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A BRIEF FROM the Manager’s desk

I am pleased to present our second series of our Newsletter. The implementation of Innovation and Technology Transfer Strategy is ongoing. With the new Research, Innovation and Engagement Strategy developed, it will give us another opportunity to review our current Innovation and Technology Transfer Strategy. This is in line with our dream of taking TUT’s innovation activities from “good to great”. With a small and overstretched team, we managed to succeed in achieving most of our goals.

The compilation of this newsletter has provided us with an opportunity to reflect on a number of activities that stood up in the reporting period. We trust that you will enjoy this selection of highlights. Our sincere gratitude to our colleagues and stakeholders who supported us through this journey and continued to support us to ensure that we attain these achievements. Our goal in the next coming period is to focus on “total” commercialisation. We strive to commercialise each and every technology developed at TUT.

Feedback from the readers will be much appreciated for improvement of the newsletter.

Best wishes

Dr Hamilton Mphidi
Dr Thandi is vocal about how impressed she is with what is happening at TUT, saying, “In terms of Research and Innovation, there is a lot of research and enquiry happening at TUT. Although these efforts are very aligned to national and global challenges, unfortunately they have not been exposed enough. There are great opportunities to align our activities even more effectively with global and national agendas, which will open up avenues to tap into the many activities and reposition staff potential differently and more meaningfully.”

Having been involved in higher education for more than ten years, Dr Thandi says that over time, she has observed some very interesting tendencies. “One of the amazing things is that there is majority of researchers in possession of PhDs at many universities in the country who seem to be totally silent. Although they have been at universities for a long time, their research outputs are not up to standard. On the short term, I would like to conduct a survey to determine how many of those are at TUT and devise a plan to tap into that potential. It is about time that the silent majority become loud and be heard,” she indicates.

Giving an overview of her immediate and medium to long-term strategies, Dr Thandi says TUT’s Research Strategy should become more aligned with and guided by international, continental, and local needs and strategies. “To have clear goals and objectives and be able to measure success is vital in any business. Therefore, I’m a strong supporter of clear monitoring and tracking tools to be built into everything we do,” she adds.

Another passion of hers is Science Communication. “The marvels of science, more specifically at TUT, must be shared with the world. We must get conversations going about science, research and innovation. One of my immediate activities will
be the implementation of a Science Communication Plan not only to profile our scientists and researchers and the wonderful work they do, but also to train researchers on science communication, including science education. In addition to being good for the image and reputation of the University, greater awareness about our excellence in science, research and innovation, will enable us to foster more international and national partnerships. In the longer term, it will also help us to raise more money for research and grants to support scientists to achieve greater heights,” she highlights.

She adds that the current cohort of young and upcoming researchers in South Africa is small. “We need to build the community of students with master’s and doctoral degrees and empower them to become emerging scientists.”

One of Dr Thandi’s first engagements with TUT was as a speaker during the Transformation Summit. Asked about her views on gender, she says, “South Africa has many issues confronting the country, from political to social cohesion. There is a growing burden of inequality. To pick but just one issue - that of gender inequality. In my view, gender inequality is not only about women, it is about society and how we address and cope with differences between and among people.”

**FIVE LESS KNOWN FACTS ABOUT DR THANDI**

1. **What is your favourite food?**
   
   I literally eat with my eyes. If it is visually appealing, I love any food. I also enjoy to experiment with different ingredients and dishes.

2. **What do you do for fun?**
   
   The outdoors is definitely my first love, walking, hiking, spending time at the beach and feeling the sun on my skin.

3. **What kind of music do you listen to?**
   
   Choral and classical music. My favourite artists include Sibongile Khumalo and Pretty Yende.

4. **What do you like to read?**
   
   I thoroughly enjoy biographies and reading about people’s experiences. I often find myself reading more than one book at a time, especially when it is “heavy stuff”, I need time to digest and reflect on the content before I can continue with a book. Redi Tlhabi’s biography of Khwezi is one such example. I started reading it, but it is so heart breaking, I had to put it down for a while.

5. **Which place in the world has made the biggest impression on you?**
   
   Without a doubt, Ethiopia. As one grows older, one experiences things differently. My recent visit to Ethiopia reminded me of the importance of things money cannot buy. Ethiopia is not a financially rich country, but they are rich in so many other ways. The spirit of the people, their hospitality, determination and their cultural pride have no equal anywhere else I have been.

**BIOGRAPHICAL INFORMATION**

Dr Thandi Mgwebi is a Research and Innovation leader with a PhD in Cell and Development Biology from the University of Cape Town. Her experience includes two years as a Post-doctoral Research Fellow with the South African Vaccine Initiative (SAAVI) at UCT; a ten-year full-time appointment as research leader and manager within the SA System of Innovation at the Council for Scientific and Industrial Research (CSIR); MRC and the NRF, where she was Executive Director for the South African Research Chairs and centres of Excellence.

She is an insightful leader in the SA Higher Education landscape, served in the Ministerial Task Team for design, implementation, monitoring and evaluation of a National Mathematical Sciences Programme. She has featured in many international forums for research management and practice in higher education. Dr Thandi has provided training on research and grant management to a range of stakeholders in and outside South Africa, including her role as trainer and facilitator for Objective 1 of the Science Granting Council Initiative (SGCI) in Africa. Dr Thandi is an advocate of science engagement and communication; she has concluded significant international partnerships that have leveraged financial and in-kind support for the national science agenda.

She has also represented the country at many international forums such as the World Science Forum; the American Association for the Advancement of Science; the European Open Science forum; the International Network of Research Management Societies (INORMS).

Prior to joining TUT, she was the Director of Research at the University of the Western Cape, since 2015.
Prof Keolebogile Shirley Motaung, Assistant Dean of the Faculty of Science as well as Tissue Engineering and regenerative medicine expert, has once again scooped the Innovative Women of the year award at the Gauteng Women of Excellence award ceremony that took place at the state theatre on 8 March 2018.

Reflecting on her career to date and when receiving her award, Prof Motaung said that there have been many personal highlights. She is looking forward to future academic collaborations and making further advancements within her field of research.

According to the Gauteng Premier, David Makhura, the awards were launched as a platform dedicated to recognising outstanding leadership, inspiration, vision, and innovation in organisations and individuals that have stepped up and shaped women’s roles within the private and public sectors.

“We are proud of Prof Motaung. She continues to be a role model to young women in South Africa and the world at large. We anticipate our visit to TUT to see some of her amazing work and innovations coming from the institution,” he said.

In addition to her accolades, Prof Motaung was selected as one of the 50 most inspiring women in South Africa. She also received the National Science and Technology award under corporate and the South African Women in Science Award for her innovative breakthroughs. She is currently a finalist for the Business Women of the year awards.

“I was greatly honoured to receive this award from a community that acknowledges women and their significant contributions to research, innovation and community engagement. Our Premier in Gauteng is a step ahead in such initiatives and this one goes to my students, especially Maepa, Mapula Razwinani and TUT for all the support given to me,” said Prof Motaung.
The Directorate of Research and Innovation hosted the first Research and Innovation Indaba, which interrogated and explored the different facets of research in the University. The event took place at TB Hall from 8 to 10 October 2018.

Dr Thandi Mgwebi, DVC: Research, Innovation and Engagement, set the scene on the first day of the Indaba, highlighting that through research activities, knowledge is shared and such initiatives should be utilised to engage, showcase ideas and highlight exciting collaborations at TUT. A first for TUT, the Indaba brought together academics, students, policy makers, industry, funders and other significant stakeholders for three days of a rich scholarship engagement.

Aspects of research presented at the Indaba covered a range of topics, including but not limited to predatory publishing, the art of science communication, the essence of international research collaboration, funding opportunities, translation of scientific research finding into viable business cases, etc. Included in the programme were poster and oral presentations, innovation competition, awards for approved patents and a cocktail event, which allowed Indaba participants to network on a lighter note. Overall, the Research and Innovation Indaba was a resounding success. It portrayed an eye-opening and empowering experience affirming that a research culture is alive and strong at TUT.

Dr Mgwebi also expressed her hope that the Indaba should evolve to a continuous discussion between academics, students, researchers and policy developers as they grapple with the good and the bad facing the research fraternity, at TUT in particular.
Among the many international solar vehicle challenges, the South African bases Sasol Solar Challenge is one of the most notorious. The route offers unique and challenging geographical characteristics as well as a rare structure. The aim is to cover the furthest distance possible in eight days, rather than the shortest time between two points of fixed distance.

Team leader, Johannes de Vries, explained that the challenge requires teams to design, build, manager and race their solar vehicles from inland Pretoria, across South Africa to Stellenbosch in the coastal region. Along the routes, teams must do careful planning, taking into account the changing landscape from a vast flat topography, to mountainous regions, ascending and descending hundreds of meters at a time. “The route also offers a broad spectrum of weather conditions near the coastal towns, leading to challenging situations with at least a day or two of rain as well as some cloudy and very windy routes,” de Vries added.

In the run-up to the 2018 Sasol Solar Challenge, TUT and Meteomatics AG, a Swiss-based global weather service provider and weather drone experts, signed a Sponsorship Agreement, underpinning their strategic commitment to the innovation of future transportation. The parties formalised their engagement in order to display their joint capabilities with specific emphasis on the development of solar-powered vehicles. The strategic alliance focused on Meteomatics providing highly accurate weather data to the TUT team to use in their advanced route planning for their solar vehicle in the recent Sasol Solar Challenge 2018.

“Optimising on technology, more specifically the use of Meteomatics AG, a Swiss-based global weather service provider and weather drone experts, played a major role in improving the performance of our solar car,” said Tiaan Oosthuizen, team member and PhD student in Meteomatics, responsible for calculating the algorithms that enabled better decision making in terms of weather predictions.
SunChaser 3, the Tshwane University of Technology’s low budget, high technology solar car, has proved beyond doubt that it is the leading solar car in South Africa. The TUT solar car took the lead nationally in the recent Sasol Solar challenge and obtained a fourth position internationally. The team from the Netherlands won the grueling weeklong challenge from Pretoria to Stellenbosch, having completed a total of 4 147.8 km. TUT’s SunChaser 3 completed 2 397 km, with its major contender, North West University, completing 2 276.3 km.

“For the past 18 months, I have developed algorithms and software, as part of my PhD, to optimize the energy use of SunChaser 3. The combined use of the Meteomatics data, which is a very accurate and stable platform for weather data, together with my algorithms, definitely gave us the edge, significantly improving the performance of our solar car, compared to 2016,” Tiaan added.

He explained that, although the North West University’s solar car was technologically much more advanced than SunChaser 3, TUT’s energy forecasts and decision making topped that of other local participants. “This, in combination with the entire team’s hard work and dedication, gave TUT the edge over other local competitors,” he added.

According to team leader, Johannes de Vries, the new regulations in terms of solar panel size posed some challenges in the design and manufacture of the solar car. The focus was on increased aerodynamics and as well as reducing the weight and size of the car, since there would be less solar energy available to it.
YOUNG GIRL’S LIFE SAVED THROUGH INVENTION

Imagine how powerless you would feel if you were unable to provide for your child’s life support. This is what Tshepiso Mashubuku, a single mother is dealing with. Her daughter, Koketso (9), living with pulmonary bronchitis, needs oxygen therapy 24/7.

But thanks to the Department of Electrical Engineering (DEE) and the Centre for Energy and Electronic Power (CEEP) students, who designed a solar system, which generates power the Mashubuku family so desperately needs, since they had no access to electricity.

The family is now able to charge the oxygen machine uninterruptedly with batteries for energy storage.

Reuben Shongwe, a technician at the Faculty of Engineering and the Built Environment, brought the family’s plight to everyone’s attention. With the support of Prof Josiah Munda, Assistant Dean of the Faculty and Head of DEE, as well as Dr Olawale Popoola, Director of CEEP, the system was designed to relieve the family of this life changing challenge.

Koketso’s grandmother, Sophie Mashubuku, mentioned that she had to walk 4km to charge the machine in the past and that it was important for the little girl.

She said the solar system changed their lives tremendously. “Since we received this donation, the doctors are very pleased with the improvement in Koketso’s health,” she added. Previously, keeping the oxygen machine charged had a huge financial strain on the family, with the mother being the only breadwinner to support them. Koketso uses two different machines to breathe. The larger machine is used when she is feeling ill and the smaller one for her day-to-day use.

Titus Mofokeng, personal assistant to the chief, thanked the University on behalf of the Manala tribe under King Makhosonke II leadership. Mofokeng said he was hopeful that the University students who came from their area, will continue to help their people.
Trailblazing Women take lead at World IP Day

The World Intellectual Property (IP) Day, which took place on 26 April 2018, was marked with an event by the Directorate of Research and Innovation. It gave centre stage to women known for their innovation and creativity.

In her opening, Dr Thandi Mgwebi, DVC: Postgraduate Studies, Research, Innovation and Engagement indicated that this year’s theme, Powering Change: Women in Innovation and Creativity, encourages women to contribute in making the world a better place to live through creative and innovative efforts. “We are excited because this event also serves as a reminder to women that though stereotypes still exist to some degree in the innovation sector, women have to halt barriers, make good use of their talents, and create their future,” she said.

Indigenous speakers such as Prof Shirley Motaung: Assistant Dean at the Faculty of Science, and CEO of Global Health Biotech; Johanna Mukoki, Co-founder: Travel with Flair; Tumelo Mashabela, founder of Mashabela IP Law firm; Rachel Sikwane, Director at ENSafrica; Thando Skosana, Business Manager at Standard Bank; and Mapula Razwinani, a D Tech student at the Faculty of Science, who graced the event, all brought in their A-game - sharing experiences of their journey to the top.

“I have been running a very successful travel company for 20 years, which employs more than 800 people. I had to be bold and challenge perceptions about female innovation, inspiration, creativity, and entrepreneurship. We have in recent years, been given more opportunities to celebrate women as thinkers, leaders and innovators outside of traditional roles. This project, along with my other business ventures have been an opportunity to celebrate women who, despite having the odds stacked against them, are persistently putting time and energy behind the creation of their ideas and dreams,” said Johanna Mukoki.

Small and medium enterprises (SMEs) also received lessons on IP registration, patents and trademarks. “Even small businesses have valuable IP. For them, the first step is recognising their potential IP value, what needs protection and then formulating a strategy to implement it and turn their focus to realising the potential of their innovations,” said Tumelo Mashabela, who qualified as the first black female patent attorney in South Africa.

To the agreement of the audience, Prof Motaung, recipient of the 2018 Innovative Woman of the Year Award, emphasised on introducing entrepreneurship education to every student at the University. “Youth unemployment is a heated topic right
With the hashtag #SEW 2018, the best of both worlds, the event aimed at supporting students who are considering entrepreneurship as a potential career and encouraging students to become employers, rather than employees. Speaker after speaker emphasised the need for students to become more entrepreneurial and help to alleviate societal problems.

During the official launch of #SEW 2018 on 1 August, keynote speaker, Greg Solomon, Chief Executive Officer of McDonalds, said students must strive to become influential leaders. “Everything starts with leadership. Being a great leader is not about crossing the finish line first, but rather about carrying others to the finish line,” he said.

“As future leaders of our country, students must start to make good and positive decisions that will make an impact in the development of our country. Our small everyday entrepreneurial innovations will become the future successes of our nation,” he added.

Prof Ahmed Bawa, Chief Executive Officer of Universities South Africa, said with the rising unemployment figures in the country that are reaching unsustainable levels, we cannot depend on the Government alone to fix our problems. “We need the innovative entrepreneurial skills of our young students to help alleviate societal problems,” he said.

“As institutions of high education, we must come up with programmes that inculcate a culture of entrepreneurship. Our universities should work together and change the way we engage with all relevant stakeholders in society,” he added.

Prof Mukhola, Deputy Vice-Chancellor: Teaching, Learning and Technology, said the University was honoured to host the National Student Entrepreneurship Week. “The University is constantly changing its programmes so that we empower students to be relevant and become job creators rather than job seekers.”

The Technology Station in Chemicals (TSC) at the Ga-Rankuwa Campus, recently hosted an eight-member delegation from the OR Tambo District Municipality in the Eastern Cape, to explore possible partnerships between the parties.

Headed by the Deputy Mayor, Robert Nogumla, the group spent a day at the TSC observing their daily activities, which include the station’s manufacturing processes. The focus was on the promotion of a culture of social development as well as technology transfer through innovation to small businesses, entrepreneurs and young people in the chemical sector.

“As a municipality, one of our goals is to resolve some of the issues the youth in the country faces, especially unemployed graduates. Another goal is to provide support to entrepreneurs. The long-term aim is to involve them in future projects we are planning,” Nogumla said.

It is foreseen that the partnership will result in skills development through Short Learning Programmes (SLP) and technology transfer to SMMEs (small, medium and micro enterprises).

Vincent Tau, TSC Manager, emphasised the need for strategic partnerships with the chemical industry, as well as local municipalities and other government entities.
SCHOOL MAKES HISTORY IN F1 COMPETITION

A team from the Siyokhela Junior Secondary School in Soshanguve, which serves many learners from disadvantaged communities, has won the National F1 in Schools Challenge at the Sci-Bono Discovery Centre in Johannesburg.

Supported by the Institution for Advanced Tooling (IAT) staff and students, the team, known as Bonad, will jet off to Dubai in September 2018 to represent South Africa in the next leg of the international competition. The Bonad team comprised five learners aged 12 to 14 years old.

The ‘F1 in Schools’ initiative is a global programme to encourage learners aged nine to 19 years old to experience Science, Technology, Engineering and Mathematics (STEM). Staff and students at IAT assisted the team to develop their first F1 car. This happened after Kelebogile Setlhodi, a TUT Education student and a Technology teacher at the school, approached Jeff Makhubela, IAT Manager for assistance.

“I am happy and proud of all my teammates because none of this would have been possible without their input. The fact that we are the youngest competitors in this challenge makes it even more special,” said Amogelang Moepi.

IAT took up the challenge and trained the learners on Computer Aided Drawing (CAD) and guided them on how to design their own F1 car. The final design was developed on a Computer Numerical Control (CNC) Milling Machine in accordance with the competition’s rules and specifications. The team also received a Nissan SA sponsorship for branding their project.

“We are thankful for IAT’s involvement in the school’s project. At present, the learners are working with the IAT staff and we are thrilled with the value added to our learners’ learning experience,” said the school’s principal, Ndo Masemola.

Executive Chairman and Chief Executive Officer of Formula 1 Group indicated that the F1 in Schools initiative was growing rapidly and that thousands of young people were now inspired to venture into science and technology careers.
Faculty of Engineering and Built Environment students will have a better understanding of how the industry works when they exit the University; all thanks to the new Technology Station in Chemicals at the Ga-Rankuwa Campus.

The station, managed by Vincent Tau, focuses on the technical part of the course. It provides students with strategic direction in regard to product development, execution and registration of their projects.

At the station, various technologies under the chemical arena are explored, namely oil extraction, cosmetics, detergents, electroplating, bar soap making and perfume creation technologies. “Currently, we are working on a project called the Green Project. We take natural resources and convert them into usable and commercialised products. We also join forces with academics, to identify high tech projects and come up with solutions on behalf of small enterprise entities,” said Vincent.

Chemical, Metallurgical and Materials course is divided into four different sections, namely project development and testing, project research, testing and analysis, and training. The training is focused on Experiential Training (P1 and P2), after the students have completed all their theoretical studies. “Due to a lack of Experiential Learning opportunities within the industry, we assist students by exposing them to an industry related environment, which allows them to complete their P1 and P2, ultimately qualifying for their diplomas,” he added.

The technology stations are financed by the Technology Innovation Agency (TIA) and chemical Small Enterprise Development Agency (SEDA). The recruited students’ work closely with the station’s team on various projects involving small enterprise companies. These projects are then evaluated and presented to the client.

To date, the station has worked on more than 30 successful projects, with several others in process. Molelekoa Mosesane, a master’s degree graduate and technician at the Department of Chemical, Metallurgical and Materials Engineering, received hands-on experience at the station. He presented an academic paper in Turkey, Antalya, and an additional paper was published in the Global Journal of Researchers in Engineering. He lauds the station for giving him the opportunity to work and be exposed to actual industry experience.
In the Institute for Advanced Tooling (IAT), a subdivision of the Faculty of Engineering and the Built Environment (FEBE), received the highly acclaimed ISO 9001 certificate of registration for its quality management system on 13 October 2017.

The ISO 9001 Quality Management System (QMS) is internationally recognised as the world’s leading quality management standard. The purpose of the standard is to assist organisations in meeting statutory and regulatory requirements relating to their products and/or services while achieving excellence in their customer service and delivery.

Over the past years, IAT has positioned itself to be able to respond to industry needs, especially in the tooling and manufacturing sector, in order to gain customer confidence. “There are many benefits that you will reap from this certification. The number of partnerships with bigger organisations will increase, it will be easier to service your customers because you now have clear and precise process in place, you will start to see better integration in your systems, and decision-making will become much easier. This certification has set a great standard for the institute as whole,” said Gorden Seopa, a representative of the South African Bureau of Standards (SABS).

As a technology station mandated with Small and Medium-sized Enterprises (SME) development, IAT has selected ISO 9001 as a tool to help it achieve its objectives. QMS ensures that the station has clear work processes and procedures, communication structures, tasks and responsibilities throughout the entire value chain of its service offering.

The main objective of the technology station is SME development, as mandated by its stakeholders. These could be start-up SMEs or those that are already trading, such as the current Original Equipment Manufacturers (OEM) suppliers. High quality goods, services and traceability for defects are some of the fundamental requirements for OEMs. Distinguished guests at the award ceremony included the companies’ key stakeholders from SABS, Technology Innovation Agency (TIA) and merSETA that commended IAT for their positive interactions.

An ISO flag that serves as an awareness sign to the general public and potential clients to show that the organisation does have an accredited ISO 9001 QMS was hoisted outside the IAT building.

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IAT RECEIVES ISO 9001 REGISTRATION

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INNOVATION WATCH | Issue 2: December 2018
Patient safety and hygiene prompted the design and development of an innovative Hand Hygiene Monitor to curb the spread of bacteria in hospitals. Steve Mbappe and Nicholas Wiles from the Technology Station in Electronics (TSE), developed an automatic hand sanitiser or soap dispenser that logs data when used.

“The idea behind this project was to address the real world problem of hygiene in hospitals and find an innovative solution. Research by the client called Makazi Concepts, has shown that there are instances where doctors and nurses do not wash their hands prior to consulting with patients,” said Kobus Vorster, manager of the TSE.

In an interview with eTUTor, Kobus explained the important role and function of the TSE in terms of research, innovation and taking a project from a concept to an implementable solution.

He explained that the stations at TUT vary according to the geographical location and expertise:

- The Technology Station in Chemicals (TSC) is located at the Ga-Rankuwa Campus;
- The Institute for Advance Tooling (IAT) is at the Soshanguve South Campus; and
- The Technology Station in Electronics (TSE) is situated at the Pretoria Campus and the Council for Scientific and Industrial Research (CSIR) Campus.

According to Kobus, the TSE deals primarily with the manufacture and design of prototypes, training of students, and consulting with clients on their needs, the development of products and processes.

The TSE either receives the majority of its projects directly from industry clients or the Technology Innovation Agency (TIA) refers them to TUT.

Kobus explained that a brief of the specific project is sent to the TSE with the specified requirements. The staff, who work in teams that can configure themselves and the facilities around the projects they have to work on, then discuss the projects and assign them to a specific design group to complete, in alignment with the agreed requirement specification of the customer.

A project can take anything from a few months to a year to complete, depending on the labour intensive nature of the development. It is important for the team to ensure that projects adhere to the clients’ requirements, hence it could take from six months to a year to form a concept and develop a prototype that will demonstrate the clients’ original concept in the physical environment.

Kobus added that the TSE recruits and offers opportunities for designers, who studied or are still enrolled at TUT, from various engineering backgrounds. These designers form part of their multidisciplinary team in the development of prototypes for individuals and businesses. A number of these designers have since completed their undergraduate studies and are ready to enrol for master’s degrees.
Song, dance and dialogue marked **AFRICA DAY**

Songs, dance, dialogue and traditional regalia from various African nations marked Africa Day on 18 May, with postgraduate students, research fellows and supervisors from different nationalities converging at the Business School.

The Africa Day event, organised by office of the DVC: Postgraduate Studies, Research, Innovation and Engagement, Dr Thandi Mgwebi, is celebrated annually in May to mark the formation of the Organisation of African Unity, now known as the African Union (AU), by 32 governments in 1963.

Speaking at the event, Prof Felix Dakora, President of the African Academy of Science (AAS), said Africa Day was a celebration of African growth and advancement, but also a day to reflect on the challenges that continue. “There is so much to celebrate and a lot more to amend. This is our time as Africans to celebrate ourselves, our languages, our innovations and everything made in Africa. Africa is well on its way to building bridges, but citizens could do more to bridge the economic, social and cultural divides that still exist in our continent,” he said.

Prof Shirley Motaung, Assistant Dean: Faculty of Science said she was proud to be African. “I am proud to call the second-largest continent on the planet my home; and what a beautiful home it is! The tireless spirit of our people, the diversity and unique beauty of Africa is incomparable anywhere else in the world. We have a rich liberation history filled with great struggle and victory with an ending that is yet to be defined,” she said.

Prof David Katerere, from the Department of Pharmaceutical Sciences, spoke on the African narrative. “In earlier years, we had no choice but to accept a certain level of ignorance and distorted media reporting of Africa, however, audiences on the continent and afar are now requesting more intelligence, nuance and fairness. It’s time we told our stories our way,” he said.

A jazz band comprising TUT students from the Faculty of the Arts got the audience on its feet, dancing and singing along to songs by the late Miriam Makeba, who was nicknamed Mama Africa.

Dr Mgwebi said the University will from now on celebrate Africa Day annually.

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**Prof Shirley Motaung**

**Prof Felix Dakora, President of the African Academy of Science (AAS)**
ENGINEERING PROFESSOR secures funds to establish an incubator

Inspired by the #FeesMustFall campaign, Professor Khumubulani Mpofu, an NRF Y-rated researcher and the Gibela Research Chair at the Department of Industrial Engineering, secured R5 million towards the establishment of a Manufacturing Incubator from the Department of Small Business Development.

"Young people are increasingly recognised as critical actors in matters of global importance such as the Fourth Industrial Revolution, especially in advancing competitive economies of the future. I place great hope in their potential and power to shape our future and the greatest investment would be in their technology-focused entrepreneurial education, hence this initiative," explained Prof Mpofu.

Moreover, fully conscious of their role as catalysts for economic and skills development, Prof Mpofu and the Gibela cabal are set on a mission to create jobs through innovation. An agreement to establish an incubator was crystallised by the many prototypes his team has developed but have not realised their commercial potential. Gibela has concurred that with creative and innovative ideas, it is imperative to secure resources, receive support, and possibly develop these concepts into technology-driven SMME businesses. This is a challenge Prof Mpofu has embraced and has given birth to the incubator support.

“The incubator will enable transition from the academic space into commercial domain, then, translate that into sustainable commercial entities. It was critical for the Gibela Rail Consortium to have the incubator, because they have a programme of developing black industrialists and on the other hand, I am on a mission to not only invest in students’ education, but also influence employment creators who will contribute in unravelling the unemployment, inequality and poverty triple helix challenge South Africa faces”, he said.

Prof Mpofu, currently the youngest professor in the Faculty of Engineering and the Built Environment, began his research career after the completion of a five-year qualification, with a design project that he carried out for his Bachelor of Engineering Honours degree in Industrial and Manufacturing Engineering. This project had both design elements and an exploratory research aspect. In 2005, he received an offer to be a lecturer in a Bachelor of Technology programme at a Polytechnic, where he was responsible for computer-related courses. He then enrolled for a postgraduate course which had a 50% research component.

During his Master of Science in Manufacturing Systems and Operations Management studies, he gained interest on the computer aspects of the manufacturing industry. He was also involved in a Cleaner Production project at the manufacturing site of an airline production and maintenance unit. He also pursued a research project in 2006, focusing on small to medium enterprise wood manufacturing companies and how they can reduce their environmental impact by collating their efforts with a clustering approach. Prof Mpofu enrolled for a Doctorate degree in Mechanical Engineering at TUT in 2007, where he designed a Knowledge Based System for Reconfigurable Manufacturing.

He initiated the Gibela collaboration on 12 March 2015 with Marc Granger, Gibela’s CEO at the time, who introduced him to the Economic Development Director, Dr Buyiswa Mncono-Liwani. Further engagements resulted in the signing of an MoU to collaborate on a research chair in manufacturing and skills development in 2016, this being an effort to support the mega million rand project to revitalise the SA commuter rail car manufacturing sector. This incubator will be the first to have a focus on rail manufacturing and manufacturing in general in the country. Gibela Rail Transport Consortium (Gibela) is a newly-established company to manufacturer 600 X’Trapolis MEGA (metric gauge) commuter trains to the Passenger Rail Agency of South Africa over a period of ten years.
Two Engineering students got a chance to overcome their fear of public speaking when they represented the Faculty at the Famelab Career Researcher’s competition, held at the Business School in March 2018.

David Abrahams, a Doctor Technologiae (D Tech): Mechanical Engineering student and Tsholofelo Modise, a Magister Technologiae (M Tech): Electrical Engineering student, were afforded an opportunity to present their projects, a Solar Heating System and a Robotic Walker respectively, in front of a full audience and fellow researchers.

Tsholofelo admitted that she has social anxiety disorder - a fear of public speaking. She said she had to put all her strength together to overcome her fear when she entered the competition. She exhibited her Robotics Walker, which aids people with general disabilities as well as elderly people with mobility. She said that what makes her walker different is the fact that it uses a sensor that allows it to move according to the phase or movement of the user. The Walker aids people with general disabilities as well as elderly people with mobility. It is designed to be a mobile and adaptable assistive device for people with disabilities.

David said he was grateful for the opportunity to participate in the competition. It provided a platform for him to create an awareness of his invention. “People might appreciate our efforts more if they are aware of our ideas and innovations from the beginning of the project,” he said. He presented a Solar Water Heating System, which is an alternative way of heating water from the conventional known metal system (geyser). He said the aim of the project was to find an environmentally-friendly design that will not have a negative impact on the environment. His design is in a shape of a parabolic curve to enhance more light to effectively heat the water. “My research was aimed at finding an easy, effective way to heat water for domestic and commercial use,” he said.

Although they were not the winners in the competition, they enjoyed the experience and believe it has equipped them with skills to become better presenters in the future.
Jeff Makhubela, Station Manager at the Institute for Advanced Tooling (IAT), is adamant that more should be done to empower learners with career information. He realises that the Department of Basic Education (DBE), teachers, and parents, play a vital role in helping learners with this process. The station is situated at the Soshanguve South Campus.

Gopolang Seyagodimo, a student doing practicals at the IAT, said he never knew which career he wanted to follow. He then took a gap year to conduct research on possible careers. This is when he discovered that Mechanical Engineering was the course for him. Gopolang believes that certain characteristics are required for that specific career, as well as background information before you can make an informed decision. Passion alone is not enough.

“Teachers in high schools have to take initiatives and expose learners to different career opportunities. This can be done by inviting people working in different industries to present talks to learners about their professions. That definitely can help learners to have a better understanding of the careers to follow,” he said.

Tshepo Magatla mentioned that initially, he did not think Mechanical Engineering was something he would do; however, he knew that he preferred something challenging and unpredictable rather than a fixed routine, which could become very boring. “Most of the products and services we receive are from abroad. We have the manpower in South Africa, we need more skilled people so that we can start producing our own products”, he explained.

The IAT, one of three technology stations in the Faculty of Engineering and the Built Environment (FEBE) and funded by the Technology Innovation Agency (TIA), focuses on Tool, Die and Mould (TDM) skills and technology development and transfer. The IAT also assists local Small, Medium and Micro Enterprises (SMMEs) to develop their manufacturing capabilities and outputs. IAT specialises in designing and manufacturing of tools such as Injection Moulds, Press Tools, Jigs and Fixtures.

Jeff stated that IAT deals with the practical part of the course, which is the making of tools, while the theoretical portion of the course is conducted by the Tshwane University of Technology. #
Entreprenurship education at TUT just received a boost with the signing of an agreement of collaboration regarding entrepreneurial education with the Haaga-Helia University of Applied Sciences (UAS). The program is among the first of this extent in Finland. The collaboration will include, among other things, the development of education, lean startup know-how, coaching skills training as well as Research and Development projects.

Prof Stanley Mukhola, Deputy Vice-Chancellor: Teaching, Learning and Technology, signed the agreement on behalf of TUT together with Hannele Mennala, Head of the StartUp School from Haaga-Helia University UAS.

The signing took place on 15 March, during the visit of Business Finland delegation led by Minister of Foreign Trade and Development Anne-Mari Virolainen.

“This co-operation is a first-rate example of how Finnish educational expertise can be a driver for the required positive change in societies. I am pleased to notice how these types of larger education export initiatives that are now happening, combine the key strengths of Finland, those of education and innovation ”, says Minister Virolainen.

A Center for Entrepreneurial Development will be created at TUT. The Centre will utilise best practices from Haaga-Helia and its StartUp School incubator. The first modules of the co-operation will start in June 2018, both in Finland and in South Africa.

Founded in 2012, the StartUp School helps Haaga-Helia students to develop their entrepreneurial skills and start their own businesses.

Haaga-Helia UAS will support TUT in developing a new entrepreneurial study programme. The programme is expected to launch in 2020. Other areas of co-operation will include lean startup expertise, coaching skills training, programmes for collaboration between companies and the University as well as Research and Development projects.

“Our co-operation with Haaga-Helia is significant as it is targeted at empowering our students to start new businesses. In this way they can become employers in South Africa who can assist in eradicating the high unemployment rate in the country”, says Prof Mukhola.

“We are extremely excited about the agreement, since it provides a new opening for education export in Finland and our joint co-operation with TUT. South Africa is highly appreciative of our StartUp School’s innovative way of operating and the pedagogical know-how in Finland,” says Mennala. “As working life is changing fast, an entrepreneurial mindset is a great asset to accelerate future growth in any work role,” Mennala concludes.

The two institutions share a number of similarities. TUT is the biggest contact university of technology in Southern Africa, with over 60 000 students in seven faculties across seven campuses. Haaga-Helia UAS is the largest business educator in Northern Europe with a strong focus on entrepreneurship and co-operation with local industries. At TUT, there is also a strong focus on entrepreneurship in many of its courses.

Haaga-Helia
Top researchers exchange outputs at SASUF seminar

Four of the University’s finest researchers and inventive speakers delivered fascinating presentations at the South Africa-Swedish University Forum (SASUF), hosted in collaboration with TUT, on Friday, 14 May 2018.

The four colleagues are all from the Faculty of Science. Prof Ntebogeng Mokgalaka, HOD of the Department of Chemistry, spoke on Soil Reclamation through Phytoremediation; Prof Tshimangadzo Lucky Nedambale, spoke on the Impact of Climate Changes in Livestock Production. He is an insightful scholar and a humanitarian who uses his expertise to empower farmers and communities across Africa.

Prof Felix Dakora, South African Research Chair in Agrochemurgy and Plant Symbioses, followed with a presentation titled Working towards Zero Hunger in Africa with Nitrogen-Fixing Legumes in Agriculture; and Prof Shirley Motaung, Assistant Dean: Faculty of Science, concluded with a talk on the Interface of Health and Agriculture.

SASUF is a strategic internationalisation project that will run from 2017–2020. The aim is to strengthen ties between Sweden and South Africa in research, education and innovation. It is also a collaborative project between 30 universities in Sweden and South Africa as well as embassies, civil society organisations, funding agencies, and ministries in these countries.

Dr Thandi Mgwebi, Deputy Vice-Chancellor Postgraduate Studies, Research, Innovation and Engagement highlighted the benefits of such international partnerships. “Universities across the world are already seeking to make the most of the possibilities SASUF presents. TUT is excited about forming global partnerships and fostering relationships with other institutions,” she said.

She added that the forum aims to bring together researchers from Sweden and South Africa in seminars, to allow exchange and collaboration on projects; explore innovative ways to approach internationalisation and use the power of digital tools for international collaboration; as well as connect researchers with funding agencies, industry, ministries and surrounding society in working towards the Sustainable Development Goals (SDGs).

New Appointments

🌟 Ms Siyanda Msithini was appointed as a Commercialisation Practitioner in April 2018. Having worked at the CSIR in the same environment, she will focus on commercialisation of TUT technologies. This will include marketing of technologies and administering the TIA Seed Fund Programme.

🌟 Mr Wakheni Mekute was appointed as an intern in April 2018. He will assist the Innovation and Technology Transfer with developing of marketing brochures of technologies as well as e-tools for marketing. He will also assist in developing business cases for technologies and with the implementation on new electronic database of Technology Transfer.

🌟 Ms Thandeka Nabileyo was appointed as an intern in April 2018. She will focus on support to technology transfer activities i.e. coordinating activities at Centres, Institutes, Technology Stations and Incubators. Apart of this tasks, she will also be assisting in compiling and analysis of CITSIs quarterly and annual reports. She will also assist with the monitoring and evaluation of CITSIs.