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UNIVERSITY OF PRETORIA
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Department of Research and Innovation

Departement Navorsing en Innovasie
Kgoro ya Dinyakišišo le Tšweletšopele

2020

ANNUAL REPORT

TECHNOLOGY TRANSFER OFFICE



UP TECHNOLOGY TRANSFER OFFICE

A SNAPSHOT OF UP'S TTO

The University of Pretoria (UP) strives to be a university that is known for its international competitiveness and local relevance through continuous innovation. UP's Technology Transfer Office (TTO) aims to ensure that its internal and external stakeholders, as well as its clients, receive an elevated level of service. The TTO is committed to contributing to economic growth within South Africa, with positive social impact in the country and beyond its borders.

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PUBLICATION INFORMATION

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LOOKING BACK AT 2020

Despite the restrictions posed by the COVID-19 pandemic and subsequent nationwide lockdown, the TTO received 10 invention disclosures and managed to file 36 patent applications. Of these, eight were Patent Cooperation Treaty (PCT) applications and 10 were provisional patent applications. Twelve international patents and two local patents were granted. Furthermore, two trademark applications were registered in South Africa, and three license agreements were signed.

The TTO sees its internal stakeholders as its most important stakeholders. The TTO Manager therefore made use of the online platform to hold meetings with researchers in the University's various faculties to encourage them to participate in technology transfer. The purpose of these meetings was to accelerate a culture change and increase the number of invention disclosures. This is an essential element of the TTO's activities as researchers must be motivated to see their research transferred out of the university and into society.

Continued positive relations with researchers has been crucial to growth, and has improved the overall quality of the disclosures received. A number of researchers entered the Gauteng Accelerator Programme (GAP) innovation competition hosted by the Innovation Hub. Two of them won innovation awards.

Three workshops were held in 2020, an induction workshop, an IP in Genetics workshop for Genetics honours students and the TTO-CIPC intellectual property (IP) webinar, which was organised in conjunction with the Companies and Intellectual Property Commission (CIPC). The purpose of these research commercialisation workshops was to increase the level of IP protection and commercialisation awareness among UP's research community. The World IP Day celebration could not take place because of the pandemic.

TTO staff members attended several virtual conferences such as those of the Southern African Research and Innovation Management Association (SARIMA), the Innovation Summit and the BioAfrica convention. The TTO also held meetings with external stakeholders to try and understand their needs and establish good relationships as successful and meaningful technology transfer is demand driven. As part of its marketing strategy, the TTO managed to produce one newsletter in 2020, despite the pandemic. Telling stories of how its activities touch and benefit people's lives around the world is important to the University.

The University of Pretoria mourned the loss of Prof Anton Stoltz, who was the Head of Infectious Diseases of both the University and Gauteng Health. He died on 20 May 2020 and was a top infectious disease expert. Just before he passed away, he was about to submit three invention disclosures to the TTO around COVID-19. The TTO once again benefitted from the significant support it receives from the National Intellectual Property Organisation (NIPMO).

RESPONDING TO THE COVID-19 PANDEMIC

COVID-19

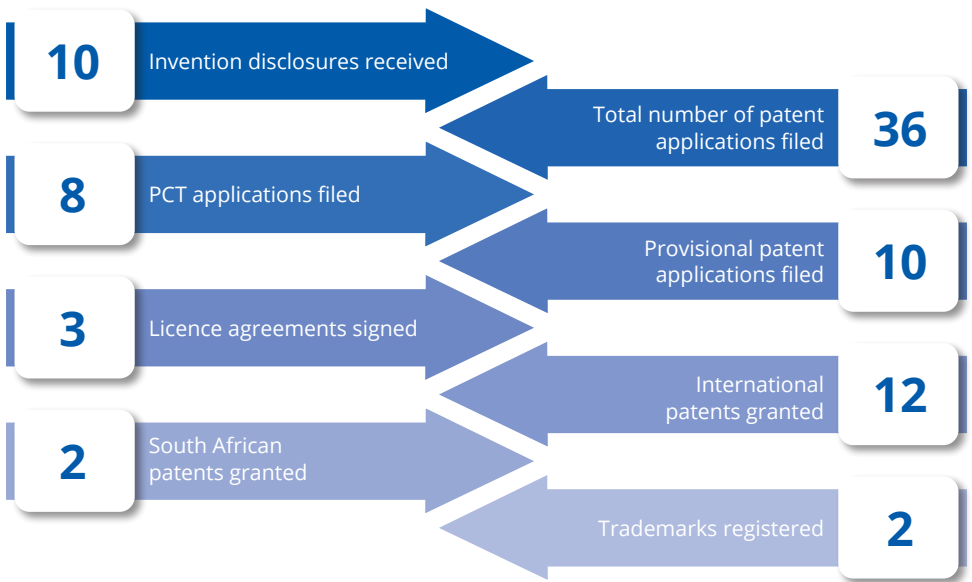
Despite restrictions posed by the COVID-19 pandemic and subsequent nationwide lockdown, the TTO endeavoured to achieve its objectives of assisting researchers with their invention disclosures and filing patents. It also continued to raise awareness about technology transfer and the commercialisation of research.



The COVID-19 pandemic is driving universities to innovate more. Universities need to transform in order to stay in the game. New solutions are needed and the safest way to find them is to experiment. At UP, researchers continued to come up with new inventions even though most worked from home in 2020. The University has been able to deal swiftly with change. It was able to shut down and set up online alternatives with speed and rearrange teaching, research and other aspects of campus life.

PERFORMANCE AT A GLANCE

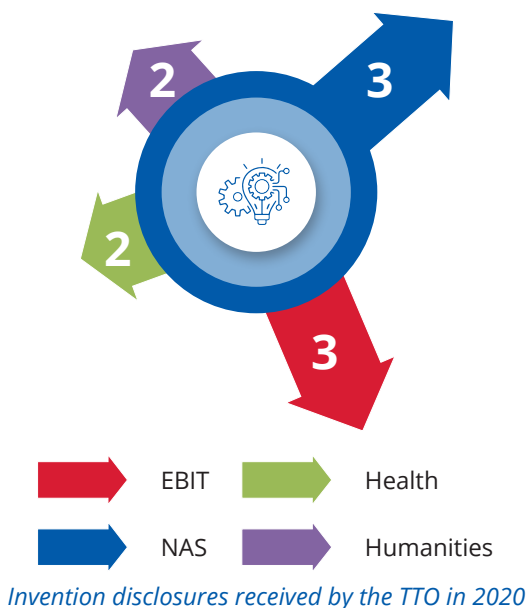
TTO's PERFORMANCE



INVENTION DISCLOSURES

Due to the COVID-19 pandemic, the TTO only received 10 invention disclosures in 2020, which was lower than the number of invention disclosures received in previous years. The faculties of Engineering, Built Environment and Information Technology (EBIT) and Natural and Agricultural Sciences (NAS) were the most innovative faculties, submitting three invention disclosures each. The remaining invention disclosures emanated from the Faculty of Health Sciences and the Faculty of Humanities, which submitted two invention disclosures each. The latter two faculties succeeded in submitting more invention disclosures than they had in 2019.

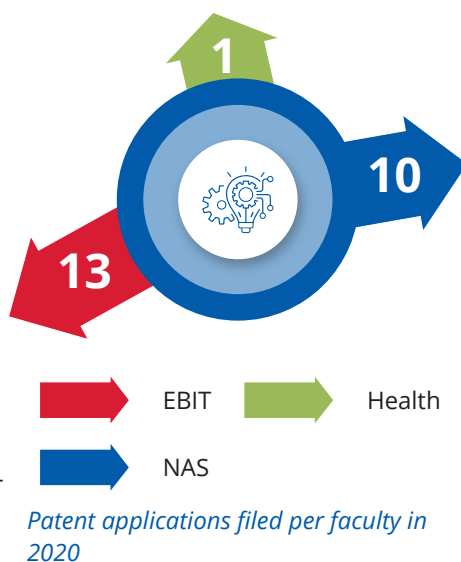
TTO's PERFORMANCE



PATENT APPLICATIONS FILED AND GRANTED

The TTO filed 36 patent applications in 2020. These include 13 from the Faculty of Engineering, Built Technology and Information Technology (EBIT), 10 from the Faculty of Natural and Agricultural Sciences and one from the Faculty of Health, and includes 10 provisional South African patent applications, eight PCT international and 17 PCT national phase applications. Eight PCT applications were filed, while previously filed PCT applications entered the national phase.

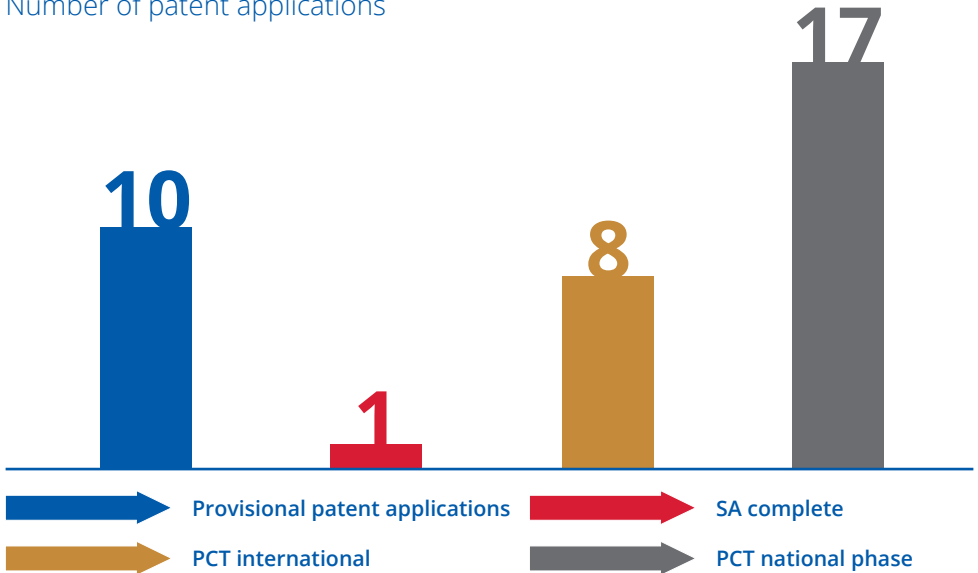
The number of PCT international patent applications filed in 2020 was higher than those filed in 2019. Only one complete South African patent application was filed as the PCT route was preferred due to the nature of the provisional applications filed.



Types of patent applications filed in 2020

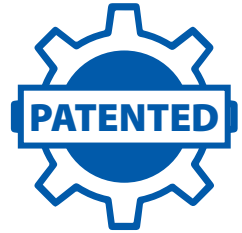
TTO's PERFORMANCE

Number of patent applications



PATENTS GRANTED

During the period under review, 12 international patents and two local patents were granted. Although this is less than the patents granted in 2019, bioscience-related inventions continued to dominate UP's patent portfolio, followed by engineering-related inventions.



The following international patents were granted in 2020:

- A liposomal composition for the diagnosis of tuberculosis (SMLs to stabilise liposomes): Indonesia
- New African indigenous skin tone active. Plant extract and use thereof (extract of *Greyia radlkoferi* and use thereof): South Korea, India, Malaysia and the USA
- Anti-cancer activity of *Helichrysum odoratissimum* (extract and compositions of *Helichrysum odoratissimum* for preventing and treating skin cancers): Australia
- Annular pyrolysis apparatus (endothermic apparatus and processes): USA
- Novel method in determining the anti-adherence of a South African plant extract (oral care): Europe

- EIS-based TB diagnosis: USA
- Audiometric device and method: African Regional Intellectual Property Organisation (ARIPO)
- Oxygenate reduction catalyst and process: USA
- Antibacterial activity of *Leucosidea serecia* leaves against *proponibacterium acnes* (skin care): India

The following local patents were granted in 2020:


- Plant growth-promoting rhizobacterial strains *Bacillus megaterium*, *Paenibacillus barcinonensis* and *Pseudomonas fluroscens* and their uses
- Acaricide resistance diagnostic test against amitraz

TRADEMARK APPLICATIONS

The TTO did not file any trademark application in 2020. However, two sports-science related trademarks that had previously been filed were registered.


These trademarks were for the following:

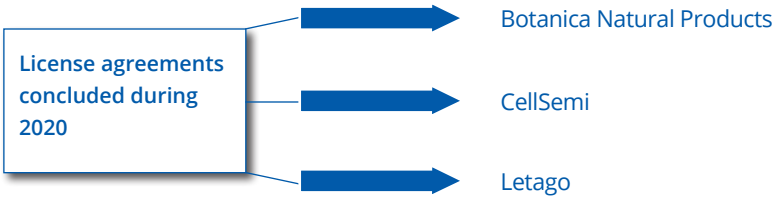
- Big on skills under pressure
- Performance & attitude focused



LICENSES

Since the establishment of the TTO, the dominant route for the commercialisation of IP at UP has been licensing. During 2020, networking took place with partners in relevant companies, but not as actively as during previous years because of the COVID-19 pandemic. However, three licence agreements were signed in 2020 which was more than the previous year.





- *Extracts and compositions of Helichrysum odoratissimum for the prevention and treatment of skin cancers*

This invention relates to an ethanol extract from the leaves of the South African plant. The extract of the invention has been shown to have *in vitro* cytotoxic activity against A431 (epidermoid carcinoma) cells, as well as antioxidant activity against free radicals that can cause cancer.

- *Buddleja saligna*

This invention relates to the anticancer activity of a South African plant and a compound mixture that has been isolated from the plant against melanoma.

- *Heteropyxis natalensis*

This invention relates to the use of plant extracts prepared from leaves and twigs of an indigenous South African plant known as *Heteropyxis natalensis* on human enamel cuttings to prevent the adherence of bacteria (*Streptococcus mutans*, *Prevotella intermedia* and *Actinomyces israelii*).

- *Leucosidea sericea*

This invention relates to investigation of the activity of *Leucosidea sericea* against acne-causing bacteria, the propionibacterium *acnes*.

CELLSEMI

- *Second-order all-pass delay network in CMOS (also known as tuneable active second-order all pass network)*

The specific focus of this invention is an active on-chip millimetre second-order all-pass network in a 130 nano-meter silicon-germanium (SiGe) BiCMOS technology node with an effective bandwidth of 40 GHz, peak to nominal delay of 62 ps and a magnitude ripple of 1.4 DB. It is a 5G-related technology.

LETAGO

- *Shoot extracts and compositions of Euclea natalensis for immune modulation and hepato protection*

This invention relates to an ethanolic extract from the shoots of the South African plant *Euclea natalensis*. It can directly and/or indirectly combat tuberculosis by means of immunomodulatory activity.

A new license agreement will be signed in due course for an invention titled "Anti-acne pharmaceutical compositions". It relates to the antibacterial activity of *Plectranthus aliciae* against acne-causing bacteria, *Propionibacterium acnes*. Clinical studies confirmed that the extract was a non-irritant and was found to be effective against blackheads, whiteheads, comedones, pustules and cysts between 14 to 28 days of consecutive use twice daily.

WORKSHOPS, WEBINARS AND MEETINGS

Although the COVID-19 pandemic limited the number of workshops that could be presented in person during 2020, staff succeeded in presenting a research induction workshop and its annual IP in Genetics workshop for Genetics honours students. It also presented a research and commercialisation webinar in conjunction with the Companies and Intellectual Property Commission (CIPC). Staff members attended several workshops and webinars to expand their capacity, many of them virtually.

Research induction workshop

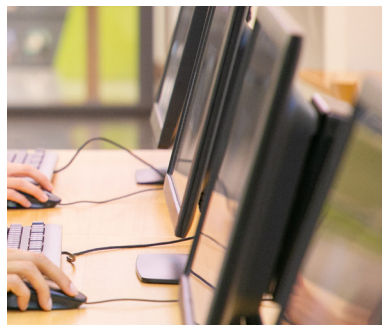
The annual research induction workshop of the Department of Research and Innovation took place on 20 January 2020. It was attended by over 30 researchers. A representative from the TTO delivered a presentation to encourage emerging researchers to participate in technology transfer. Although two induction workshops are usually held each year, the second semester workshop could not be held due to the nationwide lockdown imposed by COVID-19.

IP in Genetics Workshop

The Technology Transfer Manager presented a virtual workshop on intellectual property and commercialisation for Genetics honours students on 15 May 2020. It was attended by 30 students. During the presentation, she shared news on the benefit-sharing event that took place in 2019. Some of the students sent her messages saying they were inspired. This workshop has been taking place since 2018.

The TTO-CIPC IP webinar

The TTO presented an intellectual property webinar in conjunction with CIPC on 30 September 2020. This workshop was presented free of charge and covered the core areas of IP, including patents, copyright, trademarks and designs. It was attended by 20 delegates.



CAPACITY-BUILDING WORKSHOPS

Staff members of the TTO attended several workshops in 2020, several of them virtually due to the nationwide lockdown imposed by COVID-19.

- NIPMO-WIPO Commercialisation and Technology Transfer Workshop. This workshop, presented by the National Intellectual Property Management Office (NIPMO), in collaboration with the World Intellectual Property Organisation (WIPO) had the theme “Evaluation and roadmap for the future”. It took place at the South African National Botanical Gardens in Pretoria from 19 to 21 February 2021.
- National Roundtable discussions on Ethical Code of Conduct or Guidelines: Research on indigenous biological resources and their traditional knowledge. This took place at St Georges Hotel in Centurion on 28 February 2020.
- Training on Access and Benefit Sharing – Understanding Valorisation of Genetic Resources and User Sectors. This took place in Windhoek from 9 to 11 March 2011.
- Q&A session with IP experts on the regulatory and product labelling landscape for personal protective equipment and related medical products in South Africa. This was attended virtually on 21 May 2020.
- South African Research and Innovation Management Association (SARIMA) webinar on the SAFE notes and Convertible notes funding mechanisms used to fund early-stage start-ups. It was attended virtually on 26 May 2020.
- Briefing session on bioprospecting/biotrade presented by Khorommbi Matibe, Chief Director: Biodiversity Economy and Sustainable Use of the Department of Environmental Affairs. This was attended virtually on 10 June 2020.
- Solidarity session presented by National Treasury’s Cities Support Programme, with the support of the World Bank. This was attended virtually on 18 June 2020 with the focus on building solidarity for economic recovery.
- SARIMA webinar on applying for registered technology transfer professional (RTTP) status. This was attended virtually on 19 June 2020.
- Capacity-building workshop of the Africa-Europe Innovation Partnership (AEIP), supported by the European Union, with the theme “Empowering technology transfer organisations as key agents of innovation”. This was attended virtually on 2 July 2020.
- The SARIMA annual conference. This was held virtually from 4 to 6 August 2020.
- The Licensing Executives Society (LES) of Singapore’s Copyright Seminar. This was attended virtually on 20 August 2020.
- The South African Population Research Infrastructure Network (SAPRIN) webinar. This was attended virtually on 26 August 2020.
- Bio Africa Convention 2020, which focused on health biotech, COVID-19, agri biotech, finance and investment, zoonotics, knowledge systems and natural products, medicinal cannabis, environmental biotech, food safety and food security, as well as women’s health. This was attended virtually from 26 to 28 August 2020.

- A panel discussion on artificial intelligence presented by LES (Singapore). This was attended virtually on 28 August 2020.
- SARIMA webinar for new members, introducing delegates to the role and activities of the association. This was attended virtually on 23 September 2020.
- The South Africa Innovation Summit. This was attended virtually from 30 September to 2 October 2020.
- The SARIMA IP Wise Webinar. This was attended virtually on 14 October 2020.
- The African Innovation Summit. This was attended virtually from 9 to 13 November 2020.
- The University of Pretoria's Management Induction Programme. This was attended at the University of Pretoria.



INTERNATIONAL WORKSHOPS

Due to the restriction on international travel, it was not possible for TTO staff members to attend any international workshops in person. However, they attended a number of webinars to keep abreast of developments in technology transfer and commercialisation internationally.



MEETINGS WITH RESEARCHERS

The TTO considers its internal stakeholders as its most important stakeholders. Before the nationwide lockdown, the TTO Manager was able to conduct at least five meetings with researchers with a view to accelerating a culture change and increasing the number of invention disclosures the TTO receives per annum. Following the lockdown, use was made of the online platform to continue engagement with researchers. This is an essential element of the TTO's activities as researchers must be motivated to see their research transferred out of the university and into society. It is hoped that face-to-face meetings can be resumed in 2021.

Meetings were also held with external stakeholders to try and understand their needs and to establish good relationships as successful and meaningful technology transfer is demand driven.



Due to the COVID-19 pandemic, the TTO was unable to present its World IP Day celebration in 2020. As the theme was “Innovate for a green future”, the celebration would have taken place on the UP Hatfield experimental farm on 23 April 2020. The TTO is of the view that it was a very important theme as a low carbon future has to be shaped.

However, it succeeded in participating in two important events related to technology transfer and commercialisation: the Tshwane Inter-university Innovation Challenge and the Gauteng Accelerator Programme (GAP) Innovation Competition.

Inter-university Innovation Challenge

The University of Pretoria participated in the City of Tshwane’s first inter-university innovation challenge, in collaboration with the Tshwane University of Technology (TUT), the University of South Africa (Unisa), the Innovation Hub, TuksNovation (the University’s technology incubator and accelerator), Eskom, the Technology Innovation Agency (TIA) and Universities South Africa.

The objective of the challenge for the City of Tshwane was to find innovative solutions that can solve the current problems Tshwane is facing, focusing on transport, revenue collection, waste management, electricity and energy. It presented students from the respective universities with the opportunity to showcase their innovative solutions to improve the service delivery challenges through which the quality of life of Tshwane residents can be improved. Pitching rounds were held at each university from which finalists were identified to represent their university.

Ten student start-up companies from UP were identified as finalists, and two of the teams emerged as winners of their respective categories:

Revenue Collection: Quxeco, with founders Kanayo Asomugha, Nkosinathi Mpembe and Taleah Ayob, presented a solution to assist Tshwane residents to calculate how much money they will spend monthly for electricity usage to avoid paying interest on outstanding municipality bills.

Transport: Adaptive Traffic Light Management, with founders Brighton Zongondi and Audrit Mayenetja, presented a solution for collecting traffic data at major intersections in the city to provide the traffic control centre with live data to engage with an algorithm to determine new cycle times for traffic lights.



Presenting the award to the representative of the first prize winner in the Transport Category (Adaptive Traffic Light Management), Brighton Zongondi (centre), is Thabang Qumza from the University's Technology Transfer Office (left) and Councillor Randall Williams, Mayor of the City of Tshwane.
Photograph: City of Tshwane



Presenting the award to the representative of the second prize winner in the Transport Category (Urban Play), Penang Shirindza (left), is Councillor Randall Williams, Mayor of the City of Tshwane.
Photograph: City of Tshwane



Presenting the award to the representative of the second prize winner in the Waste Management Category (Binnergy), Maritz van Rensburg (left), is Councillor Randall Williams, Mayor of the City of Tshwane.
Photograph: City of Tshwane

GAP Innovation Competition

The annual Gauteng Accelerator Programme (GAP) Innovation Competition is run by the Innovation Hub and Emory University's Goizueta Business School. The competition is usually in five categories: Bioscience, Medical, Township Economy, ICT and Green Innovation.

Two of UP's researchers who entered the competition won first and second prizes in the Biosciences category. They were Prof Celia Abolnik and Prof Tahir Pillay. They will receive seed funding and incubation services, as well as access to the Innovation Hub's network of industry and government partners.



Prof Celia Abolnik

Prof Abolnik is a holder of the South African Research Chair Initiative in Poultry Health and Production in UP's Department of Production Animal Studies at the Faculty of Veterinary Science.

She was part of a team, with Dr Martha O'Kennedy from the Council for Scientific and Industrial Research (CSIR), which won second prize for their work on producing animal vaccines from tobacco plants that are quicker to mass produce.

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CATEGORIES

Bioscience
Medical
Township Economy
ICT
Green Innovation



Prof Tahir Pillay

Prof Pillay is the Head of the National Health Laboratory Service (NHLS) Pathology and the Department of Chemical Pathology at the UP/NHLS, and his team won first prize for producing nanobodies directed against SARS-CoV2 proteins (e.g. spike protein).

The aim of the research is to develop both low-cost biosensors and rapid lateral flow immunoassays that work on saliva rather than the uncomfortable nasopharyngeal swabs currently used in COVID-19 tests.

Make today matter