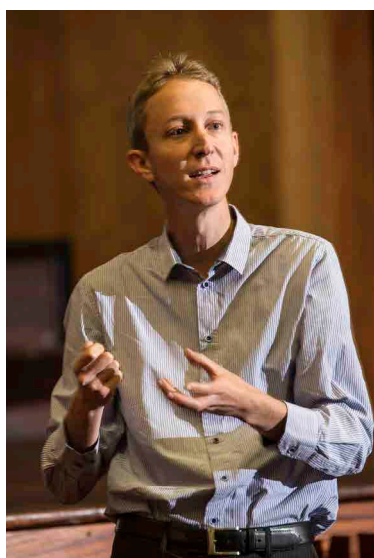
Should you wish to disclose IP, please contact Refilwe Ngoato, Khangwelo Rathogwa, Musa Masia or Phumuza Langa.

The TTO supports researchers at the University by providing an enabling environment to further the utilisation of their research in the market by licensing and technology transfer or by establishing strategic industry partnerships. It provides staff and research groups at the University with the following support:

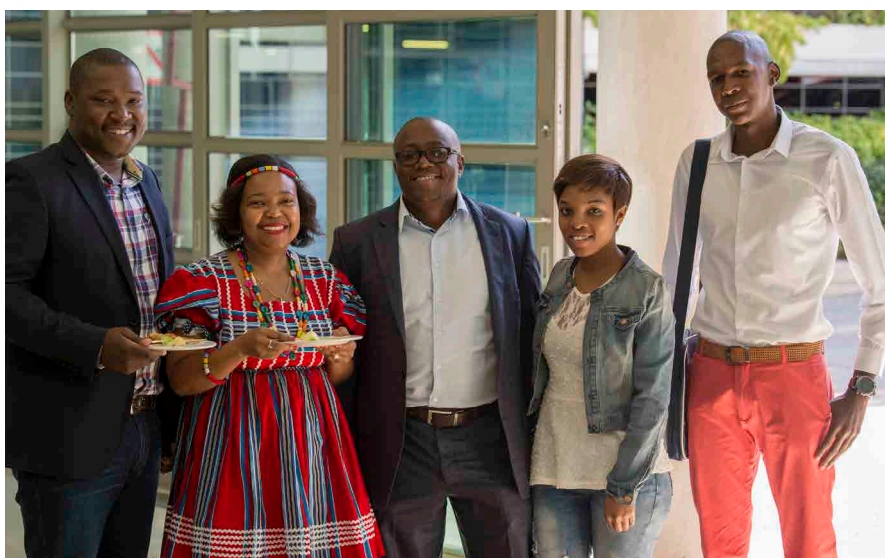
- It coordinates processes, systems and structures to facilitate the transfer of UP-created discoveries into new products and services for public use and benefit, including invention disclosures, evaluation and selection of intellectual property (IP) management, licensing and the provision of legal and financial support services for such activities.
- It provides support for legal, financial and project management services for IP activities, such as patenting, and licensing.
- It facilitates the formation of "spin-off" companies by assisting with due diligence, financial and legal services, business plans and feasibility studies.
- It develops and implements commercialisation strategies.
- It provides commercialisation services that include identifying and securing initial seed funding, recruiting management teams and securing first-round venture funding.
- It ensures the effective management of the University's new venture portfolio, thereby securing meaningful third-stream income.
- It develops marketing strategies for new inventions, including preparing marketing material, identifying and making contact with potential licensees and closing the deal.
- It selects the form of agreement, option, patent licence, copyright licence and materials licence, and prepares ready-to-sign standard agreements.
- It monitors agreement and performance, maintains relationships, and attends to legal issues in the event of breach or non-performance.

TTO celebrates World Intellectual Property Day

World Intellectual Property (IP) Day is annually celebrated on 26 April. In recognition of this, the University's TTO hosted an IP Day Lunch Talk on the University's Hatfield Campus on 30 April 2015. The presentations by specialists in the field of intellectual property management and intellectual property law attracted much interest.



Patent attorney Tyron Grant explains what patent law involves.



Celebrating World IP Day on the Hatfield Campus are (from left): Vuyisile Hobololo, Refilwe Ngoato, Lawrence Baloyi, Bontle Bokaba and Karabo Kgomo.

George Eliot once said, "Life seems to go on without effort when I am filled with music." Music has been an integral part of society for thousands of years and its contribution to culture is irreplaceable. However, protecting the music industry's IP rights in the digital age poses a challenge. Safeguarding the intellectual property of the singers, songwriters, musicians, publishers, producers, arrangers and sound engineers who have brought us our favourite songs is paramount.

The theme for World IP Day 2015 was "Intellectual property and music", which is why the lunch talk focused on copyright issues relating to the music industry. The afternoon was filled with a variety of informative talks on intellectual property rights and their enforcement. The lunch talk started

with a presentation by Mr Vuyisile Hobololo, Deputy Director of NIPMO, who explained the role of NIPMO in IP management.

Mr Tyron Grant, a patent attorney and partner at the IP law firm Spoor & Fisher, gave a presentation on patents, patent filing requirements and copyright. He illustrated these concepts by means of three case studies. One of these was the story of Solomon Linda's song, *Mbube*. When Linda and his group, the Original Evening Birds, cut a 78-rpm recording of the song in 1939, it became the first African record to sell over 100 000 copies. The song became hugely popular throughout Europe and was later reworked by two different artists into *Wimoweh* and *The Lion Sleeps Tonight*. No mention was made of the original artist. Grant explained the

copyright issues related to this case and the audience was given the opportunity to ask questions about copyright.

The event was concluded with a presentation by Ms Elzabe Barnard of the Research Institute for Innovation and Sustainability, who encouraged researchers to attend the Innovation Summit to be held in August 2015. She also provided information about the exciting Inventors Garage Competition.

During the lunch talk, the Social Strings Performing Artists delighted the audience with their music.

This was the second year that the TTO celebrated World IP Day on the Hatfield Campus. In 2014, a World IP Day Symposium on the Hatfield Campus focused on IP in the film industry.

Intellectual Property Day



Music has been
an integral part
of society for
thousands of years
and its contribution to
culture is irreplaceable.

Forging important partnerships with the USA

Refilwe Ngoato, the TTO's Manager was selected from a competitive pool of candidates as a Massachusetts-South Africa Technology (M-SAT) Fellow.

The M-SAT Fellowship unites mid-level professionals in the technology, information technology and life sciences industries from South Africa and Massachusetts for a two-way exchange to strengthen professional skills and create mutually beneficial relationships.

Refilwe spent three weeks at the Massachusetts Institute of Technology (MIT) Licensing Office learning best practices in technology transfer and commercialisation. She spent her first week at Bentley University in Waltham, Massachusetts, where she attended lectures on the role of government in the US economy, entrepreneurship (the engine of the American economy) and the Massachusetts innovation economy. She learnt that start-ups have always been at the heart of America's economic success. Companies younger than five years account for the bulk of innovation and all of the country's net job creation. Her last week was spent in Washington,

where she attended the Professional Fellows Congress. It was attended by 239 fellows from 50 countries worldwide, each of whom presented a poster.

Refilwe's presentation was on "Rationale for Innovation and Technology Transfer". She compared the performance of UP's TTO to technology transfer offices in the USA that were established around the same time as that of UP and had one or two staff members.

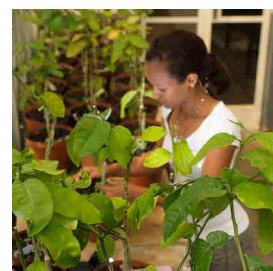
Her MIT peer, Dr Catherine Ives, spent two weeks at UP in February 2014. They co-hosted a workshop on IP and research commercialisation. During her visit, Dr Ives also had the opportunity to meet with a number of researchers and UP's innovation stakeholders, the Technology Innovation Agency (TIA), NIPMO, the Council for Scientific and Industrial Research (CSIR) and the Department of Science and Technology (DST).



Refilwe Ngoato
Manager: Technology Transfer

Encouraging invention disclosure

Technology transfer must be seen as an essential step in successful research.



A workshop on IP and research commercialisation was presented in conjunction with the legal firm Spoor & Fisher and the MIT's Technology

Licensing Office on 12 February 2014. It aimed to introduce researchers to the benefits of technology transfer, since some researchers are reluctant to disclose their inventions. One of the presenters was former UP researcher, Dr Linda Meyer, who left UP to focus on her company, MABU Casing Soils (see page 16).

She developed a mushroom casing soil that supports sustainable mushroom production, and succeeded in commercialising it. MABU Casing Soils is now producing casing soil on a commercial scale.

The title of Dr Meyer's presentation was "From research to commercialisation". The workshop encouraged its attendees to disclose their inventions to the TTO. Some 50 researchers attended the workshop.

The TTO's collaboration with institutions like MIT could provide it with opportunities to improve its methods of identifying potential patents and facilitating technology transfer.

The workshop was attended by (from left): Linda Meyer, Lawrence Baloyi and Mavis Nyatlo, Director: Advisory Support at NIPMO.



Raising awareness of technology transfer at Onderstepoort

Technology transfer is a critical part of the innovation process and, ultimately, economic growth. The University's TTO is dedicated to raising awareness of technology transfer and facilitating the technology transfer process.

On 14 August 2014, the research community at the Faculty of Veterinary Science had the opportunity to attend an IP and research commercialisation workshop at the University's Onderstepoort Campus. The TTO partnered with the legal firm Smit & Van Wyk and the Research Institute for Innovation and Sustainability (RIIS) to present this workshop. RIIS aims to sustain and manage innovation in the working

environment. It provides guidance and practical insight, and assists with planning and managing an uncertain future.

The workshop aimed to increase the level of IP protection and commercialisation awareness among the research community at the University's Onderstepoort Campus. Technology transfer helps to develop early-stage IP into tools for direct use by the research community or the public. That is why it is important to raise awareness of technology transfer within higher education institutions. Technology transfer ensures that the community experiences the economic benefit of IP commercialisation, while protecting the inventor's IP rights.

Innovation awards

UP inventors win prestigious awards

GAP Biosciences seeks to address the gap that exists between the prototyping and commercialisation of life science technologies by providing researchers with essential business skills. It is aimed at facilitating the commercialisation of bioscience technologies.

The first component of the programme is a two-day Business Basics Workshop. The second component is a Business Plan Competition. The winning team in the annual GAP Biosciences Awards receives business incubation, seed funding and mentoring.

The GAP Biosciences Innovation award ceremony for 2014 took place on 20 November 2014. The development of a new antifungal agent for the treatment of *candida albicans* infections was awarded second prize in this competition for 2014, and received R300 000 towards the development of this innovation. The research team comprised Prof Kobus Eloff and Dr Francien Botha of the Department of Paraclinical Sciences and members of the Phytomedicine Programme in the Faculty of Veterinary Science, in collaboration with Dr Candice van Wyk of the Department of Community Dentistry.

At the previous GAP Biosciences Innovation award ceremony in 2013, the development of a novel TB diagnostic method invention by a research team at the University that will significantly decrease health workers' exposure, while collecting samples for diagnosis, was one of the winners. The research team received seed funding of R500 000 and business incubation for their project. The team consists of Prof Anton Stoltz of the Department of Internal Medicine, as well as Mr Carl Baumeister and Prof Jan Verschoor of the Department of Biochemistry.

Another research project of the University, a project to develop a mushroom casing soil that is a suitable replacement for imported peat soil, was also the 2013 runner-up in this competition. The research team received seed funding of R300 000 and business incubation support at the Innovation Hub.

The SAB Foundation aims to contribute to the economic and social empowerment of historically disadvantaged communities, primarily by means of entrepreneurship development. The Foundation focuses on improving the lives of women and youths in rural areas, as well as persons with disabilities. Since its launch in 2011, the SAB Foundation has invested in 40 social innovations. .

The following research projects of the University of Pretoria were recognised at the SAB Social Innovation Awards ceremony on 30 October 2014:

- The development of a novel antifungal agent for the treatment of *candida albicans* infections was runner-up and received R500 000.
- The development of a novel hearing screening application for use on a cellphone was second runner-up and received R350 000.

Eighteen local innovations were shortlisted, and the winner received R1 million for upscaling and commercialising the innovation. The Foundation also awarded seed grants of R150 000 each and development grants of R100 000 for deserving innovations.



From left: Dr Candice van Wyk (Department of Community Dentistry), Refilwe Ngoato (Manager: Technology Transfer) and Dr Francien Botha (Department of Paraclinical Sciences) with the SAB Foundation Social Innovation Awards runner-up prize for the development of a new antifungal compound.

Success stories

Developing a cure for opportunistic fungal infections

A novel antifungal agent that was developed at the University of Pretoria has proven itself to be an award-winning innovation. Not only was it awarded a runner-up prize at the South African Breweries (SAB) Social Innovation Awards on 30 October 2014, but it also earned second place at the Gauteng Accelerator Programme (GAP) Biosciences Awards held on 20 November 2014.

Three UP staff members contributed to the development of a safe antifungal compound for the treatment of *candida albicans* infections. Prof Kobus Eloff and Dr Francien Botha of the Department of Paraclinical Sciences and members of the Phytomedicine Programme in the Faculty of Veterinary Science collaborated with Dr Candice van Wyk of the Department of Community Dentistry on this project. The antifungal agent was developed from indigenous sneezewood (*Ptaeroxylon obliquum*) trees.

Candida albicans is a fungus that forms a type of yeast in the human body. It is harmless in small amounts, but when the population gets out of control, it results in a yeast infection called Candidiasis. It causes opportunistic oral and genital infections in people worldwide. Candidiasis is commonly caused by, among other things, a diet high in sugar, antibiotics and a weak immune system.

The development of the new antifungal agent relates to a process of extracting antifungal agents from plant material. After several experiments, it was found that acetone leaf extracts of the sneezewood tree effectively fight Candidiasis. The tree is common in the east of South Africa and has a number of traditional medicinal uses. The tree's bark is made into a snuff that is used to relieve headaches, and an infusion is reported to be useful in the treatment of rheumatism and arthritis. The tree's powdered bark was used as a wash to kill ticks. Extracts from the tree have been thoroughly investigated and antifungal compounds isolated. One of the compounds was a new compound that had never been found in plants until now. The team named it obliquumol. Obliquumol's activity was compared to that of amphotericin B, the most widely used antifungal agent in the world. It was found to be 27 times more active than amphotericin B.



From left: Dr Candice van Wyk of the Department of Community Dentistry, Mr Deon Herbst, CEO of Business Enterprises at University of Pretoria (BE at UP), Refilwe Ngoato, Manager: Technology Transfer, Dr Francien Botha of the Department of Paraclinical Sciences, and Prof Stephanie Burton, Vice-Principal: Research and Postgraduate Education, with the GAP Biosciences Award.

Pharmaceutical companies, hospitals, pharmacies, doctors and nurses could use obliquumol to treat Candidiasis in affected patients. According to BCC Research, a leading market research company, the global market for human antifungal therapeutics reached nearly \$11.6 billion in 2012 and \$11.8 billion in 2013. This market is expected to grow to nearly \$13.9 billion in 2018 with a compound annual growth rate of 3.2% over the five-year period from 2013 to 2018.

In its report on the state of the antifungal market for 2014, the company states that there is critical need for new and more effective medicines, as fungi are becoming resistant to the approved compounds found in current medicines.

Success stories

Rhino database brings poachers to justice

With the western black rhino extinct, the southern black rhino critically endangered and the poaching rate of white rhinos higher than the birth rate, countless initiatives aim to combat the poaching crisis in South Africa. The Faculty of Veterinary Science at the University of Pretoria and the Castle Lager Boucher Legacy Project have joined forces to build a valuable DNA database of South African rhinos in an attempt to curb poaching.

The Onderstepoort Veterinary Genetics Laboratory (VGL) is a self-funded laboratory at the University's Onderstepoort Campus, which performs all microchipping and DNA testing of thoroughbred horses for the National Horseracing Authority of South Africa. It handles over 12 000 samples of various species every year. Since 2009, the VGL has been using its experience in this regard to research the viability of a rhino database.

The UP's TTO filed a trademark of the Rhinoceros Index System (RhODIS®) in 2011. Since its inception, the database has grown to include over 13 000 rhinos. These include South African black and white rhinos from the national parks, provincial parks and private sector, as well as rhinos from Botswana, Kenya, Malawi, Namibia and Zimbabwe. Samples taken from poached horns are compared to samples from individual rhinos in the database in order to link these horns to individual poaching incidents. The aim is to assist law enforcement agencies to gather evidence to arrest poachers. The principle of the RhODIS® database is based on the Federal Bureau of Investigation (FBI) Combined DNA Index System (CODIS) of human DNA profiles.

RhODIS® helps law enforcement agencies to understand trade routes better and to enable more effective poaching prevention. The more DNA profiles there are on the database, the more likely investigators will be able to identify the origin of the recovered horns. The VGL now routinely uses this method to individually identify rhino horn from stockpiles for security purposes and to link recovered horn to individual poaching incidents, thereby linking a horn trafficker to a poaching incident or a poacher caught with horns in his possession with the carcass of an individual rhino.

The stringent quality requirements of RhODIS® have extended to the collection of field samples to ensure that the integrity of any data used in court cannot be questioned. This has been done by developing and distributing a RhODIS® sample collection kit. The kit contains blood tubes, sample bottles for tissue and horn shavings, a disposable scalpel, drill bit, and gloves pre-labelled with barcoded labels and packed in a sealed container.

The evidence provided by the sample analysis and comparison to the database led to the conviction and imprisonment of rhino poachers. For example, a Vietnamese man who tried to smuggle poached rhino horns and two Mozambican citizens who were found guilty after being apprehended in the Kruger National Park. They were in possession of poached rhino horn linked to a carcass found in the park.

According to Save the Rhino International, at the beginning of the 20th century, there were 500 000 rhinos across Africa and Asia. This population fell to 70 000 by 1970. There are barely 29 000 rhino in the wild today. The organisation further states that large-scale poaching of the critically endangered southern black rhino resulted in a dramatic 96% decline from 65 000 individuals in 1970 to only 2 300 in 1993. Persistent efforts of conservation programmes across Africa resulted in black rhino numbers rising to a population of just over 5 000 in 2013.

Although conservation efforts were fruitful to an extent, poaching remains a threat to the rhino population worldwide. In December 2013, the Castle Lager Boucher Legacy Project raised R1.3 million to buy the Applied Biosystems 3500 genetic analyser. This project was formed when Castle Lager partnered with Mark Boucher, the legendary South African cricketer, to help protect our rhino from extinction. The older Applied Biosystems 3130 machine was not forensically validated, but it is still used for the DNA profiling of other animals. The new machine, which is forensically validated, can analyse up to 24 samples a day, compared to the older model's eight samples a day. The Castle Lager Boucher Legacy Project presented the machine to the VGL on 28 August 2014, and it is used to provide a DNA profile of each rhino, which is added to the RhODIS® database.

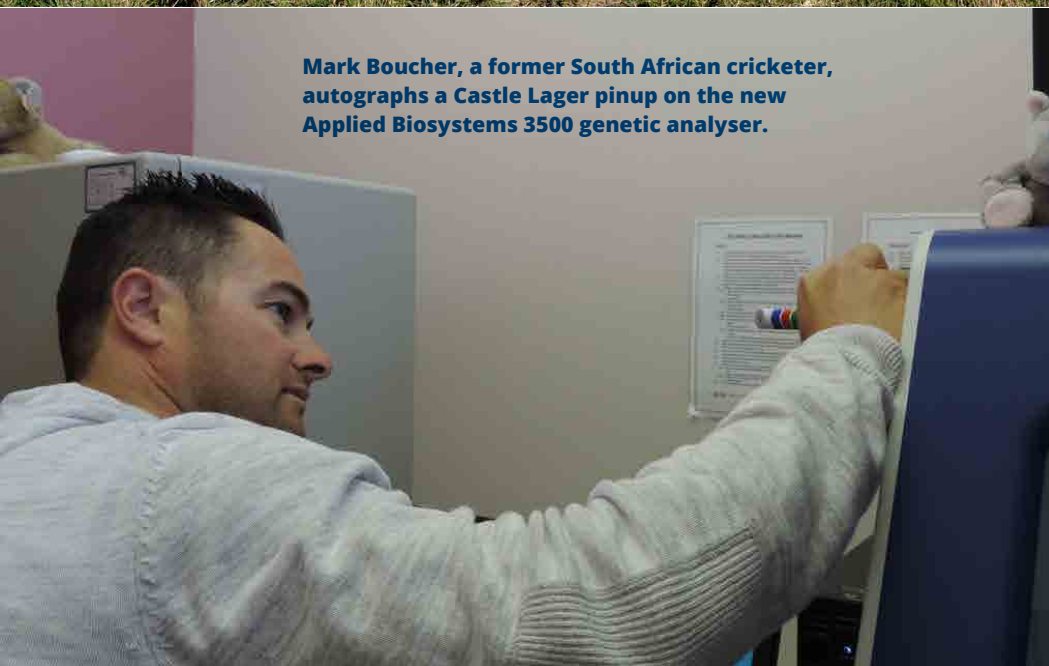
The official presentation of the new Genetic Analyser from the Castle Lager Boucher Legacy took place on 27 August 2014 at the Onderstepoort Campus. The Head of Contract Research and Innovation Support division and the Technology Transfer Manager attended the ceremony.

From left: Alastair Hewitt, General Manager of Castle Lager and Sport Sponsorship at South African Breweries, Dr Cindy Harper, Director of the VGL, and Mark Boucher, former South African cricketer and wildlife enthusiast, next to the new genetic analyser.



Below: The Castle Lager Boucher Legacy Project aims to become a leading force in protecting our wildlife heritage, which is currently being threatened by the scourge of rhino poaching.

Mark Boucher, a former South African cricketer, autographs a Castle Lager pinup on the new Applied Biosystems 3500 genetic analyser.



Success stories

Innovative smartphone application tests hearing anywhere, anytime

The novel hearScreen mobile application (app), developed by the team of Prof De Wet Swanepoel and Dr Herman Myburgh, has received a 2013/14 National Science and Technology Forum (NSTF)-BHP Billiton Award for an outstanding contribution to science, engineering and technology through research leading to innovation in a corporate organisation or institution. These awards recognise the best and most influential researchers in South Africa.



Prof De Wet Swanepoel (left) and Dr Herman Myburgh (right) with the hearScreen system and their NSTF-BHP Billiton Award.

The app has been selected as a second runner-up at the SAB Foundation Social Innovation Awards 2014 and received an investment of R350 000 to develop the invention.

The hearScreen app for cellphones is a hearing screening device that is easy to operate and can be used anywhere, anytime. It can replace the current expensive and bulky equip-

ment that needs electricity to function, a resource that is not available at all schools in South Africa.

Prof Swanepoel, who is associated with the Department of Speech-Language Pathology and Audiology in the Faculty of Humanities, is the audiology expert who had the idea, and Dr Myburgh, a senior lecturer in the Department of Electrical,



From left: Lawrence Baloyi (Head: Contract Research and Innovation Support), Simon Thanyani (Contract Research and Innovation Support Manager), Prof De Wet Swanepoel (Department of Speech-Language Pathology and Audiology), Dr Herman Myburgh (Department of Electrical, Electronic and Computer Engineering) and Refilwe Ngoato (Manager: Technology Transfer) at the SAB Foundation Social Innovation Awards function.

Electronic and Computer Engineering in the Faculty of Engineering, Built Environment and Information Technology, provided the technical expertise.

The Android application was developed for an inexpensive phone (with a retail price of approximately R900), the Samsung Galaxy Pocket Plus. Three tones are played in each ear, and if the person does not hear one or some of them, he or she is referred to a professional audiologist, who will perform further tests and implement interventions, if necessary.

The phones' microphones and the particular headset used with each phone also had to be calibrated with the phone.

Dr Myburgh had to obtain some knowledge in audiology in order to understand the signals involved in hearing tests, and then had to ensure that the signals are generated correctly according to specifications. The rise and fall time had to adhere to current standard specifications. The phones are calibrated at 70 dB HL at 1, 2 and 4 kHz to render accurate dB increments up or down.

The phones are consistent with regard to the calibration, which makes the calibration process easier. The headsets, however, present less consistency when calibrated, but the problem is solved by calibrating the phone and its particular headset together. Furthermore, to ensure accuracy and adherence to calibration standards, the phone and headset will have to be recalibrated annually.

Other than the traditional equipment, the hearScreen product can detect background noise and indicate this to the person who is conducting the test. The test will then be taken at a later stage, or it can be taken in another venue. This feature was created by using narrowband noise at different intensities and adding the mathematical calculations to take this into account with the software.

A huge benefit of the new technology is that the data of every screening can be uploaded to a central, secure database. Users will be able to access and monitor the data of their patients on their unique accounts.

A series of pilot projects in collaboration with various stakeholders is being done or is in the planning stage. The University's TTO filed a South African provisional patent application entitled "Audiometric device and method" on 30 September 2013. It also filed an international patent application under the Patent Cooperation Treaty (PCT) on 30 September 2014. In addition, the TTO filed a trademark entitled hearScreen on 19 December 2013 in classes 9 and 42.



Prof Swanepoel uses the hearScreen app to test the hearing of a young girl.

Success stories

Bridging the gap between research and commercialisation

Each successful technology transfer project has the potential of making a significant contribution to growth and development in South Africa. One such project is the mushroom casing soil project, which has been successfully commercialised.

After eight years of research at the University of Pretoria, sugar cane bagasse was used to develop a mushroom casing soil that is a suitable replacement for imported peat soil. The South African Mushroom Farmers' Association (SAMFA) and the Technology and Human Resources for Industry Programme (THRIP) funded the project. Sugar cane bagasse is the fibrous remnants that remain after sugar cane is crushed.

The University of Pretoria has filed patents internationally in the following countries: Australia, Brazil, China, the European Union, India, New Zealand and South Africa. Patents have been granted in China, New Zealand and South Africa. A private company, MABU Casing Soils (Pty) Ltd, was established to manufacture soil on a commercial scale. MABU Casing Soils holds an exclusive licence to commercialise this patented innovation and acquired a site near Bapsfontein in Gauteng. It has been in full production since August 2014 and currently employs ten people.

According to Dr Linda Meyer, Managing Director of MABU Casing Soils, the mushroom casing soil is 100% natural, cost-effective, eco-friendly, and allows sustainable mushroom growing, which was not previously possible. Dr Meyer was previously employed as a researcher in the University's Department of Microbiology and Plant Pathology. Apart from mushroom casing soil, her specialties include plant pathology, mushroom diseases and disease epidemiology.

Peat soil is an expensive import product and recognised fossil fuel, and its extraction causes irreversible damage to peat bogs and wetlands abroad. Peat is an accumulation of partially decayed vegetation or organic matter that forms slowly over thousands of years. These ecosystems are hotspots of biodiversity and home to many endangered species. Consequently, the horticultural industry is under considerable pressure to stop using peat soil. In an attempt to alleviate this pressure, MABU Casing Soils has been doing research in the horticultural, seedling and hydroponic industries.

The Technology Innovation Agency (TIA) allocated technology development funds to the company to enable it to "bridge the gap" between research and commercialisation. With TIA's financial help and business support, MABU Casing

Soils increased the volume of soil processing.

The company was nominated for the Gauteng Accelerator Programme (GAP) Biosciences Awards at the Innovation Hub in December 2013.



Dr Linda Meyer

"I was very excited and proud when we were announced runners up. Since then, our experience at the buzzing Innovation Hub has been inspiring. We have met a lot of extremely positive and proactive people," says Dr Meyer.

Apart from the R300 000 prize money that the company received, it is incubated by Maxum business support. The Maxum incubation programmes provide an enabling environment where start-ups from the knowledge-intensive sectors are fast-tracked to compete in the global village.

MABU Casing Soils is thankful for the mushroom industry's input and assistance. SAMFA initiated the research in 2002 and has supported UP, the research and MABU Casing Soils with countless trials and advice ever since.

According to Dr Meyer, MABU Casing Soils is dedicated to contributing to a sustainable future for South Africa through its commitment to environmentally responsible practices and the production of high-quality peat-free products.

The TTO wishes to congratulate Dr Meyer on a job well done.

Success stories

Researchers develop a novel TB diagnostic method

According to the World Health Organisation (WHO), 8.6 million people fell ill with tuberculosis (TB) and 1.3 million died from the disease in 2012. When people with pulmonary TB cough, sneeze or spit, they propel TB germs into the air and a person could be infected after inhaling only a few of these germs.



Receiving the GAP Biosciences Award in 2013 are (from left): Prof Jan Verschoor of the Department of Biochemistry, Prof Anton Stoltz, Head of Infectious Diseases at the Steve Biko Academic Hospital, and Mr Carl Baumeister of MARTI TB Diagnostics (Pty) Ltd.

Research conducted at the University of Pretoria has resulted in the development of a novel TB diagnostic method that will significantly decrease healthworkers' exposure, while collecting samples for diagnosis. UP's Mycolic Acid Antibody Real-time Inhibition (MARTI) TB diagnostic team was the winner of the 2013 GAP Biosciences Innovation Competition. The team received R500 000 in seed funding and business incubation for this project. The team consists of Prof Anton Stoltz of the Department of Internal Medicine in the Faculty of Health Sciences, as well as Mr Carl Baumeister and Prof Jan Verschoor of the Department of Biochemistry in the Faculty of Natural and Agricultural Sciences.

The MARTI TB diagnostic focuses on a diagnostic method that uses a blood sample to detect TB at the point of care, regardless of the patient's HIV status, or whether the TB infection is inside or outside the lungs. The method requires as little as one drop of blood.

Until now, the primary diagnostic for TB was collecting sputum from persons who might be infected with TB. According to Mr Baumeister, co-inventor of the MARTI TB diagnostic, sputum collection is hazardous to healthcare workers and fellow patients. It is also difficult for HIV-positive patients and children to produce sputum samples.

The MARTI TB diagnostic technique is accurate in HIV-positive TB patients and detects active TB, regardless of its location in the body. The diagnosis technology was primarily developed by Prof Verschoor. Numerous capable postgraduate students and colleagues have assisted him with TB research since 1994. Prof Verschoor has published more than 51 scientific papers relating to this discipline and is the key inventor of seven TB-related patents.

The current MARTI technology is the subject of four new patent applications, the first of which was submitted in 2005. The latest was submitted as a PCT application in 2014. The University has approved the founding of a new start-up company that will be the vehicle through which the MARTI technology will be commercialised. Mr Baumeister, one of Prof Verschoor's postgraduate students, was recruited to spearhead the venture, which is now known as MARTI TB Diagnostics Pty Ltd. This venture was selected to represent South Africa in the Swiss-South African Venture Leaders Programme in Switzerland in June 2014.

The team's first major objective is to raise funds to conduct the clinical validation trial. They hope to obtain a positive policy directive from the WHO to support the international implementation of the technology. The development of the MARTI TB diagnostic has come a long way under Prof Verschoor's guidance, but an equally long distance remains to be covered for its successful commercialisation.

Awards

UP's only female inventor with more than seven patents

Prof Namrita Lall is the only female inventor with more than seven patents at the University of Pretoria. In 2014, she was awarded the highest South African honour, the Order of Mapungubwe (bronze). She also received the prestigious South African Women in Science Award from the Department of Science and Technology in 2011 for her outstanding scientific contributions to advancing science and building the knowledge base in the field of indigenous knowledge systems. She is also a former recipient of the prestigious Unesco L'Oréal Women in Science Award.

She has developed novel assays for application in drug screening and analysis from botanical sources. Prof Lall is internationally recognised for her contributions to bioprospecting from traditional knowledge on medicinal plants. She has been focusing on scientifically validating the uses of plants for diseases such as tuberculosis, cancer, hyperpigmentation disorders and periodontal diseases.

In this context, she has also demonstrated her commitment to various communities around the country by engaging them towards a better understanding of indigenous

knowledge and by advancing phytomedicines towards conventional pharmaceutical products. Prof Lall is the co-inventor of eight patent applications. In addition to this, she has authored seven book chapters.

Prof Lall is equally passionate about a future where products from indigenous plants will not only benefit companies and consumers, but also local communities. "I dream of seeing small factories in local communities where they can process the plants and produce the products themselves," she says.



Some examples of Prof Lall's skin products based on the active ingredients in South African indigenous plants.



Prof Lall is ranked in the top 1% of the global Web of Science list of influential academics who write about pharmacology and toxicology.

Awards

UP's young female inventor

Cynthia Joan Henley Smith, a PhD student in Medicinal Plant Science, is studying the biological activity of the lavender tree (*Heteropyxis natalensis*) against oral pathogens with a novel predictive method. Her research interest is the potential of indigenous plants to yield medicinal products, specifically for oral care. During her studies, Cynthia developed a novel method for determining the anti-adherence effect of plants on bacteria with a scanning electron microscope.

She successfully used a logistic response model to develop and test a novel approach to predicting the influence of multiple components on microbial inhibition. UP's TTO has filed two international patents related to her research. Cynthia has also co-authored a book chapter and published two articles. She was invited to join the Golden Key International Honour Society in 2012, won the best master's or doctoral degree dissertation award at the Fanie

de Meillon Postgraduate Symposium in 2012 and received the third prize in the Young Botanist category at the South African Association of Botany in 2010. She completed her BSc honours and master's in Medicinal Plant Science with distinction. Cynthia was nominated for the 2014 Women in Science Award for her outstanding work. She was specifically nominated for her research on the medicinal value of indigenous plants, specifically for oral care.



Cynthia Joan Henley-Smith was nominated for her research on the medicinal value of indigenous plants, specifically for oral care.

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