TTO NEWS

Technology advances in medical devices

UP inventions gain recognition in innovation competitions

UNIVERSITEIT VAN PRETORIA
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Department of Research and Innovation

Departement Navorsing en Innovasie
Kgoro ya Dinyakišišo le Tšweletšopele

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Letter from the editor

The Technology Transfer Office concluded its activities for 2019 with a full-day workshop to increase the level of awareness of the protection and commercialisation of intellectual property among the University's research community.

It also ventured beyond the country's borders to build capacity related to technology transfer. I attended the regional meeting of the AUTM in Raleigh, North Carolina, and participated in a meeting with the US Embassy in Washington DC, where I promoted the work being done at UP.

Dr Simon Thanyani, the TTO's Contracts and Innovation Manager, participated in a capacity development workshop at the Nelson Mandela African Institution for Science and Technology (NM-AIST) in Arusha Tanzania.

Prof Mashudu Tshifularo, Head of the University's Department of Otorhinolaryngology, attended training on precision medicine in Shangai, China, and signed a Memorandum of Understanding for the establishment of the Belt and Road Medical Device Innovation and Application Alliance on behalf of South Africa.

The University's inventions gained recognition at the annual Gauteng Accelerator Programme (GAP) Innovation Competition, while they also attracted attention at the annual Innovation Bridge and Innovation Summit exhibitions.

We invite our researchers to contact the TTO for advice to turn their inventions into products that can be commercialised.

Adv Lawrence Baloyi
Head: Innovation and Contract Management

Workshop ensures that researchers are IP wise

The University's Technology Transfer Office (TTO) presented an IP wise workshop in collaboration with the Southern African Research and Innovation Management Association (SARIMA) and the National Intellectual Property Management Office (NIPMO) on 22 August 2019.

Delegates learn all about IP from the specialists.

The aim of the workshop was to help researchers – be they academics, postgraduate students or postdoctoral fellows – to understand the basics of intellectual property (IP) and how to identify, and protect and commercialise it.

This full-day workshop, held in the auditorium of the University's library, was attended by over 50 delegates, most of whom were postgraduate students. Ms Paballo Phiri, NIPMO's Director: Funds and Incentives Management, was also present.

Ms Phiri opened the event with a discussion on the role of NIPMO in managing IP that originates from publicly financed research and development, such as that undertaken in the course of academic studies. This was followed by four separate modules covering different aspects of IP management and protection.

The first module was presented by Dr Duduetsang Saku, Analyst: Business Development at the South African Nuclear Energy Corporation (Necsa), who gave an introduction to IP, and outlined the common forms of IP, such as patents, copyrights, designs, trademarks, plant breeders' rights and trade secrets. Patents and the patenting process were discussed in detail, including the costs and timelines related to the patenting process. This was followed by a discussion of the issues of patenting vs. publishing.

Dr Saku also touched on using patents as a source of information for research. The module was concluded with a workgroup exercise.

The second module, presented by Mr Tebogo Machete, Senior Manager: Technology Transfer at the University of Johannesburg, covered the Intellectual Property Rights (IPR) Act. He gave an outline of the IPR Act, focusing specifically on researchers' obligations.

Mr Machete presented the third module as well, and discussed the identification of IP and its role in research. He focused on generating and evaluating IP, as well as IP issues in research.

Ms Paballo Phiri, NIPMO's Director: Funds and Incentives Management, giving a presentation on the Intellectual Property Rights Act.

Dr Duduetsang Saku, Necsa's IP analyst, presenting an introductory talk on intellectual property.

This included advising researchers on how they can identify IP arising from their research, as well as issues that researchers need to be aware of, such as IP in contract research projects and confidentiality.

The fourth module, also presented by Mr Machete, covered IP utilisation and commercialisation and was divided into two sections. The first part provided an overview of the technology transfer process, with particular emphasis on the time frames involved, realistic expectations from the process, and the roles of the University's TTO and the researcher. In the second part of the module, the presenter shared different routes to commercialise IP.

The delegates all received a certificate of attendance, and found that the workshop improved their understanding of IP in order to make their research really count.

UP inventions gain recognition at the GAP Awards

The University of Pretoria's inventions attracted attention at the Innovation Hub's Gauteng Accelerator Programme (GAP) Innovation Competition, which took place on 21 November 2019. These awards are hosted annually to coincide with Global Entrepreneurship Week, which took place from 18 to 24 November 2019.

Receiving the award for the Blyde Botanics project are (from left): Prof Namrita Lall, Isa Lambrechts, Refilwe Ngoato and Bianca Fibrich.

The competition attracted more than 1 200 entries, which comprised seed funding investment worth over R14 million and incubation support to over 77 start-ups. Winners comprised innovators, researchers and entrepreneurs who have been developing novel ideas to improve the efficiency of government service delivery, to increase the competitiveness of the local economy, and to enhance the quality of life of ordinary citizens. Inventions emanating from the intellectual property of the University of Pretoria were recognised in two of the five categories: medical sciences and biosciences.

The project of Malherbe Imaging Inc Smart Solutions was awarded third place in the medical sciences category, while a special recognition award was given to Blyde Botanics.

Malherbe Imaging Inc Smart Solutions developed artificial intelligence software for the accurate identification and classification of breast cancer using high-frequency ultrasound. It was developed by Kathryn Malherbe, a radiographer in private practice. This invention emanated from her doctoral research in the field of elastography and high-frequency ultrasound for use in aesthetic medicine, which focused on developing a software algorithm for the targeted diagnosis of lobular carcinoma of the breast.

Blyde Botanics is the company that is commercialising an invention related to indigenous knowledge-based cosmeceuticals and pharmaceuticals, and was developed under the supervision of Prof Namrita Lall in the Department of Plant Sciences.

The company manufactures three scientifically proven, quality-controlled actives from three unique indigenous species for the treatment of acne, ageing and periodontal health. This entails licensing the proprietary rights to the scientific claims made on actives from the University of Pretora, sourcing plant material from local communities, extracting the active constituents from fibrous plant material (bioprospecting) and manufacturing the products.

Receiving the award for Malherbe Imaging Inc Smart Solutions are (from left): Mr Mboneni Moufhe (Board Member, The Innovation Hub); Ms Fuzlin Levy-Hassen (Interim CEO, Technology Innovation Agency); Ms Kathryn Malherbe (inventor), Mr Ernest Mahlaule (Chairman of the Board, Gauteng Growth and Development Agency) and Advocate Pieter Höll (CEO, The Innovation Hub).

Leading researcher and surgeon learns about 4IR technology advances in China

Prof Mashudu Tshifularo, Head of the University's Department of Otorhinolaryngology, was granted the opportunity to attend training on precision medicine, specifically on technology advances related to the Fourth Industrial Revolution (4IR) at the Shangai University of Technology from 23 November to 8 December 2019.

Prof Tshifularo put the University of Pretoria on the map earlier in 2019 by performing the world's first middle ear transplant making use of additive manufacturing technology, also known as 3D printing, to print the bones that make up the middle ear (the hammer, anvil, stirrup and ossicles). He then successfully implanted the 3D model into a trauma patient. After the surgery, Prof Tshifularo explained that by replacing only the ossicles that are not functioning properly, the procedure carried significantly less risk than known prostheses and their associated surgical procedures.

His visit to Shangai included his attendance of the Design of Medical Devices Conference, which took place from 6 to 8 December 2019. His visit was organised by the Technology Transfer Office (TTO), in collaboration with the governments of China and South Africa (through the Department of Health).

While in Shangai, Prof Tshifularo also signed a Memorandum of Understanding for the establishment of the Belt and Road Medical Device Innovation and Application Alliance on behalf of South Africa. This initiative represents 20 medical device education and research institutions from nine countries (China, Brazil, Israel, Italy, Pakistan, South Africa, Spain, Singapore and South Korea).

According to Prof Tshifularo, the new knowledge he gained while in China related to the latest advances in precision medicine, the generation, development and production of medical devices, and robotic advances in the health sector. The exposure he received in China will enable him to continue to develop innovative procedures to the benefit of the medical profession.

During the course of his visit, Prof Tshifularo succeeded in establishing an international network that would benefit future collaboration between countries, as well as universities and departments internationally. He is grateful to the TTO, as well as to the South African Department of Health, for granting him this opportunity.

Prof Mashudu Tshifularo performing the groundbreaking operation.

Prof Mashudu Tshifularo (far right) signing the Memorandum of Understanding.

Dr Simon Thanyani (second from left) with the group of delegates at the Nelson Mandela African Institution for Science and Technology (NM-AIST) in Arusha, Tanzania.

UP's TTO shares its expertise with Tanzanian inventor

In November 2019, the Nelson Mandela African Institution for Science and Technology (NM-AIST) in Arusha, Tanzania, invited Dr Simon Thanyani, Contracts and Innovation Manager at the University of Pretoria's Technology Transfer Office (TTO), to participate in a capacity development workshop.

The workshop formed part of the technology transfer process for low-cost water filter technology, developed by Dr Askwar Hilonga, a chemical engineer from NM-AIST. This invention comprises a low-cost filtration system for drinking water that uses nano technology, called Nanofilter®, sponsored by Southern Africa Innovation Support (SAIS). The invention received an award from the World Health Organisation (WHO) under the United Arab Emirates Health Foundation in 2019. A requirement of the sponsor was to transfer the technology from Tanzania to Zambia, starting in the Kalulushi region.

According to Dr Thanyani, the transfer and adoption of this invention as a water-purifying technology from Tanzania to Zambia will increase access to clean and safe water, and thereby reduce waterborne diseases, dental fluorosis and deaths in children under five. The project will establish 20 water stations that will provide safe and clean water to 2 000 people daily. It will also provide employment to 20 local entrepreneurs in Zambia.

The workshop was aimed at enhancing the capacity of the partners involved in the project, and took the form of a "train-the-trainer" activity, which would enhance the sustainability of the project, and help ensure that developed strategies have the best chance of successful application. The presenter of the workshop was an expert in enterprise development, entrepreneurship, education and strategy, and would also provide useful information to transform the water sector in Zambia, and ensure that stakeholders have a sense of ownership of the project.

The workshop covered various topics related to technology transfer. The first session provided an overview of the technology transfer process, including the typical role and function of a TTO and success factors. The participants discussed the establishment, positioning and resourcing of a TTO within an institution. Other topics that were covered in the subsequent sessions included the assessment of invention disclosure, commercialisation strategies, licensing and new venture creation.

Dr Thanyani believes that he was able to contribute positively to this important capacity-building initiative in Africa.

Developing innovation support in higher education

Adv. Lawrence Baloyi, the University's Head: Contract Research and Innovation Support in the Department of Research and Innovation, was invited to attend the regional meeting of the Association of University Technology Transfer Managers (AUTM) in Raleigh, North Carolina, USA, from 3 to 8 October 2019.

The AUTM is an international association that strives to educate, promote and inspire professionals to support the development of academic research that changes the world and drives innovation forward.

Adv. Baloyi's attendance of this meeting was facilitated by the Entrepreneurship Development in Higher Education (EDHE) Programme of the Department of Higher Education and Training and Universities South Africa (USAf), as well as the American Embassy in South Africa. He is one of more than 3 000 members of this organisation, which works in more than 800 universities, research centres and government organisations around the world.

It plays a valuable role in capacity development, and – as such – its members work closely with commercial partners to transform ideas into opportunities. It supports the work of its members in different countries, including Africa, thereby empowering dynamic, professional practices, and advancing current and future generations of leaders in the field of technology transfer.

The key sessions of the meeting focused on foundation agreements, plant intellectual property (IP), university IP monetisation, patent claims for biotechnology inventions, contingency fee arrangements, what universities need to know about blockchain stacks, and leveraging university resources to increase industry partners.

He also participated in a meeting with the US Embassy in Washington DC.

Adv. Lawrence Baloyi pictured at the regional meeting of the AUTM in the USA.

TTO exhibits UP inventions at the Innovation Bridge

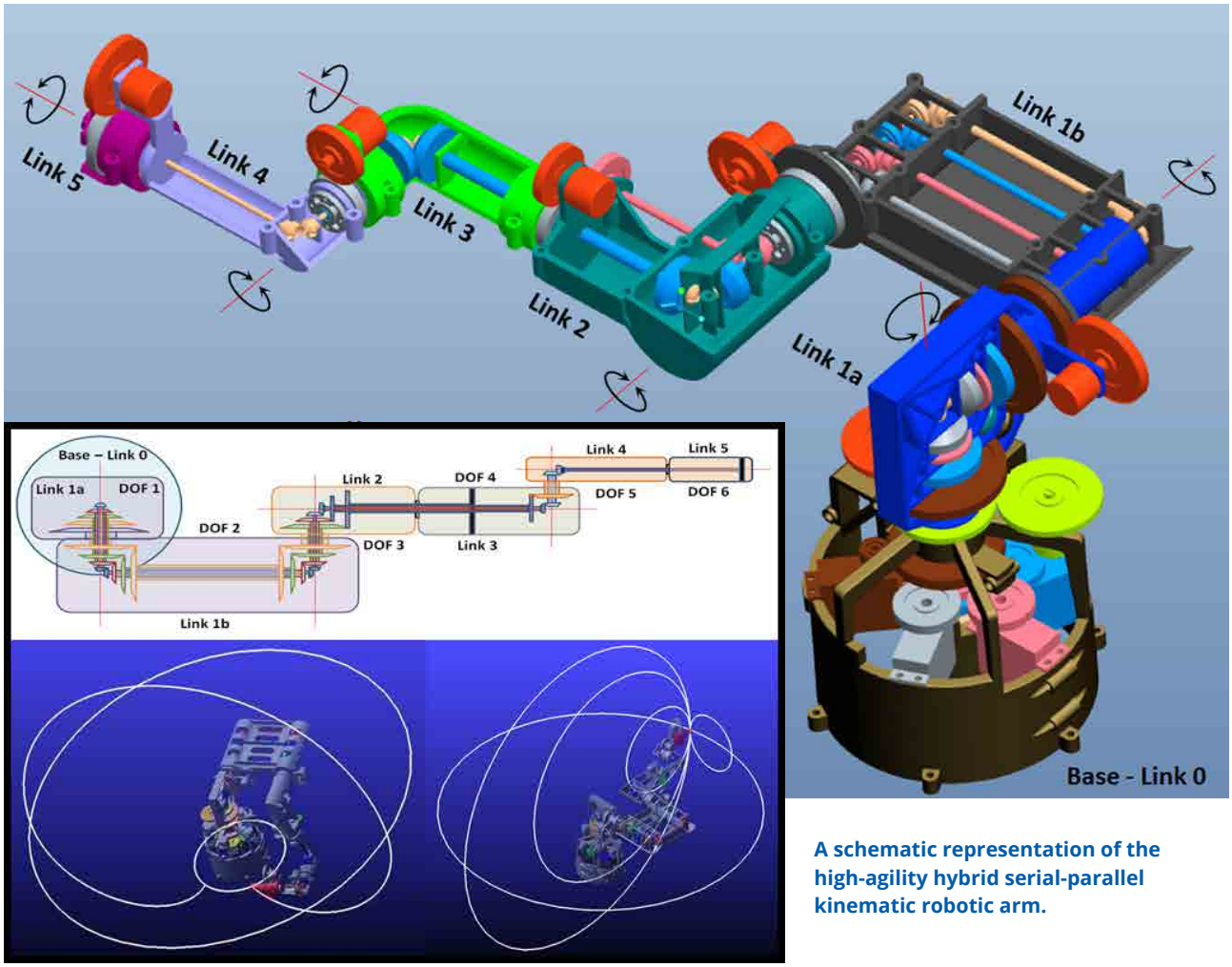
The annual Innovation Bridge competition of the Department of Science and Innovation (DSI) took place at the CSIR International Convention Centre from 4 to 6 December 2019. A highlight of the 2019 event was its combination with Science Forum South Africa (SFSA), which is usually presented as a separate event. This meant that the University of Pretoria's inventions, which were exhibited at the Innovation Bridge, received additional exposure.

Ryno Pretorius, the inventor of the rotowinner device.

The Innovation Bridge has become known as South Africa's premier technology matchmaking and showcasing event, which is aimed at encouraging and accelerating the utilisation of existing and new knowledge and technologies that have been developed by publicly funded South African research and technology development institutions. The focus on publicly funded research and technology differentiates the Innovation Bridge from other innovation and technology conferences and exhibitions held in South Africa.

The theme of this year's joint event was: "Igniting conversations about science for innovation with impact". It provided an opportunity for national and international technology-based companies, entrepreneurs, research institutes, financiers, and public and private sector representatives to scout for new technology solutions, new collaborative partnerships and new investment opportunities.

The University made use of this opportunity to profile two of its inventions emanating from the Faculty of Engineering, Built Environment and Information Technology (EBIT): novel electrowinning technology developed in the Department of Chemical Engineering, known as the "rotowinner" due to the rotational nature it employs. and a high-agility hybrid serial-parallel kinematic robotic arm.



A schematic representation of the high-agility hybrid serial-parallel kinematic robotic arm.

Rotowinner

The rotowinner was developed from a fundamental analysis of the industrial electrowinning process that has been in use up to now, which makes use of archaic technology. The design team invented a dynamic solution to improve on existing electrowinning processes in terms of usability, footprint, civil investment requirements, fluid dynamics, current distribution, production throughput, production efficiency and safety.

The rotowinner makes use of a single moving part, a rotating cathode surface where the metal is plated on continuously and then removed by means of a scraper. The metal is then collected as a ribbon, flake or powder for downstream processing.

Further safety features include the option to fully enclose the device with a cover to prevent the release of acid mists. Fresh electrolyte, which is rich in valuable metallic ions, is pumped through the machine on a continuous basis to ensure improved mass transfer and the continued replenishment of ions that have been taken out of the solution at the relevant electron.

The novel technology addresses as many of the problems associated with traditional electrowinning as possible, without compromising the robust design principles.

Robotic arm

The architecture of the high-agility hybrid serial-parallel kinematic robotic arm leverages off the benefits of serial and parallel kinematic machines, while minimising the disadvantages of each.

The design is based on the transmission of mechanical power via embedded drive trains to each joint in the system, from actuators that remain stationary in the base.

This promotes a lightweight structure with greater stiffness, stability and dynamic performance, while still offering high agility, a low footprint-to-end-effector reach ratio and a near spherical work envelope.

This architecture lends itself to the development of reconfigurable industrial robots that facilitate flexibility in automated manufacturing facilities. The lighter weight and optimised arm structure also allows for the deployment of robots with this architecture as Co-bots.

Although the concept was applied to an industrial robotic arm, it can be also be applied to and implemented in robotic exoskeletons and robotic prosthetics.

Photograph: Kyoob Studio

Sorghum invention attracts attention at Innovation Summit

The University of Pretoria once again took advantage of the opportunity to showcase one of its unique inventions at the Innovation Summit, which was held in Cape Town from 11 to 13 September 2019.

This was the twelfth annual summit, which attracts top entrepreneurs, innovators, thought leaders, policy makers, inventors and investors, who annually witness some of the very best of African innovation. This is the flagship event on the African innovation calendar, and provides a platform for nurturing, developing and showcasing African innovation, while facilitating innovation thought leadership. It was developed to support and showcase African innovation, and to facilitate collaboration and inspire sustained economic growth across Africa.

One of the highlights of the summit is the Inventors Garage, sponsored by the Technology Innovation Agency (TIA). This is an easily accessible competition for inventors, entrepreneurs and organisations who have a working prototype or product from proven concept to early commercialisation. This competition attracted 146 entries from across Africa, from which 20 finalists were selected.

SoYhum, a range of healthy Sma2rt Snacks from climate-smart crops, was selected as one of these finalists. This product, developed by Keneiloe Kganane of the University's Department of Food Science, in collaboration with Prof Riëtte de Kock, is made from naturally gluten-free sorghum, and competes sustainably with other snacks that are high in fat, sugar and sodium, but low in dietary fibre.

The product's development was aimed at reviving sorghum in the South African market by providing innovative, climate-smart, nutritious, affordable and tasty sorghum biscuits that will ensure food security for generations to come.

It was developed as part of a project in collaboration with the National University of Lesotho and the Botswana University of Agriculture and Natural Resources.

Its commercialisation was funded by Phase II of the Finnish-Southern African Partnership Programme (BioFISA) of the Southern Africa Network for Biosciences (SANBio)/BioFISA II Programme, an initiative of the New Partnership for Africa's Development (NEPAD). An outcome of this research programme has been the establishment of Sorghum Revolution (SR) Snacks (Pty) Ltd to manufacture and market these healthy snack products.

Inter-university Innovation Challenge develops student entrepreneurs

The University of Pretoria (UP) is participating in an inter-university innovation challenge, together with the Tshwane University of Technology (TUT) and the University of South Africa (Unisa), in collaboration with the Innovation Hub, TuksNovation (the University's technology incubator and accelerator), Universities South Africa (USAf) and the Technology Innovation Agency (TIA).

The aim of this challenge is to help the City of Tshwane Metropolitan Municipality come up with ideas for innovative and efficient service delivery, so that it can become "Africa's innovation capital". Through this challenge, the objective is to develop highly competent and confident student entrepreneurs with the capacity to conceive and implement innovative solutions that can solve service delivery challenges and ultimately improve the quality of life of the residents of South Africa and beyond.

An anticipated outcome of the programme is to build a vibrant, competitive entrepreneurship community in Tshwane. In the process, the programme will build a pipeline of entrepreneurs and innovators, create a platform for student entrepreneurs to showcase their innovative ideas, identify service delivery-focused innovations that can be upscaled and commercialised, and provide financial and non-financial support to student entrepreneurs.

The focus areas are water and energy, waste (clean tech), finance (revenue generation and collection) and clean transport/mobility. Students must be enrolled at one of the participating universities at the time of the application for participation in the challenge. They must have a registered legal entity, or the business must be in the process of being registered. They may submit two proposals. Those selected will be invited to participate in innovation boot camps.

Prizes for winners include seed funding/start-up support, incubation, mentorship and piloting.

Project applications were submitted between 27 February and 30 April 2020. This was followed by regional pitching sessions on the various campuses from 4 to 20 May, and an innovation bootcamp from 26 to 29 May. The final pitching week was to take place in the first week of June. The winners will be announced at a gala event on 16 June 2020.

Students of the University of Pretoria who wish to take part in the challenge, are invited to contact Thabang Qumza, the TTO's Commercialisation Coordination Manager, at 012 420 2029.

Representatives of the stakeholder organisations at the launch of the Inter-university Innovation Challenge.

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