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EBITTimes

Newsletter of the Faculty of Engineering, Built Environment and Information Technology at the University of Pretoria (UP)
June 2018 www.up.ac.za/ebit

THUMA MINA – WE ARE READY: WE WANNA BE THERE!

As South Africa prepares for the 4th Industrial Revolution (4IR), EBIT focuses its research, and teaching and learning activities on bringing competitive knowledge to industry, education and society. The Faculty prioritises research excellence and international collaboration, as evidenced by its high global rankings among 26 000 universities. The call to work together to build a new knowledge economy and better South Africa has been actioned through a range of initiatives. These include our new Future Transportation and Sustainable Future Smart Cities infrastructure and research programme, and our world-leading Big Data and Data Science Institute. The Faculty has established four externally funded Research Chairs in Artificial Intelligence (AI), Machine Learning, Cybersecurity and Data Science, all focusing on a strategic niche area related to the 4IR.

Every day, global technology is evolving on an exponential scale. In answer to this, EBIT is eager to embrace the challenges of the 4IR, armed with exceptional researchers, and cutting-edge teaching, learning and laboratory facilities.

Each one of the Faculty's 22 undergraduate degree programmes facilitates the development of work-ready graduates who are equipped to enter ever-changing job markets – some of which were not even in existence when a graduate started his or her studies. To facilitate inclusiveness, the Faculty also prioritises its extended programmes, which allow students to lay a strong foundation for their tertiary studies.

Opportunities for industry-relevant collaborative research are constantly investigated to ensure that the Faculty is ready to embrace and overcome future challenges and industry partnerships that can enable the development of scarce and specialised skills. Through these partnerships, the Faculty is well equipped to support its many leading research chairs and entities. These partnerships also enable the Faculty to develop and maintain its extensive and cutting-edge facilities across the University's Hatfield and Hillcrest campuses.

Thanks for your continued interest in the work of the EBIT Generation.

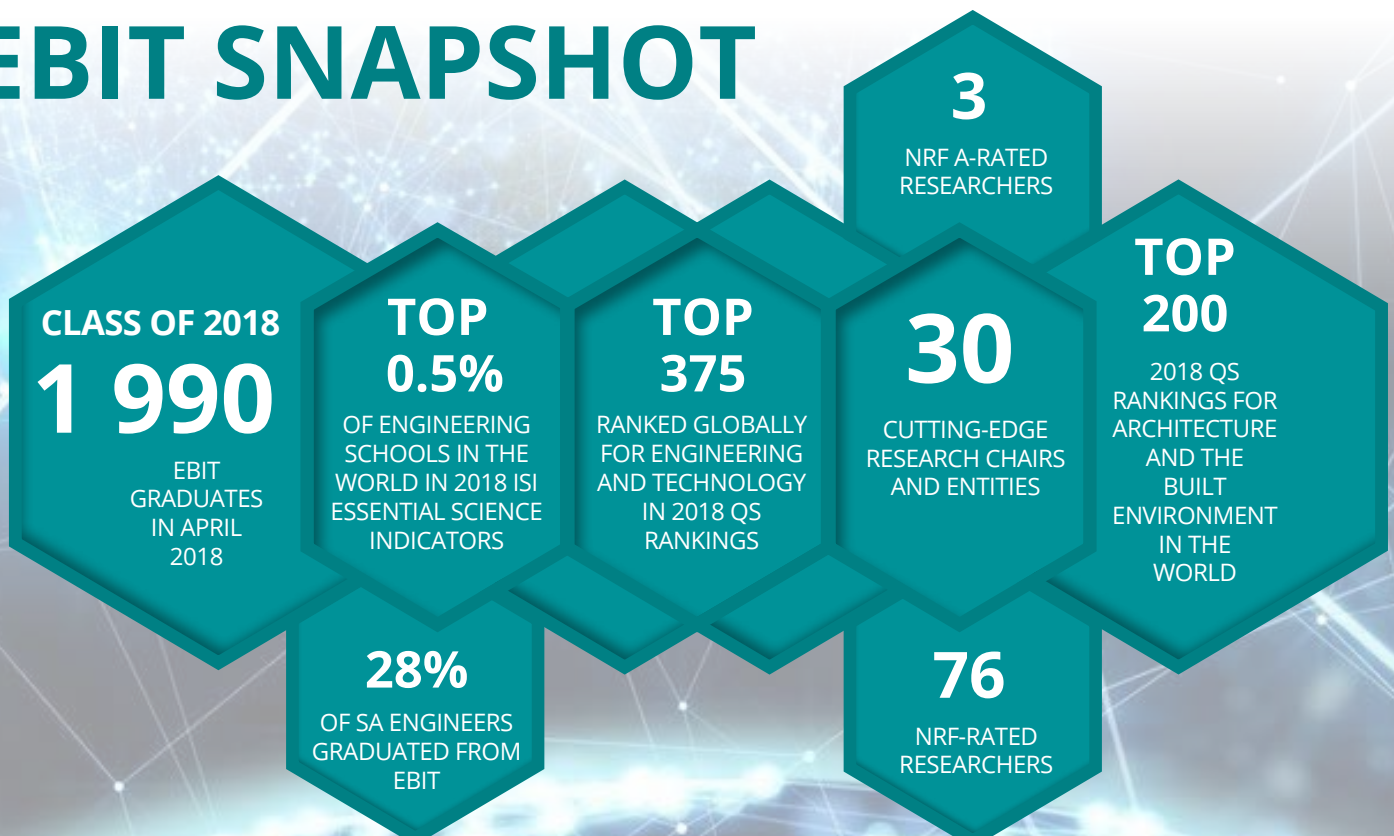
At EBIT:

**I wanna be empowered,
I wanna empower,
I wanna be 4IR.**

Every day.

MESSAGE FROM THE DEAN: PROF SUNIL MAHARAJ

EBIT SNAPSHOT



NEWS

MultiChoice partnership to foster technology talent in South Africa



Prof Sunil Maharaj, Dean of EBIT, Mr Buti Manamela, Deputy Minister of Higher Education and Training, Prof Cheryl de la Rey, Vice-Chancellor and Principal of UP, and Mr Calvo Mawela, CEO of MultiChoice South Africa.

The exciting new partnership between EBIT and MultiChoice South Africa intends to develop and sustain scarce artificial intelligence, as well as machine and deep learning skills in the country.

This partnership will see MultiChoice sponsoring a Research Chair in the Faculty. The Chair will guide the selection of projects and research topics for sponsorship, and will include the awarding of bursaries to students at all levels in engineering, data science and computer science. The projects will range from final-year and honours projects, to Master's and PhD projects.

The field of artificial intelligence, and specifically machine and deep learning, is key to the Fourth Industrial Revolution and a truly digital future. There is a severe skills shortage world-wide, and even more so in Africa. MultiChoice has identified opportunities to apply the very specialised fields of artificial intelligence and machine learning at various points throughout its value chain. This includes content creation, understanding what content to offer customers, customer service and improving interactions with its customers. Partnering with an academic institution is a forward-looking way for the company to nurture these skills in South Africa. MultiChoice South Africa CEO, Mr Calvo Mawela, said that the Chair will help the company to grow its pool of talent in order for it to build a digital future.

[Read more](#)

Engineering 4.0

Smart Cities and Transportation

The Faculty is focusing on innovation in future smart cities and transportation as one of its core research focus areas. The activities in this arena relate to the active and continuous collection of data regarding transportation users' activities and experiences, infrastructure condition and user-infrastructure interaction. These activities have the potential to support infrastructure owners' decisions regarding transportation service and infrastructure provision with the objective of an optimised and economically efficient transportation system.



During the next two years, the smart cities and transportation research focus area will become embodied in the new Engineering 4.0 facility on UP's Hillcrest Campus. This facility, which is funded through both the South African National Roads Agency Limited (SANRAL) and UP, will initially entail an integrated road material reference laboratory, a training laboratory and a research laboratory. This will be combined with a live traffic research facility and an accelerated pavement testing facility on the Campus.

The vision of the Engineering 4.0 facility is to provide an internationally renowned platform for academic and vocational training support in transportation infrastructure materials testing, a national transportation materials reference testing platform, high-quality research facilities and skilled staff.



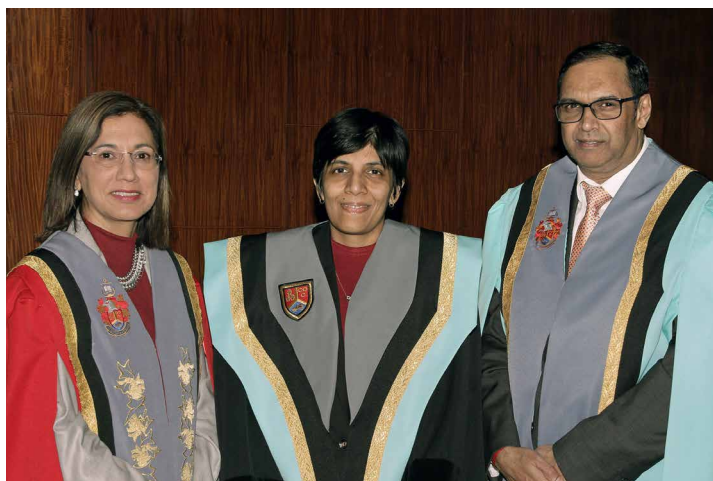
Virtual Reality and Interaction Lab

The new frontier in multimedia research, teaching and learning

EBIT's Department of Information Science has launched a state-of-the-art research, teaching and learning facility through its new Virtual Reality and Interaction (VRI) lab.

The VRI lab is set to open new pathways for students and researchers in the field of multimedia studies to engage in immersive research in several virtual reality (VR)-related fields, including user experience design and interaction design in VR. This facility gives postgraduate students in the Department access to commercial VR equipment and allows them the freedom to push the boundaries of the current knowledge and uses of VR to develop exciting ways of utilising this technology to surpass current solutions to real-world challenges. With VR quickly becoming part of the mainstream technologies available for both business and entertainment, industry players have become increasingly interested in leveraging this cutting-edge technology.

New Head of Department: Computer Science



Prof Cheryl de la Rey, Vice-Chancellor and Principal, Prof Nelisha Pillay, Head of the Department of Computer Science and Prof Sunil Maharaj, Dean of EBIT.

Prof Nelisha Pillay has been appointed as the new Head of the Department of Computer Science from September 2017. On 8 May 2018, she delivered her inaugural address in UP's Senate Hall.

The title of Prof Pillay's inaugural address was "Artificial intelligence: myth or reality for the Fourth Industrial Revolution?" The address aimed to answer the question of whether artificial intelligence can meet the challenges posed by the Fourth Industrial Revolution and to examine the impact of artificial intelligence, specifically search techniques, on the discipline of computer science, industry, education and society. The talk also examined a South African perspective of artificial intelligence.

Prof Pillay forms part of the nature-inspired computing optimisation research group. Her areas of interest include operations research, data science, applications of genetic programming, evolutionary algorithm hyper-heuristics, automated design of machine learning and search techniques, and biologically-inspired methodologies. She holds a C1 NRF rating and is Chair of the IEEE Task Force on Hyper-heuristics within the Technical Committee of Intelligent Systems and Applications at the IEEE Computational Intelligence Society. The lecture was attended by UP's Vice-Chancellor and Principal, Prof Cheryl de la Rey.

[Read more](#)

EBIT's Department of Mining Engineering has been working towards securing support for its industry-relevant research chairs

In 2013, the Department established the **Harmony Chair for Rock Engineering and Numerical Modelling**, and Harmony Gold Mining Company Limited has now extended its financial support of the Chair. The Department has also launched the **AEL Mining Services Chair in Innovative Rock-breaking Technology** in collaboration with AEL, a member of ARCI Group in South Africa.

EBIT Symphony Concert: Music – reaching beyond borders

This year's concert celebrated landmarks and achievements, and the promise of hope for a rainbow nation that is passionate about introducing innovations in our world. The beautiful musical ensemble was brought to guests by the University of Pretoria Symphony Orchestra (UPSO) under the guidance of conductor Gerben Grooten.



Industry support helps EBIT to achieve its goals

EBIT is grateful for the unfailing support it receives from industry partners.

The Department of Informatics received R5.4 million for 50 bursaries from BANKSETA for the 2018 academic period.

BANKSETA is an enabler of skills development and transformation in the broader banking and microfinance sector, and supports people development through partnerships, skills development, alleviating unemployment, creating a brighter future and enabling change. BANKSETA focuses on SMEs, the youth, adult education, continuous professional development and research.



[Read more](#)

The Department of Industrial and Systems Engineering received a donation of 10 tablets from Mobitel for deserving students.

Mobitel and Dr Maria du Preez, Business Development Director of Bidvest Panalpina Logistics, who also serves on the Board of the Department, joined forces to support financially disadvantaged students to gain access to smart technology, which in turn creates an enabling environment for their success. Access to technology and technological instruments is vital to the success of engineering students.



[Read more](#)



Vertically integrated projects programme

Real solutions for real clients

EBIT's Department of Industrial and Systems Engineering is changing the face of higher education learning with its vertically integrated projects (VIP) programme. Through this programme, students work towards solving real problems for real clients.

[Read more](#)



After multiple competitive rounds, the finalist teams were expected to put together a coherent argument and appropriate proof of the commercial viability of their ideas through a business plan. The top three teams will receive assistance for prototype development, eight months worth of business incubation and support services through TuksNovation, and a R10 000 cash prize.

Tech Launch Pad Competition

EBIT's Department of Informatics is collaborating with TuksNovation, a high-tech business incubator on campus, to host the Tech Launch Pad Competition. The initiative seeks to equip young entrepreneurs with improved entrepreneurship skills and the capacity to develop a functional prototype so that they are empowered to turn their ideas into a commercial reality.

EBIT OFFERS NEW DEGREE PROGRAMMES

BIT (Information Systems)

Skilled information and communication technology professionals are in high demand in South Africa. EBIT's Department of Informatics strives to fill this void with the addition of the BIT (Information Systems) degree programme to its academic offerings.

The BIT (Information Systems) degree facilitates the study of the application and use of computer and information systems in organisations. The use of such systems by organisations is growing exponentially and new, more complex and challenging applications are essential. Core modules of the degree programme include systems analysis and design, programming,

critical thinking skills, database design and implementation, network infrastructure, project management, human-computer interaction and trends in information technology. Students also have the opportunity to specialise in any one of the following streams: computer auditing, information science, entrepreneurship, e-business, geography, statistics and e-taxation.

MIT (Big Data Science)

The University has existing world-class expertise in multiple disciplines that closely relate to big data and big data science. To leverage these expertise, EBIT's Department of Computer Science has added a stream in big data science to its master's offerings.

This multidisciplinary degree programme spreads across a number of academic faculties and departments. Its focus is to provide educational opportunities on a postgraduate level for researchers and practitioners in big data and data science to investigate needs both in South Africa and in the international landscape. Graduate professionals from industry can leverage this

degree to re-skill themselves in the building blocks of big data and data science, while researchers can excel in related research projects. The degree forms part of EBIT's big data science strategic initiative, which includes an already established Institute for Data Science and the appointment of a person in the Absa Chair for Data Science.

[Read more](#)

STAFF ACHIEVEMENTS

Top research rating

Prof Josua Meyer, Head of the Department of Mechanical and Aeronautical Engineering, has received an A-rating from the National Research Foundation (NRF).

A-rating is the highest rating awarded to individuals who are recognised by their peers as leading international scholars in their fields. Prof Meyer is the only A-rated researcher in mechanical and aeronautical engineering in South Africa. He leads the clean energy research group, where his work focuses on thermal-solar, wind and nuclear energy. He has grown this group to approximately 50 full-time graduate students and ten staff members over the years.

[Read more](#)



SAYAS membership

Prof Reza Malekian from the Department of Electrical, Electronic and Computer Engineering and Dr Mardé Helbig from the Department of Computer Science have been selected as members of the South African Young Academy of Science (SAYAS).

SAYAS is the voice of young scientists in South Africa and aims to contribute towards solutions to national and global challenges facing society. The country's leading emerging researchers in basic and applied sciences, engineering, social sciences, arts and humanities are selected as members.



Newton Mobility Grant

Dr Beth le Roux, Associate Professor in the Department of Information Science, has been awarded a Newton Mobility Grant to the value of just over £9 000 by the British Academy.

The grant is for a collaborative research project between Dr Le Roux and Dr Caroline Davis of Oxford Brookes University, UK, that seeks to examine the role of publishing in the cultural struggle, both for and against apartheid in South Africa. It will also help to support new research in print culture and publishing studies.

[Read more](#)



2018 Gauteng Premier's Service Excellence Awards

The urban renewal and social transformation project, led by Dr Johnny Coetzee, senior lecturer in EBIT's Department of Town and Regional Planning, has been named a Gold winner in the prestigious 2018 Gauteng Premier's Service Excellence Award in the subcategory "building safe communities".

This award recognises projects that strive to mobilise against drugs, eradicate violence against women and children and build safe communities. The objective of the project was to develop a precinct plan, implementation strategy and action plan for a newly defined Hatfield Campus Village and City Improvement District.

[Read more](#)

FACULTY NRF RATINGS

EBIT's research excellence is reflected in the high number of National Research Foundation (NRF)-rated researchers among its staff.

31%

**Rated researchers
across the Faculty**

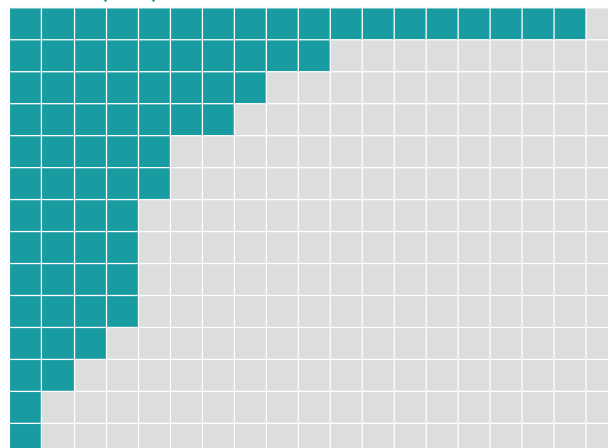
Associate of Mine Managers of SA Prize

Prof Josua Meyer from the Department of Mechanical and Aeronautical Engineering and Prof Ronny Webber-Youngman from the Department of Mining Engineering have been awarded the Associate of Mine Managers of SA Prize for their ground-breaking work published in the journal article entitled "Application of computational fluid dynamic modelling in the design of shaft systems".



Department of Electrical, Electronic and Computer Engineering
Department of Mechanical and Aeronautical Engineering
Department of Informatics
Department of Computer Science
Department of Chemical Engineering
Department of Information Science
Department of Civil Engineering
Graduate School of Technology Management
Department of Industrial and Systems Engineering
Department of Materials Science and Metallurgical Engineering
Department of Architecture
Department of Engineering and Technology Management
Institute for Technological Innovation
Department of Town and Regional Planning

Researchers per Department



3

A-rated researchers

15

B-rated researchers

45

C-rated researchers

13

Y-rated researchers

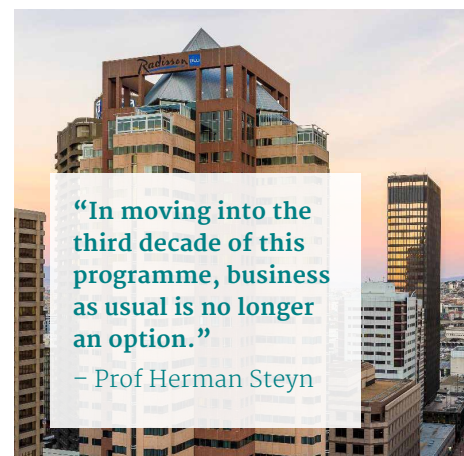
LONG-TERM INDUSTRY COLLABORATION BEARS FRUIT FOR GSTM

The Graduate School of Technology Management (GSTM) has been leaving its mark on the South African project management industry for three decades. In its efforts to contribute to project management excellence on the continent, GSTM offers the only master's Programme in Project Management (PPM) to be accredited by the Global Accreditation Centre for Project Management Education Programs (GAC) of the Project Management Institute, USA.

The 20th anniversary of the PPM, which GSTM presents in collaboration with Enterprises University of Pretoria, was celebrated in August 2017. Since the programme's inception in 1997, it has hosted more than 7 000 students and delegates from a range of industry partners. A particularly successful partnership has been the ten-year collaboration between GSTM and Group 5, one of South Africa's leading construction and engineering companies, since 2007.

The PPM has been instrumental in GSTM's establishment of the Master's in Project Management (MPM), which, in turn, has led to several PhDs and the subsequent publication of a range of project management papers.

GSTM is committed to embracing innovative ways of staying ahead of the pack in the project management industry in South Africa. The year 2017 also marked GSTM's 30th year of existence, which was celebrated on 24 November 2017 with a look at the milestones that have already been achieved. As GSTM enters its new phase of existence after 30 years of project management education and training excellence, it strives to maintain strong bonds with industry partners. An example of this is the recent memorandum of understanding that GSTM has signed with the Project Management Institute (PMI) South Africa Chapter to promote the advancement of the art, science and benefit of project management as a profession.



"In moving into the third decade of this programme, business as usual is no longer an option."

– Prof Herman Steyn



INNOVATE

Innovate is an annual publication compiled by the Faculty through the Graduate School of Technology Management. It covers new and emerging technologies in the fields of engineering, the built environment and information technology, and delivers to its readers relevant and pertinent insight into research and business matters, as well as issues pertaining to higher education tuition and community service. Follow the work of the EBIT Generation by scrolling through the pages of *Innovate*. Issue 12 is currently available.

Free download



IN MEMORIAM

It is with great sadness that we announce the sudden passing of Prof Helene Gelderblom. She was an excellent researcher in the Department of Informatics, where much of her work focused on solving problems through improved user experience designs. She will be sorely missed.



75 YEARS OF EXCELLENCE IN DESIGN EDUCATION

Department of Architecture



The Department of Architecture is rated among the top 200 of its kind in the QS World Rankings.



Faculty of Engineering,
Built Environment and
Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en
Inligtingstechnologie / Lefapha la Boetsenere,
Teknoloji ya Kago le Teknoloji ya Tshedimoso



In 2018, the Department of Architecture celebrates its 75th year of existence. After the Transvaal University College became the University of Pretoria in 1930, a course in Architecture was instituted in 1931, taught in collaboration with the University of the Witwatersrand. The Department of Architecture at UP became an independent institution in 1943 when a young (at the time), dynamic staff complement was appointed.

The Department strives to build a great future, but it does so in acknowledgement of its proud past. The completion of the new Boukunde Building, which has been the home of the Department since 1951 and which was evacuated for renovations in 2017 for the first time since the major renovations of 1973, will coincide with the Department's 75th anniversary.

[View celebration programme](#)

[Innovating our tomorrow](#)



STUDENT ACHIEVEMENTS



EBIT student wins gold at global innovation lab

John G. Oyewole, a PhD student in the Department of Industrial and Systems Engineering, is developing a sustainable alternative to shrink wrap that has already won gold at an international innovation lab in Denmark. John was selected as one of seven UP students and one staff member to take part in the UNLEASH innovation lab, supported by the United Nations Development Programme (UNDP), the Carlsberg Foundation, Dalberg, Microsoft and Deloitte, among others.

[Read more](#)

Best student coders of 2017!

UP has, for the first time ever, achieved a hat-trick for all major programming competitions held during 2017. The University was ranked first in the Standard Bank IT Impact Challenge, the Catalyst Coding Contest, and the ACM International Collegiate Programming Contest (ICPC). The leader in all three competitions was team AwesomeSource from the Department of Computer Science, comprising Ulrik de Muelenaere, Brent Walsh and Jacobus du Plooy.

In the first round of the Standard Bank IT Impact Challenge, teams from various universities across South Africa participated in a four-hour contest where students had to solve numerous mathematical and algorithmic challenges and were ranked according to both the number of valid solutions they produced and the efficiency of their code. The winning team of each university qualified for the final round, where the team

members were booked into a hotel where they had a weekend to solve a blockchain problem. Blockchain is the technology on which cryptocurrencies such as Bitcoin and Ethereum are based.

The Catalyst Coding Contest is a European-based coding competition where more than 2 400 participants from numerous international universities competed in an intense coding

challenge. For the first time, the contest was also hosted at UP, where Ulrik de Muelenaere emerged as the victor.

The ACM ICPC is arguably the largest and most difficult international coding competition and has been going since 1970. In the African and Middle East regional contest, more than 100 teams competed. UP computer science, mathematics and

engineering students formed 14 of these teams, and three UP teams were ranked in the top 10. AwesomeSource won by solving seven of the eight problems in the final round, which is an exceptional result in the ACM ICPC.

AwesomeSource will travel to Beijing this year for the ACM ICPC world finals, where they will be challenged by the top programmers in the world.



EBIT alumna receives first prize in LafargeHolcim Foundation Awards

EBIT alumna, Heidi van Eeden, was awarded the first prize in the prestigious LafargeHolcim Foundation Sustainable Construction Awards for the Middle East Africa region Next Generation category for proving that brick-making can be technically sustainable and deliver a social contribution to community-making. Her decision to rework a student project earned her a big trophy and a cash prize.

According to the LafargeHolcim Foundation, sustainability in building is rapidly gaining significance in the Middle East Africa region – particularly among female professionals and young graduates in architecture and engineering.

The LafargeHolcim Awards is about more than just beautiful buildings and stands out as the world's most significant competition in sustainable design. The competition only acknowledges projects, not finished work, because the Foundation seeks designs that go beyond current standards and deliver new, surprising, or truly visionary solutions to the way we build.

Second-generation winner of the Advancement of Science Medal

On 14 August 2017, Shruti Lall received the Bronze Medal of the Southern Africa Association for the Advancement of Science (S²A³). The S²A³ Bronze Medal is awarded annually to the most outstanding research student in a scientific subject graduating at Master's level at each South African university or

university of technology. This award is particularly special, considering Shruti's mother, Prof Namrita Lall, a professor in UP's Faculty of Natural and Agricultural Sciences, had received the same award. Shruti completed her Master's degree in electronic engineering (*cum laude*) under Prof Maharaj.



Shruti Lall with Prof Sunil Maharaj and Prof Stephanie Burton, Vice-Principal: Research and Postgraduate Education.

Exceptional research in Architecture

Reneé Minnaar, a master's student from the Department of Architecture, was awarded the Corobrik Architectural Student of the Year Award. She impressed the judges with her thesis entitled "Remediator – Restoring the dichotomous relationship between industry and nature through an urban eco-textile mill and dye house".



The Corobrik competition has been running for 31 years and the Department has won the most awards of all the schools of architecture in South Africa. It was commended for developing research directions that focus specifically on environment potential, heritage and cultural landscapes, and human settlements and urbanism over the years.

[Read more](#)

UP track champion graduates from EBIT

Akani Simbine is a 2016 Rio Olympic finalist in the 100 m event, the South African record holder in the 100 m sprint and a Diamond League gold medalist. He graduated with a Bachelor of Information Science from the Faculty in September 2017.



Akani describes his experience at EBIT as "amazing", and says that the support he has received has equipped him to study and progress as an athlete at the same time. "Completing this degree has provided me with a pathway outside of the sports arena, and this is something that I encourage all professional sportspeople to consider," he says.

[Read more](#)

Twin triumph



Dr Monique Potgieter and Dr Ciara Blaauw are identical twin sisters who have both graduated with a PhD in Electronic Engineering.

They started their undergraduate studies in the Faculty in 2011 and their postgraduate studies in 2015. By this time, they had already presented research papers at international conferences and published in peer-reviewed journals. The twins are grateful for the support received from their supervisor, Prof JW Odendaal, and their co-supervisor, Prof JW Joubert. Monique's thesis was titled "A study on bistatic RCS simulations, measurements and calibration" and Ciara's thesis was titled

"RCS simulations and measurements of electrically large complex airframes and dielectric structures".

They are both currently working as radar signal and systems analysts at the Unit for Defence, Peace, Safety and Security at the Council for Scientific and Industrial Research (CSIR). They are excited about what the future holds and are passionate about making positive contributions in the field of engineering.

[Read more](#)

Top student in the Department of Construction Economics

On 18 May 2018, EBIT's Department of Construction Economics presented its annual prize-giving function during which recognition is given to its students, from first-year to honours level. One student in particular caught the attention of the audience with her remarkable academic achievements.

Qabilah Abramjee completed her BSc in Quantity Surveying (QS) with distinction and is currently studying towards an honours degree in the same field. During the prize-giving function she received the following awards for her achievements during the course of her three years of study:

- The Lafarge Prize for the best student in Building Science 310/320
- The ASAQS Prize for the best achiever: third-year BSc (Quantity Surveying)
- The Prof Thys Siglé Prize for the best BSc (Quantity Surveying) undergraduate student in Quantities 100/200/300
- The ASAQS Gauteng Branch Prize for the best BSc (Quantity Surveying) student in Quantities 300 (HVH300)
- The Bell-John Prize for the best BSc (Quantity Surveying) achievement in any year of study



EBIT EVENTS

FUELING THE EBIT GENERATION



Watch video

EBIT Week is a four-day holiday programme, held twice a year. During the week, Grade 10 to Grade 12 learners are given a broad view of all the different departments in the School of Engineering and the School of Information Technology. Easter EBIT Week, held from 3 to 6 April was a great success

Winter EBIT Week: 8–11 July

Web: www.up.ac.za/ebit-week | Facebook: University of Pretoria EBIT weeks

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@UPEBITFaculty

Get all the latest Faculty news first, on EBIT's Facebook page. Stay connected to the EBIT Generation.



Follow EBIT House on Facebook and Twitter to keep up with all the above and more: @ebithouse

EBIT House activities

In February 2018, EBIT House hosted a work readiness workshop in collaboration with the Golden Key International Honour Society, Enterprises University of Pretoria and Murray and Roberts.

Over 150 students attended the workshop, where presentations regarding CV writing and interview skills. They were also informed about the free online "Ready for Work" programme offered by the University. These students now feel much more equipped to make the transition from students to potential employees. EBIT House is also involved in various other student activities, including TUKS Athletics, EBIT Running Club and Rag of Hope Day Fun Run. Many students have been showing their support through their purchase of EBIT House merchandise.

Robot Race Day 2018



The third-year students in the Department of Electrical, Electronic and Computer Engineering's Microcontrollers module have once again demonstrated their abilities to tame the powers of light, silicone, copper and plastic to create little marvels of engineering for the annual Robot Race Day.



This year's winners were Pieter Kok, Daniël Wepener and Frederik du Toit

COMMUNITY ENGAGEMENT



Through the compulsory undergraduate Community-based Project Module (JCP), students engage with a section of society that is different from their own social backgrounds by dedicating 40 hours of their time to a project that they plan and execute.

19 862
STUDENTS

5 857
PROJECTS

794 480
SERVICE HOURS

Unit for Urban Citizenship



EBIT's Department of Architecture has proposed the establishment of a Unit for Urban Citizenship as a vehicle through which collaborative community-engagement work can be developed and researched.

In 2017, the Department had managed to align groups to projects undertaken at early childhood development centres in Mamelodi. The Architecture students collaborated with the students involved in the Foundation Programme on UP's Mamelodi Campus. This inter-faculty collaboration supports the establishment of an ethos of urban citizenship both in the graduates and the communities concerned.

Institute for Big Data and Data Science (IBDDS)



Prof Andries Engelbrecht: IBDDS Director, DST/SARCHI Chair in Artificial Intelligence

The Institute for Big Data and Data Science (IBDDS) represents a multi-, inter- and transdisciplinary research cluster in the domains of Big Data (BD) and Data Science (DS). The IBDDS was created as a strategic initiative to leverage existing expertise in a number of research areas that form the foundations of BD and DS research.

Although the research agenda of the IBDDS encompasses all these aspects of BD and DS, its strongest focus is on data analytics and the development of new, efficient machine learning and statistical learning approaches to extract hidden knowledge from small to very large data sets. Data analytics technology will be developed for stationary data and non-stationary data, specifically data streams. Many data analytics problems require the analysis of multiple data streams, often of different data sources and types. Another focus is on the development of algorithms to fuse and analyse such heterogeneous data streams.

BD and DS research, via the IBDDS, is targeted towards providing BD and DS solutions for the following main research focus areas:

- Astrophysics and the Square Kilometre Array (SKA)
- Digital forensics and cybersecurity
- Health and biological sciences, ranging from bioinformatics and genomic research to disease control and lifestyle research
- Financial and economic sciences, with a focus on the insurance, banking and finance industries

- Learning analytics, with the main purpose to understand and optimise learning
- Engineering sciences, with a strong focus on supply chain engineering and smart transportation

For all of the above focus areas, BD and DS technologies will aid in making UP and related industries leaders in the Fourth Industrial Revolution (4IR) in the specific context of the African continent.

These activities in the Faculty are strategically led by our internationally recognised leading academics:

- Prof Andries Engelbrecht: IBDDS Director, DST/SARCHI Chair in Artificial Intelligence
- Prof Jan Eloff: DRS Chair in Cybersecurity
- Prof Nelishia Pillay: Multichoice Joint-Chair in Machine Learning
- Prof Pieter de Villiers: Multichoice Joint-Chair in Machine Learning
- Dr Vukosi Marivate: Absa Chair in Data Science