

Faculty of Engineering, Built Environment and Information Technology Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la BoetSenere, Tikologo va Kaze le Thekenolotši va Tabedimoka

## EB Tgeneration Innovating our tomorrow

### WELCOME TO THE EBIT GENERATION

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■ ENGINEERING
■ BUILT ENVIRONMENT
■ INFORMATION
■ TECHNOLOGY

EBIT is the only faculty at a South African university to incorporate the unique blend of the fields of engineering, built environment and information technology. The EBIT Generation is a generation of problem-solvers and innovators who are ready to change the world.



Message from the Deputy Dean



### **Dear prospective student**

The year 2020 will be remembered as the year in which we were forced out of our comfort zones and a year that drove us all to adapt to changing circumstances without losing our focus. This year taught us to innovate in order to succeed and to reach the goals we set for ourselves.

Your decision to study at the Faculty of Engineering, Built Environment and Information Technology (EBIT) is your first step towards a fulfilling future. Once you have completed your degree with EBIT, you will become the innovator, the spark and the change agent who will work towards a better world for all your fellow human beings.

We are all eagerly awaiting the Grade 12 results.

A new chapter in your life will soon begin. No matter what the results are, make the decision now that it will be a positive chapter in your life. EBIT is ready for you and we will support you all the way if you are ready and willing to put in the work, no matter what the challenges are.

**Unlock your potential** 

I hope you find the content of this newsletter, and in particular the testimonials and achievements of our current students, inspirational, and that it will motivate you further to not give up on your dreams – no matter what.

We look forward to welcoming you to EBIT.

A new chapter in your life is about to begin.

**Prof Alta van der Merwe** Deputy Dean: Teaching and Learning

# INNOVATION IS OUR BUSINESS

Find your passion in one of our many cutting-edge fields

disruptive

technology

virtual and augmented reality



digitisation



society 5.0



internet of things

big data



machine learning



smart grids



additive manufacturing



automation

smart cities

green

building



Engineering 4.0 Complex

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artificial intelligence

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### Electronic engineering

### Armand Steyn

**I AM** a BEng Electronic Engineering student at the University of Pretoria. My fascination in innovation and technology fuels my desire to constantly seek knowledge and expand my mind. EBIT not only enables, but also encourages this.

The manipulation of electricity to create technology is captivating and I've been able to experience this in action at the Department of Electrical, Electronic and Computer Engineering (EECE). The Faculty prioritises the overall development of its students. The academic staff members continually encourage us to strive beyond our limits. The Faculty is also incredibly interactive and hosts numerous events such as career exhibitions, health and fitness gatherings, and community outreaches.

My department offers world-class facilities to aid in our learning experience. One event I especially enjoyed was the highly anticipated annual robot race day, where I was a track official. Bearing witness to the knowledge acquired by the students to produce fully functioning microcontroller-based autonomous robotic vehicles was awe-inspiring. From my experience, the Faculty truly cares about and supports its students' progress in their studies.

I enjoy my course and look forward to my future learning experience. My dream is to bring innovative technology to the world and to further my knowledge in bioengineering technology in order to make a career out of it. EBIT is undoubtedly the best platform to bring this dream to fruition.



FROM EBIT

TOP 364

OF UNIVERSITIES RÁNKED GLOBALLY FOR ENGINEERING AND TECHNOLOGY IN 2020 OS RANKINGS ENGINEERING SCHOOL IN AFRICA BY THE US NEWS AND WORLD REPORT RANKINGS 2020

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TOP 1%

OF ENGINEERING SCHOOLS IN THE WORLD IN THE 2019 CLARIVATE ANALYTICS ESSENTIAL SCIENCE INDICATORS

Bethe change

BEng Chemical Engineering student at the University of Pretoria, Jaco-Louis Venter, has started a project to donate hand sanitiser to paediatricians at Steve Biko Academic Hospital's Department of Paediatrics and Child Health. This project has shown how, in difficult times, community needs can be addressed by creating teambased solutions – enabling those with the capacity to help where they can.

It is so easy to get caught up in your studies that you forget why you chose to prepare for a specific career in the first place. I chose chemical engineering as it creates so many opportunities to contribute to our society. I am very grateful for this opportunity to do something that might actually make a real difference.

Apart from generous donations from the research supplies of ethanol and glycerol of the Department of Chemical Engineering's lecturing staff, the Department's facilities were also used to produce hand sanitiser in accordance with the World Health Organisation's recommended hand-rub formulation. With the assistance of Gerrie Claassen, the laboratory manager, and Franco Pretorius, a master's student in the Department, as well as multiple contributions from staff members, enough hand sanitiser was produced before the national lockdown to supply a bottle to each doctor in the unit. The project team is currently working to acquire more supplies to continue production. Their aim is to continue production for as long as possible during the pandemic.



Jaco-Louis Venter with Prof Izelle Smuts, a paediatric neurologist at Steve Biko Academic Hospital

Empowering young female scientists

Bianca Gevers from the Department of Chemical Engineering received a grant from the L'Oréal-UNESCO Women in Science South African National Young Talents programme to pursue her PhD degree.

READ MORE

Women in science have the power to change the world, provided they are given the means and support.

### Mashoto Tsogae

**I AM** a BSc Construction Management student at the University of Pretoria. I am looking forward to graduating and starting the honours programme in EBIT.

Construction management

Initially, it was difficult for me to decide which degree programme would suit me best. Fortunately, the Faculty has various options to guide one. I chose to study construction management because of the poor infrastructure, or lack thereof, in the township in which I grew up. I am passionate about ensuring that quality construction is provided in our communities, because people's safety should always be of the utmost importance.

My Department is located on the University's South Campus, which is always in close proximity to active construction projects. Construction is an ever-changing industry, which allows room for innovation. I look forward to forging my path in this field.

The Faculty aims to produce well-rounded students by encouraging us to not only excel academically, but also to engage in community outreach projects. EBIT serves students who are inquisitive, open minded, independent and hardworking. It has been a privilege to be lectured by experts in their respective fields, because they are always willing to shed light on current issues and how we should equip ourselves for the future.



## Community-based Project Module

In this module, all EBIT students engage with a section of society that is different from their own social background. The goal is for students to develop an awareness of personal, social and cultural values, as well as multidisciplinary and life skills, like communication, interpersonal and leadership skills.



David de Villiers



## Ase your skills to uplift your community

Two BEng Computer Engineeering students at the University of Pretoria, David de Villiers and Kian Strydom, have developed a mobile app for homeless shelters to access assistance during the COVID-19 pandemic. The app enables shelters in the Tshwane Homelessness Forum to communicate more effectively with warehouses about their needs. It provides a user-friendly interface whereby shelter managers can submit details about stock and requirements for their respective shelters to a singular database and spreadsheet. This creates an easy way for both site managers and workers at the distribution centre to gain access to the data and to provide optimal supply and service to each other and the community at large.

David and Kian developed the app as part of their JCP module. Although it has been built for members of this specific community to meet their unique needs, it is easily adaptable and very modular, making it possible to update and adapt the app for different communities with similar needs. After overcoming various challenges related to lockdown regulations, the app is now available on both the Google Play Store and the Apple App Store. The duo plans to continue working on the app to provide the necessary updates and equip it with other functionalities.

We felt we could really make a difference in our community, especially during the pandemic, and help further the cause of offering homeless people a safe, secure place to stay. This is our way of taking our existing skill set and giving back to our community.



Kian Strydom

## Information Technology

### Mathopatona Paballo Matabane

I AM a BIT student at the University of Pretoria. I come from Lebowakgomo in Limpopo, and only knew IT as programming games or websites. However, studying in this field has exposed me to different IT disciplines, such as informatics, information science and computer science. I was triggered by the flexibility of the BIT degree, because one can pursue any career in the IT industry, from becoming a programmer to becoming an analyst of data, businesses or systems. The industry-based learning programming in your third year really prepares you for the challenges and complexities you will face in industry.

I can now apply my IT skills in any business or industrial environment. My studies have taught me to integrate IT in the business sector, and my final-year project has taught me to approach companies to develop feasible systems. By joining various student structures on campus and within the Faculty, I have also developed leadership skills. EBIT has provided me with the support structure and the stability I needed to focus on my studies.



Studentlife

Although the Faculty expects total commitment from its students with regard to their academic work, it encourages them to actively participate in university student life. This supports the development of well-rounded future leaders. The University hosts a wide range of student life activities through campus organisations like the Student Representative Council (SRC), Student Culture (STUKU), the Student Sport Committee (SSC) and RAG.



All the Faculty's students automatically become part of EBIT House, which represents students and acts as a communication channel between the Faculty and its students. Within EBIT House, students can find a variety of discipline-specific sub-houses through which to become involved in more specialised student activities.



EBIT House

Music and motorsports

EBIT's BEng Mechanical Engineering twins are ready to take the music and motorsport worlds by storm. Justin and Darren Oates share identical interests in engineering, music and motorsport. They play the piano and have recorded music in English under the name Telepathy, and in Afrikaans under the name Alter Ego.

Justin and Darren specialised in motor vehicle engineering, which studies the behavioral characteristics of motor vehicles to predict or enhance specific dynamic or performance effects. Motorsport is about precision, which appeals to the brothers' calculated perfectionist personalities. They hit the main motor racing circuit in 2015, competing in the VW Polo GTI Cup Series, which is the most competitive level of racing in the country, with Total as their sponsor.

Much of our passion in motor vehicles is centred on performance: acceleration, braking, cornering and riding. With our passion for motorsport and the physics of vehicle behaviour, we finally decided that engineering was the way to go. We have always been entrepreneurial and are continuously thinking of new ideas. To our pleasant surprise, we learnt that engineering builds a solid platform for innovation and getting ideas into the real world.





Interesting read

### The global rise of AI holds both promise and danger, and Africa needs its own experts to balance the two

Financial consultancy Pricewaterhouse Coopers (PwC) says that artificial intelligence (AI) could contribute up to US\$15.7 trillion to the global economy by 2030. But the technology is not inherently benign. While it can be a tool to achieve transformation, it also has the potential to reinforce structural inequalities and biases, and to perpetuate gender and racial imbalances. One of the problems with AI is that its "intelligence" depends entirely on the data from which it learns. Al algorithms trained on biased data inherit that bias. For example, when the head of Facebook's AI unit tested its Portal Smart Camera (which uses algorithms to identify multiple subjects during video calls), the camera kept focusing on her male colleagues, not on her. Upon examining the datasets used for training the camera's Al, she found an uneven representation for skin tone and gender. Bias data sets may prove problematic because we usually trust machines to be right, and therefore may not immediately see the problems how many of us have followed our GPS even though we suspected it might be leading us astray?

### **AVOIDING NEFARIOUS USES OF AI**

There are other dangers that come with the growing influence of AI. The flood of personal data that comes out of social media applications like Facebook, combined with ever-smarter algorithms, has the potential to stoke political tensions, and can even turn the tides of government elections. In 2018, British consulting firm Cambridge Analytica was outed for having used personal data from Facebook users – ostensibly collected for research purposes – to build an algorithm that influenced voting patterns in the 2016 US general election.

Developing countries, with their overstretched and unconsolidated democracies, are particularly at risk of such nefarious uses. An example of this is the deal that the government of Zimbabwe struck in March 2018 with Chinese tech firm Cloudwalk to import facial recognition technology. Such deals are examples of top-down development of AI applications mainly situated around social control and repression.

### **BUILDING CAPACITY IN AFRICA**

Apart from regulating the sector, another way that African nations can protect themselves against bad AI applications is through training. One of the solutions is to make sure that the teams working on AI applications are diverse in terms of gender, ethnicity, training and background. This will increase the likelihood of unconscious biases being recognised and addressed. In order to contribute to the desired diversity, Africa needs its own AI experts. Global tech giants need to collaborate – on an equal footing – with local communities to build AI-based solutions. Research on AI is vital if Africans want a voice in the development of the new technology. In order to contribute to the desired diversity in AI training and data, Africa needs its own AI experts.



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Read the full article by Eunice Kilonza