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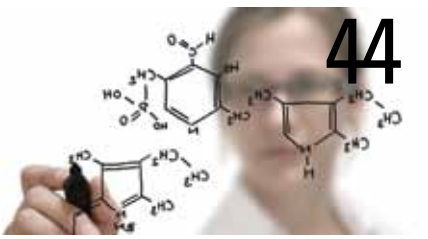

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August means we've broken the back of 2015 - and within a few months we'll be donning summer dresses, hats and sunblock!!

On the 9th, we celebrate National Women's Day; I would like to wish all my readers a joyous and relaxing day.

Ladies, this issue of **watt**now is especially for you, with more than usual feature articles. We kick off with our features by paying homage to the women who made a difference in Maths and Science (pg28). This article was aptly researched and written by Dudley Basson.

On page 40, we can learn a few Life Lessons by walking the labyrinth with Sharon Stobbia. Learning how to relax - a few tips I really should take to heart.

John Butler-Adam tells of how Africa has a long way to go to get more women into the sciences (pg 44). We should take heed in this article and support our daughters to become scientists.

Brenda Wingfield hit home by her article on the Juggling demands of a Career and Motherhood, and shares with us how she has coped. Read this on page 48.

Page 50 sees an article written by Marco Da Silva on how to keep the lights on in your green building.

Herewith your August issue, enjoy the read!

Minx

Visit www.saiee.org.za to answer the questions related to these articles to earn your CPD points.

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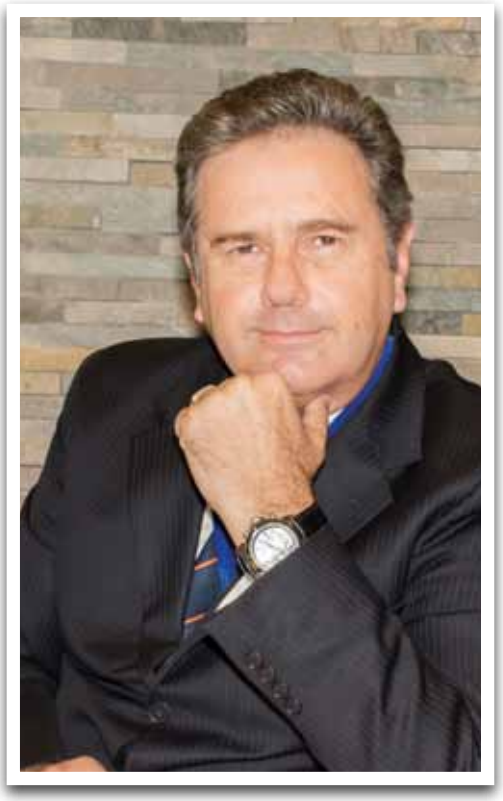


André Leo Hoffmann
2015 SAIEE President

Warm greetings from a windy Johannesburg.

The theme is 'women in engineering'; however the gender dice at conception conspired that I would be male and permits me only an outsider's appreciation of this qualification. I was bemused recently by a comment made by one of the leaders in our industry, at a function to interact with the leadership of Eskom. Disappointment was expressed that there were so few women in the room and by implication the group was deficit. A male colleague pointing out in conversation later that power stations and electrical sub-stations were dirty and dangerous places that often don't attract the fairer gender among us.

That said, I'd like to tell you about nine different women that have knocked this engineering technologist into shape. The first was my mother; yes, every male engineer has one. Mary had a fighting spirit, she fought to have me as a child, she fought to educate me and if she were alive today she would be my biggest fan. My mother was 40 years of age and my father was 61 when I was born. I was the love-child of my father's mistress, a circumstance bad enough in this day and age, but 55 years ago quite a societal taboo to deal with, I'm sure.

I had three sibling half-sisters, Deanna, Jackie and Marjorie, who while they were much older and were not at home much while I was growing up, they certainly had influence over my early life, and still do. As did the many female teachers and guides that an adolescent comes into contact with.

Leaving home and finding a wife at the tender age of 22, my first wife and the mother of our children, Veronique put up with me for 25 years, before we drifted towards different paths in the journey of life. Her patience and maternal strengths helped us raise our two children and saw me grow as a telecommunications practitioner from a wiry and naive apprentice technician, into a competent technologist and Senior Manager within the incumbent Telco operator.

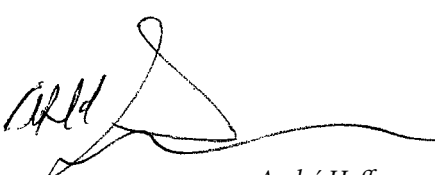
This period introduced me to my second born, daughter Alexa. As I recall, I passed out at her birth from the sheer emotion of the occasion and had to be resuscitated by the nursing staff at Parklands Hospital in Durban. Alexa has grown into a beautiful and confident woman and is herself a wife and mother of our first grandchild, Theo.

Since then I have had the privilege of adding even more good women into my life. My son Vincent married the beautiful Sarah, who has in turn given us our second grandchild, the cute little Jade. It is still some years before she becomes a woman, but their influence over my life is set on course and will no doubt be as profound as any other chapter in my life.

As engineers and technologists, we tend to be more introverted, and I am no exception, which is why my wife and partner Janine, with her bubbly and outgoing personality, compliments and brings balance and sanity to my life. Without her love and support, I would not be able to succeed in all the activities that have somehow found traction in my life.

While all these women in my life, are not directly involved in engineering, they have, and will continue to have sway and influence over my life.

I have no doubt that every male engineer owes some debt of gratitude to all the women in their lives. Every woman, confident enough to embrace a career in engineering, not only adds value to the profession, but can stand as confident peers with her male counterparts.



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THE DEADLINE FOR NEW APPLICATION SUBMISSION IS 30 OCTOBER 2015.

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WATTSUP

The road back to the future – paying it forward

Students hard at work in the laboratory.

It was a cold winter morning when the trip to Potchefstroom happened. This was a trip that had been motivated by our President Mr Andre Hoffman's message "going back to the future; pay it forward". A few months ago the Power & Energy Section (PES) had embarked on a journey to adopt schools in order to make a meaningful impact to society by promoting the electrical engineering profession.

It was a pleasant surprise to find out that one of the Institute's senior members, Professor Jan de Kock who is the Director of School of Electrical, Electronic and Computer Engineering at North West University (NWU) had a team who had a programme running at a high school in Potchefstroom. This presented a great opportunity for the SAIEE to obtain insights that could be useful in adopting schools in a sustainable manner that has impactful results. The programme is known as SETH (Science Engineering Technology & Health) Academy and is on its fourth year running.

The SAIEE Delegation with some of the SETH Academy Students

The objective of SETH is to encourage and support learners to pursue professions in the Science, Engineering, Technology and Health sectors.

A comprehensive itinerary was planned that gave detailed insight into the SETH program; from its formulation motivated by the Minister of Higher Education's drive to double the number of engineering graduates to the current status and future intentions.

SETH Academy Students working on a barrier ointment to combat nappy rash, with guidance from the lecturer below.

Students at the school are exposed to mathematics, science, critical thinking, problem solving and life skills at the university twice a week. The students are taught by university lecturers and professors giving them a feel of what being at a university could be like. The SAIEE team managed to attend a pharmaceutical lab session where Grade 10 students were being taught how to create a barrier ointment that can be used for diaper rash. The professor indicated to the students that he was showing them the practical application of subjects they learn at school such as Mathematics and Chemistry. The students who are on the SETH programme are averaging marks that are 27% higher than those of their counterparts who are not on the programme.

One of the major success factors was the invaluable partnership between the school and the university. This principle will be the catalyst to make the SAIEE's school adoption strategy a success.

New tool to precision-align rotating shafts

Comtest, local distributor of Fluke test and measurement tools, is pleased to announch the launch of the Fluke 830 Laser Shaft Alignment Tool, specifically engineered for precision-align rotating shafts.

Rotating machinery is susceptible to misalignment, and usually rulers and dial indicators are used to ensure rotating machinery is properly aligned. This could be costing the facility thousands of rands per year in replacement bearing costs, hours of unnecessary repair time, and crippling unplanned downtime, and a probable decrease in the machine's useful life.

The Fluke 830 Laser Shaft Alignment tool offers simple functionality, fast, accurate and actionable answers. Unlike the straight-edge method or dial indicators, Fluke's 830 performs complicated alignment calculations automatically, which means users have the answers needed to quickly align the machine. An enhanced user interface provides easy format results that don't require extensive alignment knowledge. The "All-in-One" result screen shows both coupling results and feet corrections (vertical and horizontal) in real terms, allowing for corrective alignment action. The Fluke 830 features:

- Single laser measurement technology - reduced errors from backlash resulting in better data accuracy
- Intuitive guided user interface for easy alignment
- Compass measurement mode for flexible, reliable and repeatable measurements using an activated electronic inclinometer
- Dynamic machine tolerance check for continuous evaluation of alignment adjustments
- Unique extend mode handles gross misalignment by virtually increasing laser detector size
- Data protection with auto save and resume capability

Since machine downtime is costly, test repeatability is critical. The Fluke 830 uses a patented single laser precision alignment system that provides accurate and repeatable measurement results ensuring that misalignment problems are properly addressed. For more information visit www.comtest.co.za

Local SMME Pump Manufacturer Wins Prestigious Awards

The South African Premier Business Awards (SAPBA) Awards is an annual event hosted by the Department of Trade and Industries (the dti) to award business excellence and honours enterprises that promote the spirit of success and innovation as well as job creation, good business practises ethics and quality.

The 2014/15 was the third annual SAPBA awards ceremony, and the gala event held at the Sandton Convention Centre was hosted by the dti, in partnership with Proudly South African and Brand South Africa, and sponsored by Absa and the Gordon Institute of Business Science (GIBS).

The Award categories included: Lifetime Achievement, Manufacturers, Exporters, Enterprise Development Support, Women-Owned Businesses, Young Entrepreneur, Investor of the Year, Proudly South African Enterprise, Play Your Part and SMME.

Group photo of all the winners with Deputy President Cyril Ramaphosa and Minister of Trade and Industries Rob Davies

HAZLETON PUMPS entered into three categories namely in the Manufacturers, Exporters and SMME categories and was nominated as finalists in all of these. The family owned and managed company won the prestigious MANUFACTURER OF THE YEAR award for the design, development and manufacture of a Medium/High Voltage Slurry Submersible Pump in collaboration with customers in order to meet their individual and customized requirements. This pump is the first of its kind in the world.

HAZLETON PUMPS was also the winner of the SMME COMPANY OF THE YEAR and a finalist in the EXPORTER OF THE YEAR category.

WATTSUP

SAIEE Chairty Golf Day Pay out

On 5 May 2015, the SAIEE hosted a few members and clients to its annual Charity Golf day at the Glenvista Golf Course. Every year, the SAIEE President identify a deserving charity of his choice and then the proceedings of the Golf day are donated to the charity. This year, 2015 SAIEE President, Andre Hoffmann, chose the Johannesburg Children's Home (JCH) in Observatory, Johannesburg.

Aged from 3 to 18 years, the children at the JCH have suffered physical, sexual or emotional abuse, severe neglect or abandonment. Some are Aids orphans and/or are HIV positive. At JCH they start a new life, living in cottages of up to ten children under the loving eyes of trained Child Care Workers.

So, on Friday 31 July 2015, André Hoffmann handed over a cheque to the Managing Director, Narisha Govender and the Head of Operations, Fiona Duke for the children of the JCH.

From left: Fiona Duke, Head of Operations; André Hoffmann, 2015 SAIEE President & Narisha Govender, Managing Director, Johannesburg Children's Home.

TomTom South Africa and PGA Announce Strategic Partnership

TomTom South Africa and the PGA (Professional Golfers Association) South Africa are pleased to announce their official partnership, which will see the TomTom Golfer GPS Sports Watch on the arms of passionate golfers around the country.

With a membership of 620 fully qualified PGA professionals, the PGA was founded in 1925 and PGA professionals are employed in every aspect of the golf industry within the country. The PGA has noteworthy affiliates such as Ernie Els Wines, Avis and Diners Club South Africa.

"The PGA is widely known for its exacting standards and rounded support to the golfing community in South Africa," says TomTom South Africa's Marketing Manager, Carey Dodd. "TomTom South Africa is pleased to support such an established golfing brand and association; and we will do our best to work with the PGA to elevate the enjoyment of golf within our country."

The TomTom Golfer GPS sports watch is designed to make it easy for golfers to improve their game. Unique course graphics clearly show accurate distances to hazards and layups, and the best approach to the green. Providing key golf course data from more than 34,000 golf courses across the globe on its extra-large screen, course updates are delivered wirelessly via a unique smartphone app, so golfers can trust they are playing with the most up-to-date course information.

The TomTom Golfer GPS Sports Watch will be available at your preferred golf facility for use both on and off the course when it comes to hazards, lay-ups and greens to help improve their game.

Ivano Ficalbi, Chief Executive of the PGA South Africa says, "The PGA of SA prides itself on being associated with quality partners and brands and our new affiliation with TomTom continues this tradition. The TomTom Golfer is a natural fit as not only does this exceptional product add to the professionalism of the game and our members but more importantly provides a quick and very easy to use platform for all golfers enhancing their enjoyability of the game and adding to the whole playing experience."

Dodd adds that the addition of the TomTom Golfer to the PGA tournaments is a great opportunity for the brand but also for the sport.

Roxtec launches new fibre cable seal for telecoms market

Manchester cable seal manufacturer Roxtec has developed a new product aimed at the telecoms market which protects fibre cables as they enter buildings.

Developed in conjunction with a leading telecoms company, the Roxtec End User Inlet is a quick and easy-to-install plug for both new and existing cables.

Roxtec UK managing director Graham O'Hare said the watertight seal prevents dust and rodents from interfering with fibre cables, which are now widely used to transmit telephone signals, Internet communication and cable television signals.

"The Roxtec End User Inlet is designed to be used wherever fibre or hybrid cables are being installed into existing buildings," he said. *"Specifically manufactured with the telecoms market in mind, the product provides a high level of protection and is IP 68-rated.*

The End User Inlet can be installed into drilled holes in brick or concrete walls or floors to prevent dust and rodents from entering the building and, crucially, provides water ingress protection too.

"The product has been rigorously tested for constant pressure, has a 2mm tolerance level, is available in a range of sizes for cables from 4 to 16mm in diameter and can be used below ground to a maximum depth of 3m. Like other Roxtec products, the End User Inlet ensures safety, efficiency and operational reliability and has been manufactured to stand the test of time."

For flexibility, the flange can be removed to enable installation into angled holes. Re-installation is also possible with existing seals.

Roxtec develop and manufacture complete sealing solutions for cable and pipe penetrations. The firm's modular-based seals are its foundation, but its growth is primarily built on committed personnel, strong values and a clear customer focus.

Graham O'Hare said the company's close co-operation with customers has created an innovative environment which enables Roxtec to tailor new solutions such as the End User Inlet and target new markets.

"This new product fits perfectly with Roxtec's ethos of delivering high-quality sealing solutions that are easy to fit," he said. *"All of our seals protect against multiple hazards and, as the creation of the End User Inlet shows, our specialist staff have the knowledge and experience to tailor bespoke designs which ensure that our customers' needs are met."*

Voltex showcases innovative solutions at MTE Witbank

MTE – the travelling Mining and Technical Exhibitions aims to bring innovative products and energy solutions closer to the mining and industrial sector. Voltex recently exhibited at the Tweefontein Golf Club and the Landau Recreation Centre. Both shows attracted between 100 to 200 industry professionals as well as commercial contractors.

Energy efficiency was high on visitors' agendas with a good deal of interest being shown in LED products. Contingency measures for alternative energy also drew many visitors to the Voltex stand which showcased their commercial generators amongst other innovative power generation solutions. Also on exhibit were Voltex's LS breakers and contacts range.

With its broad range of innovative energy efficient products and various divisions Voltex was well positioned to meet the attendees' expectations.

Seen here representing Voltex are from left: Pieter Groenewald, Impact Energy; Nicholas Strydom, Voltex Witbank; Johan Hattingh, Voltex LSIS; Denzil Iyavoo, Voltex Witbank and Steve Lea, Phambili Interface.

WATTSUP

Pasternack releases new Waveguide Detectors

Pasternack's latest release of waveguide detectors consists of 6 unique models covering a broad frequency range of 26.5 GHz to 110 GHz. The input ports use popular waveguide sizes ranging from WR-28 to WR-10, while the video output ports utilize SMA female connectors. The detector circuits use high performance GaAs Schottky Barrier Beam lead diodes with extremely low junction capacitance. These designs perform with minimal sensitivity variation resulting in a flat frequency response across the entire waveguide band.

The new waveguide detectors are all zero biased, so no external DC bias or mechanical tuning is required. The package designs utilize rugged steel construction and are thermally stable. Integrated waveguide connectors make the outline extremely compact. Performance is guaranteed over 0°C to +50°C. These detectors offer negative output voltage polarity for a variety of applications. Typical voltage sensitivity levels range from -600 mV/mW to -3000 mV/mW.

"This selection of waveguide detectors utilize high performance GaAs Schottky Barrier Beam lead diodes that exhibit high sensitivity performance in Ka, Q, U, V, E and W bands without external DC bias or mechanical tuning," explains Tim Galla, Active Components Product Manager at Pasternack. *"Designers will find them particularly useful for applications which involve instrumentation, power detection, power monitoring and direct detection receiver applications."*

Spark New Zealand chooses Globetom Convergent Billing Platform

Globetom announced that it has extended its Telecommunications Industry reach with GP3, its flagship convergent billing and prepaid platform.

Globetom has signed a five year agreement with Spark New Zealand, previously Telecom New Zealand, to provide its GP3 platform for prepaid voucher management, distribution and prepaid loyalty.

Commenting on the recent deployment of GP3 in Spark New Zealand, Dr. Claire Barber, GM Change & Technology at Spark says *"The fact that Globetom offered a comprehensive voucher management and loyalty platform in a single solution made their offer to us very compelling."*

GP3 has initially been rolled out in Spark New Zealand for prepaid voucher management resulting in total prepaid voucher management control functions being rolled out on a single platform. The management functions include voucher generation, distribution to electronic distributors and full life-cycle management of vouchers. The system also includes processing of sales from distributors for revenue assurance purposes.

Lisa Chapman, Delivery IT Integrator at Spark commented *"I have been very impressed with the capability of the Globetom team throughout the project to deploy the GP3 solution. We had a mixture of both on and off shore technical and project resources working alongside the Spark team and the collaboration between the teams was outstanding. Globetom ensured that they fully understood Spark's business processes and technical environment, resulting in a smooth migration from our legacy platform and seamless deployment into production."*

Future rollouts are planned which will further enhance Spark New Zealand's renewal and innovation strategy by leveraging other system functions offered by Globetom.

Globetom's contract with Spark New Zealand marks its entry into the APAC region and further extends its GP3 market penetration.

GP3 is used by multiple customers spanning Nigeria, Qatar, South Africa and Zambia for loyalty, voucher management, billing, electronic prepaid distribution, revenue assurance and transaction fulfillment. As an example the platform already generates over 3 million transaction journal entries per month in Zambia alone, forming part of multi-party service delivery environments.

The addition of Spark New Zealand to Globetom's client list is further endorsement of Globetom's contribution to technology innovation in South Africa and the broader Telecommunications Industry and is illustrative of the growing interest from Telecommunications companies to look at innovative new suppliers to offer market differentiation.

Order for twenty mini-subs complete in record time for Sasol

The WPI Power Solutions factory based in Centurion undertook to deliver an order for twenty mini-substations for Sasol Synfuels in Secunda within thirty days. The first ten were assembled and ready for delivery within seven days of the enclosures arriving at the factory in Centurion and passing the initial inspection from Sasol. Each lighting distribution unit was fitted with a RM6 ring main unit and 50 kVA transformer. The LV compartments housed control boards, control gear and a warning light for potential safety hazards. The units were designed, assembled and passed according to Sasol's high standards of quality. The second part of the order was delivered before the end of June. The factory and engineering departments worked tirelessly to ensure the completion of this project.

WE "HEART" BANDANA DAY, DO YOU?

The slogan this year is "We ♥ Bandana Day!"

Take a stand and show you care about people with serious blood disorders like leukaemia. Buy and wear your bandana on 12th October and contribute towards saving a life.

The campaign is fun, hip and happening and involves Ambassadors of Hope for The Sunflower Fund: Corne Krige with his family, Benito Vergotine, Nonala Tose and Liezel van der Westhuizen. Featuring in the TV advert together with South Africans of all ages, they pledge their support and ask that you do too.

The bandana design is fresh, distinctive and is a trendy fashion accessory. Available in 8 different colours, it appeals to everyone from the young to the young at heart! Buy your brightly coloured bandana from Pick n Pay, Round Table, selected Makro stores and the online shop, Zando from 15th August. It's all about saving lives.

Funds raised through National Bandana Day go towards paying for the expensive tissue typing (DNA) tests for new stem cell donors to join the South African Bone Marrow Registry (SABMR).

Behind the campaign, stand the cancer patients who face a very daunting task of fighting for their lives. This unfortunately is a reality for countless people and for many; their only hope is to receive a life-saving stem cell transplant.

"Please support this campaign and help make a difference as together, we can save more lives. We cannot do this without you. To the public of South Africa, I have one question for you... We Heart Bandana Day, do you?" asks Tarryn Corlett, Chief Executive Officer of The Sunflower Fund.

Come on South Africa, "Share a Little, Save a Life"… buy your bandana to give hope to someone else and wear it to show support towards the brave fight that these patients face daily.

For more information on National Bandana Day or becoming a stem cell donor, call the toll free line on 0800 12 10 82 or visit www.sunflowerfund.org.za

12th OCTOBER – NATIONAL BANDANA DAY

South Africa proud to host the International Renewable Energy Conference

Renewable energy is very much a part of our present and will increasingly become mainstream in both our country and our continent's future. It is not surprising that the International Renewable Energy Conference (IREC), a global platform for the advancement of renewable energy is coming to Africa.

To be proudly hosted by the Department of Energy (DOE) in conjunction with the South African National Energy Development Institute (SANEDI) and the Renewable Energy Policy Network for the 21st Century (REN21), the South African International Renewable Energy Conference (SAIREC) takes place at the Cape Town International Convention Centre from 4 –7 October 2015.

Under the theme, RE-energising Africa, SAIREC 2015 is an opportunity to demonstrate why Africa is the business destination for the renewable energy sector, given its current growth trajectory and need for investment in clean energy to underpin sustainable economic growth.

Comprising a conference, an exhibition and a series of side events, SAIREC is expected to attract 140 ministers from around the world as well as renewable energy leaders in government, the private sector and civil society.

As a nation, South Africa is privileged to host this important event and we are ready to chart the way forward for this sector with like-minded countries that realise the benefits of investing in renewable energy.

The focus is on removing barriers to the rollout of renewable energy globally, promoting development and innovation in this sector and highlighting the role that renewable energy can play in terms of accelerating development in general.

The DoE believes that the renewable energy value chain offers solutions for increasing energy access, security of supply, emissions reduction, sustainable development and trust that this conference will contribute to the advancement of this sector in South Africa, Africa and around the world.

Without a doubt, increasing South Africa's dependency on renewable energy makes sense. Here are the benefits.

- Clean energy has much to offer in terms of helping nations industrialise, creating jobs, protecting the environment, expanding access to energy services and lowering the overall cost of electricity.
- Renewable energy decreases our dependence on foreign fuel sources and is a big step towards achieving energy independence.
- Enhanced use of renewable energy will do much to protect our environment.
- Out of all supply options, renewable energy exhibits the lowest marginal cost of electricity generation mainly due to having virtually no input costs compared to coal, and hence it reduces overall electricity cost production for the entire generation fleet.

Just like financial analysts who like to urge investors to diversify and hedge against risks, the trick is to work hard to add enough renewable energy projects to our power portfolios to provide some price stability. But the ultimate solution is to go even further and recognise the inherent inefficiency of our energy supply infrastructure.

The silver lining is that South Africa is developing tools and technologies to propel a revolution in energy that mimics, to a large extent, the evolution in the telecommunications and computer industries.

These new technologies such as solar panels and wind turbines - are the equivalent to wireless cellular phones and portable laptop computers that replaced traditional grid-connected phones and mainframe computers.

South Africa's energy supply conundrum reveals the limits of our old transmission and distribution grid of yesteryear. Our electricity grid, with its emphasis on large polluting and centralised power plants sending power long distances over transmission lines, is many years old.

In South Africa, our renewable energy independent power producer programme (REIPPP) has already exceeded expectations. Since the Department of Energy called for bids four years ago, it have received overwhelming interest and increasingly competitive prices from local and foreign investors.

This has enabled us to increasingly pursue clean energy solutions to meeting the needs of our constrained electricity system. Since the commencement of the internationally renowned REIPP Programme in 2011, the Department has connected 37 projects (primarily Solar and Wind) and procured 5 243 Megawatts of power in Bid Windows 1 – 4. Of that total, 1 827 MW are now connected to the grid. In addition, the 13 projects announced by Minister Tina Joemat-Pettersson on 24 April 2015 will add another 1 084 MW to the grid when they are completed, helping to boost the power supplied by Eskom from other sources. In all the investment by the private sector in this programme currently stands at R193 billion ($15.4billion).

The DOE looks forward to the first IREC to be hosted on African soil, and to the opportunity to share our experiences to date, while at the same time benefitting from global best practice as renewable energy leaders from around the world gather together under one roof at the Cape Town International Convention Centre.

Registration is free and we encourage South Africans and Africans in any way involved in powering our future, from government ministers to specialists and private sector participants, to take full advantage of our hosting of this important event. International participants beyond the continent are also important participants who are encouraged to join us as we engage in discussions on the future of RE globally. It is only when we are able to share experiences and knowledge broadly, that we will jointly achieve the goals of the Climate Change agenda of reducing carbon emissions in the interests of us all.

Why should you attend SAIREC 2015? Because, it is an unmatched global platform to discuss and exchange experiences and solutions to accelerate the global scale-up of renewable energy. Above all, we need diverse views and inputs in order to optimise future policy development for the benefit of ourselves and future generations.

For more information on the programme, speakers list , and for free registration please visit: www.sairec.org.za. wn

Advanced fire-rated cables

Advanced cables with the ability to maintain their integrity for up to two hours in fire condition have been introduced locally for fire alarm and emergency evacuation systems or wherever long term electrical circuits are required under fire conditions.

The new generation cables are designed to self extinguish when exposed to flames and are halogen-free so will not emit corrosive or toxic gasses under fire conditions. This makes them ideal for use in public areas to ensure essential electrical services are maintained in the event of an emergency.

The new Helufire PH30/120 cables from Helukabel expand the company's range of function integrity products that include a large variety of security cables, as well as heat and fire resistant cables, enclosures, protection boxes, glands and accessories.

HIGH STANDARDS

"Building regulations, as well as regulations relating to public places, transport and key points require high levels of function integrity on critical equipment especially fire control panels evacuation systems etc.

"The range of Helufire cables are specially designed to withstand direct flames and heat of 850° for 30 minutes for the PH30 cables and two hours on the PH120 cables. They are also shock resistant and able to withstand the kind of forces that one might expect in a severe fire related incident with falling objects or even shock from blasts caused by flammable substances exploding.

"All Helufire cables are also manufactured in accordance with BS EN 50200:2006 which requires tests to be conducted to verify circuit integrity of cables exposed to fire at 850°C for the required duration as well as mechanical shock," says Doug.

EXTRAORDINARY APPLICATIONS

Helufire cables are typically used in industrial complexes, power stations, communal establishments mines and public places or wherever the highest levels of function integrity are required to ensure the safety of people, animals or property. The cables are suitable for fixed installations on or beneath plaster in dry and moist room applications. They are also suitable to be run outdoors or underground in conduits that exclude excessive water build-ups. The cables are available in 2 or 4 core varieties from 1mm to 2.5mm cross sections to compliment Helukabels extensive range of function integrity cabling products and accessories. *"Due to the high demand for this kind of product we have ensured that we have sufficient stock to cover the needs of the local market,"* says Doug.

Helukabel fire testing of cables

The line up of new products is further bolstered by security cables up to 1kV with the ability to withstand bare flames for extended period of time with rating up to 3 hours. These are ideal for use in areas where function integrity is of the utmost importance such as hospitals, fire brigade, power stations, offshore plants, multi-storey buildings and public places.

ENCLOSURES

In addition to cables, Helukabel also offers the full range of Spelsberg function integrity junction boxes and enclosures. These are able to match the cable products with different flame resistance ratings with the additional benefit of having IP67 protection ratings for dust, water and mechanical stress resistance.

Spelsberg junction boxes are suitable for high-voltage cables and wires, busbars etc and are manufactured to the highest quality and standard.

To complete the range, cable protection systems, glands, terminals and marking systems accompanied by the correct processing tool are added to give a one stop shop solution. WN

UKZN Solar Car team Unveil 'Hulamin'

The University of KwaZulu-Natal's (UKZN) School of Engineering held an Unveiling and Launch of its new and improved Solar Car, Hulamin at the Howard College Campus in Durban recently.

ulamin is the culmination of hard-work and dedication from some of UKZN's best Engineering students, and represents innovative and energy efficient engineering design, promoting green energy for the future. The Solar Car is a UKZN initiative, previously known as Hulamin - iKlwa and now rebranded 'Hulamin'. The team named the car 'Hulamin' in gratitude to the aluminium manufacturing company, HULAMIN, who funded and supported the project with the intention to see it entered into the World Solar Challenge.

Over the past 2 years, the ambitious UKZN Solar Car Team have worked to enhance Hulamin with one goal in mind – to prepare it to qualify as an entrant in the 2015 Bridgestone World Solar Challenge. The car is set to make history as this is the first year the race will see an entrant from Africa.

The 2015 Bridgestone World Solar Challenge will be held in Australia from 18 – 25 October. The race will see teams travel a distance of 3000 kilometres from the city of Darwin in the Northern Territory to Adelaide in South Australia. The UKZN Solar Car team is one of 47 teams from 25 countries around the world. Hulamin will be entered in the Challenger class - 4 wheels (widely considered the primary racing class). The car will be shipped to Australia on 31 July.

Stakeholders, members of the media, staff and students were invited to witness the momentous Unveiling and Launch of Hulamin.

Solar Car Project leaders, Miss Kirsty Veale and Dr Clint Bemont said the team is extremely excited about the race. Dr Bemont said, *"We are going to Australia to win! We hope to beat teams from some of the best Universities in the World like Stanford, Cambridge, MIT and even Delft!"*

The University's Vice-Chancellor, Dr Albert Van Jaarsveld delivered a special message of support, *"Not only, is this a landmark event for the University but for the province and the country as a whole. I'm confident that you will come back with a flag flying high, the University is 100% percent behind you and wish you all the luck in the world,"* he said.

HULAMIN Communications Manager, Ms Noma Kanyile said that the company's view was that the team was extremely resourceful and innovative. *"These are the initiatives that HULAMIN wants to be associated with."*

iKlwa won the national 2014 Sasol Solar Challenge and set distance records for the Olimpia Class. The new and improved UKZN solar car is an undergraduate Engineering final year project. The team includes students and staff from Electronic and Computer Engineering, as well as Mechanical Engineering.

ABOUT HULAMIN:

The car is five meters long, has an aerodynamically optimised design, weighs under 250 kg, and is nimble and agile. Hulamin has an asymmetrical design, with a highly aerodynamic profile that has a very small frontal area. The theoretical drag of the car is very low, at 0,07; which enables the car to go faster and further. The car is lightweight yet rigid and safe, with a fully carbon-composite monocoque chassis. The car will have 6 m2 of super-high efficiency silicon solar panels to harvest energy from the sun. This energy can be stored in 21kg of lithium ion batteries. The car exhibits the cutting-edge of solar power and electric vehicle technology, is a reflection of the skill and enthusiasm of UKZN students and a demonstration of what brilliant and dedicated students can achieve. wn

Wiser

Schneider Electric, a global specialist in energy management, has announced significant updates to its Wiser Home Control, a truly integrated control solution that interlinks electrical, multimedia and telecommunications in a single home automation platform.

Wiser Home Control allows owners to control all appliances in the household and customise settings to adapt to their living patterns through a user-friendly interface for a more eco-friendly and stylish way of life.

"The advances in smart home technology have allowed us to evolve our solution even further," says Anoop Hariparsad, product manager in the Eco-Buildings Division of Schneider Electric South Africa. *"The latest updates to our Wiser Home Control solution simplify home living with automated systems that not only allow for flexible control but also bring great convenience to just about any scenario one can imagine. Owners can look forward to a more comfortable lifestyle, as upgrades can be easily executed and the control system can be accessed from a greater range of mobile devices."*

The Wiser Home Control solution has expanded from its iOS compatibility onto the Android platform, which increases support for more mobile devices in the market. Homeowners can now install Wiser Home Control applications directly on their Android devices, ensuring a smooth transition and control across multiple platforms.

The solution has been extended with several upgrades to its system architecture aimed at providing homeowners with a better user experience and a hassle-free retrofitting and installation process.

- Hassle-free installation: The backbone of the solution, the Wiser Home Controller is updated with the new "plug-and-play" USB ZigBee interface, which allows for communication with the ULTI EZinstall3 switches. As ULTI EZinstall3 switches are ZigBee-oriented and designed for easy retrofitting, homeowners using the Wiser Home Control solution can now avoid compatibility issues with mechanical switches and directly install ULTI EZinstall3 switches in their homes whenever they

Home Control solution

want to. With the ZigBee wireless signal, ULTI EZinstall3 switches can also communicate directly with the solution and, as a result, not only can home owners now control lighting, but also all other home appliances such as air-conditioning, curtains and security. With this innovative Wiser USB ZigBee interface, owners need not worry about the hassle of rewiring or undergoing a major renovation overhaul when they want to upgrade their existing home or install a new system. The Wiser Home Control provides users with an easy and cost-effective way to upgrade their homes with automation technology.

- Reliable control in the comfort of your living room: The upgraded Wiser Home Control solution now has the added option of using the big screen – your TV set – as a controller. The Wiser Home Controller's newly added HDMI port allows home owners to directly connect their television sets to the Controller Hub and access the controls through a larger display, for a better navigation performance and ease of use. With the television remote as a controller, users no longer have to worry about their control devices dying, and an external keyboard or mouse can also be used for control via the USB port. The lack of a Wi-Fi or Internet signal will no longer hamper control as well, improving reliability.

Furthermore, Wiser Home Control allows owners to manage energy usage around the home through smart automation, which uses sensors and time scheduling to avoid unnecessary electricity wastage, and monitoring features that give home owners greater insights to power usage.

These ultimately help consumers reduce their energy bill by up to 30 percent.

"At Schneider Electric, our expertise lies in helping homeowners achieve energy efficiency through smart energy management. We believe that combining technology, aesthetics and design can bring homes to the next level, creating a space, which owners would not want to leave, by delivering great innovations that help individuals and organisations make the most of their energy, both at home and at work," adds Hariparsad. wn

What opportunities do you expect BAUMA CONEXPO AFRICA 2015 to provide for exhibitors and visitors?

Being the largest trade fair in its sector in Africa, BAUMA CONEXPO AFRICA 2015 brings together all key industry players, including the heavy-weights of the industry. The trade fair provides exhibitors the opportunity to showcase their products and new technologies on an international platform. We will have a dedicated demonstration area for exhibitors to demonstrate their latest developments.

In addition, exhibitors will have the opportunity to connect with customers and each other. From this perspective, the opportunity arises to enhance networks, generate business leads and facilitate deal-making among world-class players in the industry.

Visitors including customers and potential customers, will this year also benefit from the BAUMA CONEXPO AFRICA Forum. The Forum that will be open to all visitors is a new introduction to the trade fair and will feature "Country Specials", focusing on investments and projects in South, East and West Africa.

Furthermore, IFAT Environmental Technology Africa will run alongside BAUMA CONEXPO AFRICA. This trade fair, which is an extension of our trade fair portfolio in Munich, will focus on environmental solutions for the mining and construction industry.

In your opinion, what positive economic impact will BCA 2015 make in South Africa in terms of business tourism in Johannesburg, and deal flow?

In 2013 we welcomed 14 700 visitors from 101 countries to the trade fair. Being an international brand recognised for excellence, we welcome many people travelling from all over the world and the region to attend the event. In 2013 BAUMA Africa visitors took up most of the hotels in close proximity to the venue and enjoyed not only the trade fair but also visited restaurants, shopping malls and conducted other sight-seeing activities while utilising public transport. This will be the same for 2015. As organisers, we also provide pre- and post-show tour package deals that include attendance of the trade

Elaine Crewe Businesswoman Extraordinaire

Exhibitions and events are powerful platforms that can bring about change, and motivate and inspire people. It is for this reason that Elaine Crewe, CEO of BAUMA CONEXPO is so passionate about what she does. When looking at her track record and impressive credentials, it is no surprise that when MMI expanded into Africa they chose her to lead the way. Elaine is an entrepreneurial thinker who invests a lot of time and energy in what she does. She brings broad-based management experience to every show through her ability to think, plan, and implement strategically. We had a chat to Elaine to learn more about the upcoming show...

fair, providing our international visitors the opportunity to enjoy the best that South Africa has to offer. In this sense, we extend their stay in the country and create the opportunity for increased revenue for business tourism.

Why is SADC such an important focus for the mining and construction sectors currently?

As the majority of activities in the industry are currently taking place in the SADC region, it makes sense for us to have a strong focus on projects and potential investments for the region.

Without mentioning company names, share some examples of deals or partnerships that you know were cultivated at bauma Africa 2013?

The feedback from our 2013 exhibitors was outstanding and showed numerous cases of deal-initiation and deal-making. These include the sale of machines and equipment as well as the establishment of strategic networks that included important contacts for future business.

Are women playing more of a role in the mining and construction sectors - globally and in Africa? And in your opinion, should they be playing more of a role in these traditionally male-dominated industries?

Women are playing an increasingly important role in the industry but the same can be said for all industries at the moment, not just mining and construction. The role of women has and will continue to grow. Women bring another dimension to business, opening avenues for a different way of thinking and doing. Women in Africa have shown that they are strong, courageous and resilient and they have a vital role to play in the development of the continent.

In your dealings with mining and construction players in SADC, have you noticed an increase in female decision makers? Please elaborate.

Yes, we have recently held roadshows in the SADC region and in Namibia and Zambia for example, it is noteworthy that the majority of decision-makers in round table discussions are women.

As a female business leader, what are some of the personal and professional attributes needed to achieve success in a traditionally male-dominated industry such as mining, construction and engineering?

The most important attribute is to be confident of and to stick to one's convictions. Sometimes it is difficult for people to move away from the stereotypical roles and also to look for and apply new thinking to solving problems. In this sense, I find that women need to work harder to influence and convince however with dedication and commitment, women always find ways to succeed. Women have a strong voice and it important to let their voice be heard. wn

Earn CPD Credits

Historical Ladies of Science and Maths

There has never been a better time for girls to pursue careers in engineering, science and mathematics.

BY | DUDLEY BASSON

The chauvinistic obstruction to higher learning for women has almost completely disappeared, allowing women to study in all faculties offered by academic institutions.

Let us take a brief look at the careers of a selected list of women who succeeded brilliantly in their chosen fields of study despite, in some cases, severe obstruction to their ambitions.

ELENA CORNARO PISCOPIA (1646-1684)

Elena was born on 5 June 1646 in Venice. She was the third child of Giovanni Battista Cornaro-Piscopia and Zanetta Boni. Giovanni was a Procurator of St. Mark's Cathedral which entitled him to accommodation in St. Mark's Square. Elena studied Latin and Greek under distinguished instructors, becoming proficient by the age of seven. She later mastered Hebrew, Spanish, French and Arabic, earning her the title Oraculum Septilingue (seven tongued orator). She also studied and mastered mathematics,

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philosophy and theology. She was a contemporary of Newton and Leibniz – a period of great advances in mathematics. She was invited to be a part of many scholarly societies when her fame spread, and in 1670 became president of the Venetian society Accademia dei Pacifici. She was awarded a Doctorate in Philosophy in Padua Cathedral in June 1678 in the presence of the professors and students of all faculties.

Elena spoke for an hour in classical Latin, explaining difficult passages selected at random from the works of Aristotle. She received plaudits as Professor Rinaldini proceeded to award her the insignia of the doctorate, the book of philosophy, placing the wreath of laurel on her head, the ring on her finger, and over her shoulders the ermine mozetta. (A mozetta is like an elbow length poncho, open at the front).

This scene is illustrated in the magnificent Cornaro Window of the West Wing of the Thompson Memorial Library at Vassar College. The American Vassar and Bryn Mawr colleges were initially for women students only, but later changed to co-ed. Mathematician and computer scientist Dr Grace Hopper (1906-1992) was both a graduate and an associate professor at Vassar.

Elena became an accomplished musician, mastering the harpsichord, clavichord, harp and violin, and was also accomplished in musical composition. She was succeeded in musical composition by Venetian maestro Antonio Vivaldi (1678-1741). A notable contemporary was Italian instrument maker Bartolomeo Cristofori (1655-1731) who invented the keyboard action of the grand piano.

Elena became a member of various academies and was esteemed throughout Europe. She also became a lecturer in mathematics at the University of Padua in 1678. She died in 1684 in Padua suffering from tuberculosis.

MARIA SIBYLLA MERIAN (1647-1717)

Maria Sibella Merian was born on 2 April 1647 in Frankfurt to Swiss engraver and publisher Matthäus Merian the Elder who died when Maria was only three years old.

In 1651, shortly after her father's death, her mother married still-life painter Jacob Marrel who encouraged her to draw and paint.

At the age of thirteen she painted her first images of insects and plants from specimens she had captured. Merian wrote: *"I spent my time investigating insects. At the beginning, I started with silkworms in my home town of Frankfurt. I realized that other caterpillars produced beautiful butterflies or moths, and that silkworms did the same. This led me to collect all the caterpillars I could find in order to see how they changed".* In 1665, Maria married Marrel's apprentice, Johann Andreas Graff, with whom she had two daughters.

Merian published her first book of natural illustrations, titled Neues Blumenbuch, in 1675. In 1699 the city of Amsterdam awarded Merian a grant to travel to Surinam in South America with her daughter Dorothea. On returning to Europe she proceeded to publish her major work, Metamorphosis insectorum Surinamensium, in 1705, for which she became famous. Because of her careful observations and documentation of the metamorphosis of the butterfly, she is considered by David Attenborough to be among the most significant contributors to the field of entomology. She was a leading entomologist of her time and she discovered many new facts about insect life through her studies.

Shortly before Merian's death in 1717, her exquisite work was seen in Amsterdam by the Tsar Peter the Great of Russia. The tsar acquired many of Merian's paintings and illustrations which are still housed in academic collections in St. Petersburg. In 2005, Germany financed the construction of the RV Maria S Merian, the nation's most sophisticated and well-equipped ocean-going research vessel, named in her honour, in recognition of her ground breaking scientific accomplishments.

LAURA MARIA CATERINA BASSI (1711-1778)

Laura Maria Caterina Bassi was born in Bologna on 31 October 1711 into the family of a wealthy lawyer. She was privately tutored for seven years in her teens by Gaetaon Tacconi, a university teacher of biology, natural history and medicine. She

is said to have studied anatomy, natural history, logic, metaphysics, philosophy, chemistry, hydraulics, mechanics, algebra, geometry, ancient Greek, Latin, French and Italian. She was encouraged in her scientific work by Cardinal Prospero Lambertini who would later become Pope Benedict XIV.

Aged 21 in 1732, she was appointed as Professor of Anatomy at the University of Bologna and elected to the Academy of the Institute for Sciences. In the following year she was elected to the Chair of Philosophy. Laura was the second woman in Europe to receive a university degree after Elena Piscopia in 1678, and the first woman to be offered an official teaching position at a university in Europe.

In 1738, she married Giuseppe Veratti, a fellow academic with whom she had twelve children. One of her principal patrons was Pope Benedict XIV. He supported less censorship of scholarly work, such as happened with Galileo, and he supported women figures in learning, including Agnesi. She was interested in Newtonian physics and taught courses on the subject for 28 years. She was one of the key figures in introducing Newton's ideas of physics and natural philosophy to Italy. She also carried out experiments of her own in all aspects of physics in order to privately teach Newtonian physics and Franklinian electricity. Her studies of physics caused her to delve into advanced mathematics. She was a contemporary of the great mathematician Leonhard Euler. In her lifetime, she authored 28 papers, the majority of these on physics and hydraulics. Pioneering mathematical work on hydraulics had been done by Daniel Bernoulli. Much of her scientific impact is evident through her many correspondents including Voltaire, Francesco Algarotti, Roger Boscovich, Charles Bonnet, Jean Antoine Nollet, Giambattista Beccaria, Paolo Frisi and Alessandro Volta.

In 1745, Pope Benedict XIV established an elite group of 25 scholars known as the Benedettini ("Benedictines", named after himself). Bassi pressed hard to be appointed to this group, but there was a mixed reaction from the other academics. Ultimately, Benedict did appoint her, the only woman in the group. In 1749, she presented a dissertation on the problem of gravity.

During the 1760s, Bassi and her husband worked together on experimental research in electricity. This attracted the talent of Abbé Nollet and others to Bologna to study electricity.

In 1746 Nollet gathered about two hundred monks into a circle with lengths of iron wire connecting them. He then discharged a battery of Leyden jars through the 4 km human chain and observed that each man reacted at substantially the same time to the electric shock, showing that the speed of electricity's propagation was very high. The term 'battery' for a group of Leyden jars was coined by Benjamin Franklin who likened it to a battery of cannons. It is no longer current practice to use monks for detecting electric current. The term 'cell' for the components of plant and animal tissue (and later batteries) was coined by Robert Hook who likened them to monks' cells. Work on electricity would be taken further by Italian scientists Luigi Galvani (1737-1798) and Alessandro Volta (1745-1827).

In 1776, at the age of 65, Bassi was appointed to the chair in experimental physics by the Bologna Institute of Sciences, with her husband as a teaching assistant. Two years later, she died, having made physics into a lifelong career and broken a huge amount of ground for women in academic circles.

MARIA GAETANA AGNESI (1718-1799)

Maria Gaetana Agnesi was born in Milan on 16 May 1718 to University of Bologna

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University Mathematics Professor Pietro Agnesi and Anna Fortunata Brivio.

Maria was recognized early on as a child prodigy; she could speak both Italian and French at five years of age. By her eleventh birthday, she had also learned Greek, Hebrew, Spanish, German, and Latin, becoming, like Elena Piscopia, an Oraculum Septilingue. She also educated her younger brothers.

When she was nine years old, she composed and delivered an hour-long speech in Latin to some of the most distinguished intellectuals of the day. The subject was women's right to be educated.

By age fourteen, she was studying ballistics and geometry. When she was fifteen, her father began to regularly gather in his house a circle of the most learned men in Bologna, before whom she read and maintained a series of theses on the most abstruse philosophical questions.

Maria's father remarried twice after her mother died, so that she eventually became the eldest of 21 children. She spent much time teaching her siblings and half-siblings. Maria is regarded as the first important woman mathematician since Hypatia of the 5th century AD. Her book published in 1748 was regarded as the best extant introduction to the works of Euler. This two volume work of over 1000 pages dealt with integrating mathematical analysis with algebra.

The first volume treats of arithmetic, algebra, trigonometry, analytic geometry and calculus, and the second focused on more advanced topics: infinite series and differential equations. These works were translated and published in English and French. The work was dedicated to Empress Maria Theresa, who thanked Agnesi with the gift of a diamond ring, a personal letter, and a diamond and crystal case. Many others praised her work, including Pope Benedict XIV, who wrote her a complimentary letter and sent her a gold wreath and a gold medal.

Maria was a contemporary of the famous mathematicians Lagrange (1736-1813) and Laplace (1749-1827). She declined a request from the University of Turin to act as referee of the young Lagrange's papers on the calculus of variations. Joseph-Louis Lagrange is regarded as a French mathematician but was actually born in Italy and named Giuseppe Lodovico Lagrangia.

In 1750, on the illness of her father, Maria was appointed by Pope Benedict XIV to the chair of mathematics and natural philosophy and physics at Bologna, though she never served. She was the second woman ever to be granted professorship at a university, Laura Bassi being the first.

Maria spent her last years with the study of theology and doing charitable work with the poor, sick and homeless. She even set up a charitable hospital in her home.

MARY ANNING (1799-1847)

Mary was born to cabinetmaker Richard Anning and Mary Moore on 21 May 1799 in Lyme Regis, on the West Dorset coast.

The site of her home and fossil shop now houses the Lyme Regis Museum. The fossil rich coast from Orcombe Point near Exmouth in East Devon to Harry Rocks near Swanage in East Dorset has been declared a UNESCO World Heritage site.

The coast is well known for ammonite fossils which are found in profusion. The fossils come from the crumbling coastal cliffs which have strata from the Mesozoic era which includes the Triassic, Jurassic and Cretaceous periods.

A delightful touch to the seaside town of Lyme Regis is that the ammonite spiral with chambers is included in the design of the lampposts. Novelist Jane Austen loved Lyme Regis and used it as a setting for her novel "Persuasion".

Mary and her brother Joseph were the only two of ten children to survive to adulthood. At the time, child mortality in Britain was very high resulting in only about half of the children born surviving more than five years.

Mary, with her father and brother, collected and sold fossils to supplement the family income. In 1811, when Mary was 12 years old her brother dug up a 1,2m ichthyosaur skull, and a few months later Mary found the rest of the skeleton.

It was displayed in London where it attracted considerable interest. It was later sold to the British Museum and given the name ichthyosaurus. Mary continued to support herself by collecting ammonite and belemnite fossils. The vertebrate fossils sold for more but were much rarer. Mary became more knowledgeable in the various fossil species than the wealthy collectors who bought them. In 1823, an article in The Bristol Mirror reported:

This persevering female has for years gone daily in search of fossil remains of importance at every tide, for many miles under the hanging cliffs at Lyme, whose fallen masses are her immediate object. They alone contain these valuable relics of a former world, which must be snatched at the moment of their fall, at the continual risk of being crushed by the half suspended fragments they leave behind, or be left to be destroyed by the returning tide. To her exertions we owe nearly all the fine specimens of Ichthyosauri of the great collections.

This was dangerous work – on one occasion Mary was narrowly missed by a rock fall that crushed her dog.

Mary's reputation grew as she continued to make important finds. In 1823 she found the first complete Plesiosaurus, and in 1828 the first British example of a Pterosaur (called a flying dragon) which was displayed in the British Museum. Explaining the age and species of the fossils was problematic at the time as it was unfashionable to suggest that the Earth was more than a few thousand years old or that it was possible for species to become extinct. This problem would come to a head when Darwin published his controversial book.

By 1826, Mary had saved enough to purchase a home with a glass store-front window which became Anning's Fossil Depot. In 1844 King Frederick of Saxony visited the shop and purchased an ichthyosaur skeleton for his natural history collection.

In 1865 Charles Dickens wrote a magazine article about her life which ended with: *"The carpenter's daughter has won a name for herself, and has deserved to win it."*

In March 2010 the Royal Society invited a panel of experts to produce a list of the ten British women who have most influenced the history of science. The list included Mary Anning.

In February 2015, a fossil which had been stored in the Doncaster Museum for 30 years, was found to be of an unknown species of ichthyosaur from 189 million years ago. It has been named icthyosaurus anningae in honour of Mary Anning. On 21 May 2014 the Google Doodle commemorated her 215th birthday.

ANNA ATKINS (1799-1871)

Anna Children was born in 1799 to John George Children and Hester Ann in Tonbridge, Kent. Her mother died soon after Anna's birth. Anna received an unusually scientific education for a woman of her time. She was a talented artist – her detailed engravings of more than 200 shells were used to illustrate her father's translation of Lamarck's Genera of Shells. Her father was an experimental chemist, keeper of natural history at the British Museum, and a fellow of the Royal Society. In 1825 she married John Pelly Atkins, a wealthy London West India merchant.

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Her father and John Pelly Atkins were friends of William Henry Fox Talbot. Anna learned directly from Talbot about two of his inventions relating to photography. He is considered to be the first person to publish a book with photographic images. Her prints were not actually photographs but photograms or contact prints. There is no known camera based work by Anna. Sir John Herschel, a friend of Atkins and Children, invented the cyanotype photographic process in 1842. This involves the exposure of a mix of ammonium iron citrate and potassium ferricyanide to ultraviolet light, leaving the paper with a so-called Prussian blue colour.

The word 'blueprint' comes from the same process, which in the past had been used to reproduce engineering and architectural drawings.

Within a year, Atkins applied the process to seaweed making cyanotype contact prints by placing the specimens directly on the cyanotype paper, and then exposing them to sunlight for fifteen minutes, after which they were washed. Anna collected botanical specimens and became a member of the Botanical Society of London.

Anna self-published her book of photograms "Photographs of British Algae" with hand written text in 1843. Eight months later Fox Talbot's "The Pencil of Nature", the first photographically illustrated book, was published. Only 17 copies of Anna's book were published and are held by prestigious museums in the UK and USA.

A copy of the book with 411 plates in three volumes was sold at auction in 1996 for £133 500. Another copy with 382 plates in two volumes was sold at auction in 2004 for £229 250.

Anna's botanical work is highly regarded by the scientific community. She was honoured by the 16 March 2015 Google Doodle.

Anna was also a novelist writing: The Perils of Fashion (1852), The Colonel. A Story of Fashionable Life (1853), Murder Will Out (1859) and A Page from the Peerage (1863).

SOFIA VASILYEVNA KOVALEVSKAYA (1850-1891)

Sofia was born in Moscow on 15 January 1850 to Vasily Korvin-Krukovsky and Yelizaveta Schubert. Her father was a Lieutenant-General of Artillery who served in the Imperial Russian Army.

Her mother, Yelizaveta Schubert, was a scholarly woman of German ancestry. Sophie had an early introduction to mathematics when she was eleven years

old – the wallpaper of her bedroom had a decoration of integral and differential calculus.

Her parents employed a tutor, who was in favour of higher education for women, who taught her calculus. Despite her obvious talent in mathematics she could not complete her education in Russia as women were not permitted to attend the universities.

She needed a husband to emigrate from Russia so she arranged a marriage of convenience with a young palaeontology student, Vladimir Kovalevskii with whom she emigrated in 1867. Vladimir would become famous for his collaboration with Charles Darwin. She began attending the University of Heidelberg in 1869. She was permitted to attend lectures provided that the professors gave their approval.

Aged 19, she went to London with Vladimir who visited his colleagues Thomas Huxley and Charles Darwin. Sofia was invited to attend the Sunday salons of authoress

George Eliot where she met Herbert Spencer and was led into a debate on "Women's capacity for abstract thought." Mary Ann Evans (1819-1880) used the pen name "George Eliot" as it was not considered proper at the time for women to write novels. She wrote several novels including Middlemarch and The Mill on the Floss.

Sofia spent two years in Heidelberg studying under the famous scientists Hermann von Helmholtz, Gustav Kirchhoff and Robert Bunsen, after which she went to Berlin to take private lessons from mathematician Karl Weierstrass. In Berlin she was not permitted to attend lectures at all.

In 1874 she presented three papers to the University of Göttingen as her doctoral dissertation: on partial differential equations, on the dynamics of Saturn's rings and on elliptic integrals. With the support of Weierstrass, this earned her a doctorate in mathematics, summa cum laude, bypassing the usual required lectures and examinations. She had now become the first woman in Europe to gain a doctorate in mathematics.

Her paper on partial differential equations contains what is now commonly known as the Cauchy–Kovalevskaya theorem, which gives conditions for the existence of solutions to a certain class of those equations.

In 1883, with the help of the mathematician Gösta Mittag-Leffler, whom she had known as a fellow student of Weierstrass', Sophia was able to secure a position as a privat-docent at Stockholm University in Sweden. In the following year she was appointed to a five year position as "Professor Extraordinarius" (Professor without Chair) and became the editor of Acta Mathematica. In December of 1888 Sofia learned she was to receive the highest scientific recognition ever accorded a woman to that day - the Prix Bordin.

Her work was described by Hermite as, *"an ingenious application of mathematics to a system of equations of great mathematical interest,"* while the President of the Academy of Sciences said of it in his congratulatory speech that it, *"bears witness not only to profound and broad knowledge, but to a mind of great inventiveness."*

The originality and standard of her work also saw the prize money being raised from three to five thousand francs. Her submission included the celebrated discovery of what is now known as the "Kovalevskaya Top".

On hearing of Sofia's victory in the Prix Bordin, Weierstrass was delighted and proud. He wrote to her from Berlin: *"… your success has gladdened the hearts of myself and my sisters, also of your friends here. I particularly experienced a true satisfaction; competent judges have now delivered their verdict that my 'faithful pupil', my 'weakness' is indeed not a frivolous humbug."*

More much needed prize money was awarded to Sofia when a further refined version of her solution would see her receive an award from the Swedish Academy of Sciences, who were doing their very best not to lose the woman they viewed as the star of their relatively new university.

In 1889 she was appointed Professor Ordinarius (Professorial Chair holder) at Stockholm University. She died of influenza in 1891 at age forty-one, after returning from a pleasure trip to Genoa.

CHARLOTTE ANGAS SCOTT (1858-1931)

Charlotte was born on 8 June in Lincoln, England to Caleb Scott and Eliza Exely, the second of seven children. She was educated at Girton College Cambridge where she became a resident lecturer in mathematics until 1884. She did her graduate research under the famous mathematician Arthur Cayley. Cambridge did not begin issuing degrees to women until 1948, so she received her BSc in 1882 and DSc in 1885 from the University of London.

She obtained special permission to take the Cambridge Mathematical Tripos Exam in 1880, as this was not available to women. She came eighth in the Tripos but the title of "eighth wrangler" of all students taking them had to be awarded to a male student. At the ceremony however, after the seventh wrangler had been announced, the undergraduates repeatedly called out "Scott of Girton" and cheered tremendously.

This marked a turning point in England regarding advanced education for women. She was given a special ceremony and crowned with laurel at Girton College to celebrate her accomplishment. After

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this incident, women students were formally permitted to take the exam. At this time in Cambridge, women walking unaccompanied about town could be arrested and thrown into the 'Spinning House', a prison for prostitutes and suspected prostitutes.

Charlotte moved to the United States in 1885 where she became one of eight founding members and an Associate Professor of Mathematics at the women only Bryn Mawr College near Philadelphia *(bryn mawr are the Welsh words for 'hill, large')*. The famous Austrian physicist Lise Meitner, discoverer of nuclear fission, became a visiting professor of Bryn Mawr.

Charlotte directed the PhD theses of many pioneering women mathematicians. She was the first mathematician and the first department head at Bryn Mawr and became full Professor from 1888 to 1917. Her book on analytical geometry was published in 1894 and reprinted thirty years later.

In 1891 she became the first woman to join the New York Mathematical Society, which later became the American Mathematical Society.

Charlotte was a staunch supporter of rigour in women's classes, writing in a letter to Bryn Mawr President Carey Thomas:
I am most disturbed and disappointed at present to find you taking the position that intellectual pursuits must be "watered down" to make them suitable for women, and that a lower standard must be adopted at a woman's college than in a man's. I do not expect any of the other members of the faculty to feel this way about it; they, like (nearly) all men that I have known, doubtless take an attitude of toleration, half amused and half kindly, on the whole question; for even where men are willing to help in women's education, it is with an inward reserve of condescension.

Charlotte retired in 1924, but stayed an extra year at Bryn Mawr to help her seventh doctoral student complete her dissertation.

She returned to, and settled in Cambridge, where she died in 1931. Lise Meitner also spent her retirement years in Cambridge.

ANNA JOHNSON PELL WHEELER (1883-1966)

Anna Johnson Pell Wheeler was the daughter of Swedish immigrants, Andrew Gustav and Amelia (Friberg) Johnson, who travelled to the United States in 1872 from Swedish parish-Lyrestad in Skaraborgllin, Wastergotland. Settling originally at Union Creek in Dakota Territory, they lived in a dugout hollowed from the side of a small hill, and the father tried to eke out a living as a farmer. In 1882 he moved his ever-growing family to the nearby town of Calliope (now Hawarden), Iowa, where Wheeler was born on May 5, 1883, the youngest of three children.

The earliest records indicate that Anna was sent to the Akron public school. Though there appears to have been no tradition of academic achievement in the family, in the fall of 1899 Anna enrolled at the University of South Dakota, where her sister had already been studying for a year. After one year as a "sub-freshman" making up entrance requirements, she fulfilled the degree requirements in three years. Her main interest - mathematics - was evident early in her college career. One of her mathematics professors at South Dakota, Alexander Pell, recognized her talent for mathematics and actively coached her into a mathematical career.

Obtaining an A.B. degree from South Dakota in 1903, Anna won a scholarship to the University of Iowa. She completed a master's degree the following year, taking five mathematics courses and a philosophy course. Simultaneously, she taught a freshman mathematics course and wrote her master's thesis, "*The extension of the Galois theory to linear differential equations.*" The quality of her work was high, and she was elected to the Iowa chapter of the scientific society Sigma Xi. Winning a scholarship to Radcliffe, she earned a second master's degree in 1905. She stayed at Radcliffe an additional year on scholarship, enrolling in courses with such noted mathematicians as Maxime Bocher, Charles Bouton, and William Osgood.

In 1906 she applied for and won the Alice Freeman Palmer Fellowship offered by Wellesley College to a woman graduate of an American college. A stipulation of the fellowship was that she agree to remain

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Ladies of Science & Maths

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unmarried throughout the fellowship year. Wheeler used the funds to finance a year's study at Gottingen University, then the worldwide center of intense mathematical activity. While at Gottingen, she attended lectures given by the mathematicians David Hilbert, Felix Klein, Hermann Minkowski, and Gustav Herglotz, and the astronomer Karl Schwarzschild. Of these professors, she was most influenced by Hilbert and his work.

Throughout her years of graduate study at Iowa, Radcliffe, and Gottingen, her former teacher, Alexander Pell, kept in touch with her. He was very proud of her progress and achievements. His first wife died in the interim, he and Wheeler finally decided to marry, despite her family's objections to the twenty-five-year age difference.

In July 1907, when her fellowship expired, they were married in Gottingen. They then returned to South Dakota, where Pell had been promoted to the position of first dean of the College of Engineering. During the fall term of 1907-1908, the young wife taught two courses at South Dakota-theory of functions and differential equations. Still, she wanted the Ph.D.; and in the spring of 1908, she decided to return to Gottingen alone to complete her doctoral work.

By the late fall of 1908, Anna had almost completed the requirements. The final examination for the Ph.D. was imminent. Evidently, some conflict of unknown origin arose between her and Hilbert, and she returned to America in December 1908 with a thesis (written independently of Hilbert) but no degree. She rejoined her husband in Chicago, where he had moved after academic policy disagreements forced his resignation from the University of South Dakota. His new position involved teaching at the Armour Institute of Technology.

In the fall of 1911, a vacancy opened at Mount Holyoke College. She applied for it and was accepted. Hired initially as an instructor, she was promoted to associate professor in 1914. However, Anna's years at Mount Holyoke (1911-1918) were not easy ones. Teaching loads were heavy. She felt compelled at all costs to continue her research work, and she had to take care of her husband, who never fully recovered from a stroke.

In 1918 she decided to resign from her position at Mount Holyoke College and accept an associate professorship at Bryn Mawr College. She felt that Bryn Mawr offered greater potential for her career advancement. The possibility of teaching advanced mathematics to graduate students intrigued her, and there was the prospect of being promoted to chairperson when Charlotte Angas Scott retired.

Professionally, her career at Bryn Mawr was successful. She became chairperson in 1924 and full professor in 1925. Except for brief periods, Anna remained at Bryn Mawr as chairperson and teacher until her own retirement in 1948.

Anna's personal life during the Bryn Mawr years were not consistently happy ones. She lost her father in 1920, and her husband several months later. There was a brief but happy second marriage, followed by the death of her second husband in 1932. In 1935 her mother died. Later that same year, Emmy Noether, her colleague and new-found friend, also died suddenly. All of these events took their toll on Anna.

During Wheeler's second marriage, to Arthur Leslie Wheeler, a classics scholar, the coupled lived in Princeton. Wheeler gave up her administrative duties at Bryn Mawr but continued lecturing on a part-time basis. She had more time to devote to her own research and could participate in the stimulating mathematical environment at Princeton University. Summers the Wheelers spent in the Adirondacks at a place they built and called "Q.E.D.," a name appropriate in the light of both of their careers. Following her husband's death, Anna returned to live and work full-time at Bryn Mawr.

Retirement for Anna in 1948 did not mean withdrawal from all mathematical activity. Despite recurring severe bouts of arthritis, she kept abreast of new developments and attended mathematical meetings. She remained in contact with many of her students, taking great pride in their achievements.

She travelled, spending most of her summers in the Adirondacks, where she enjoyed various outdoor activities.

She suffered a stroke early in 1966. Never recovering, she died a few months later, on March 26, at the age of eight-two. According to her wishes she was buried beside Alexander Pell, in the Lower Merion Baptist Church Cemetery at Bryn Mawr.

Anna was highly respected professionally during her lifetime. Of the 211 mathematicians ever starred in American Men of Science, only three were women. One of them was Anna Wheeler. Such starring was an honour reserved for those considered prominent in their field of activity by their contemporaries. wn

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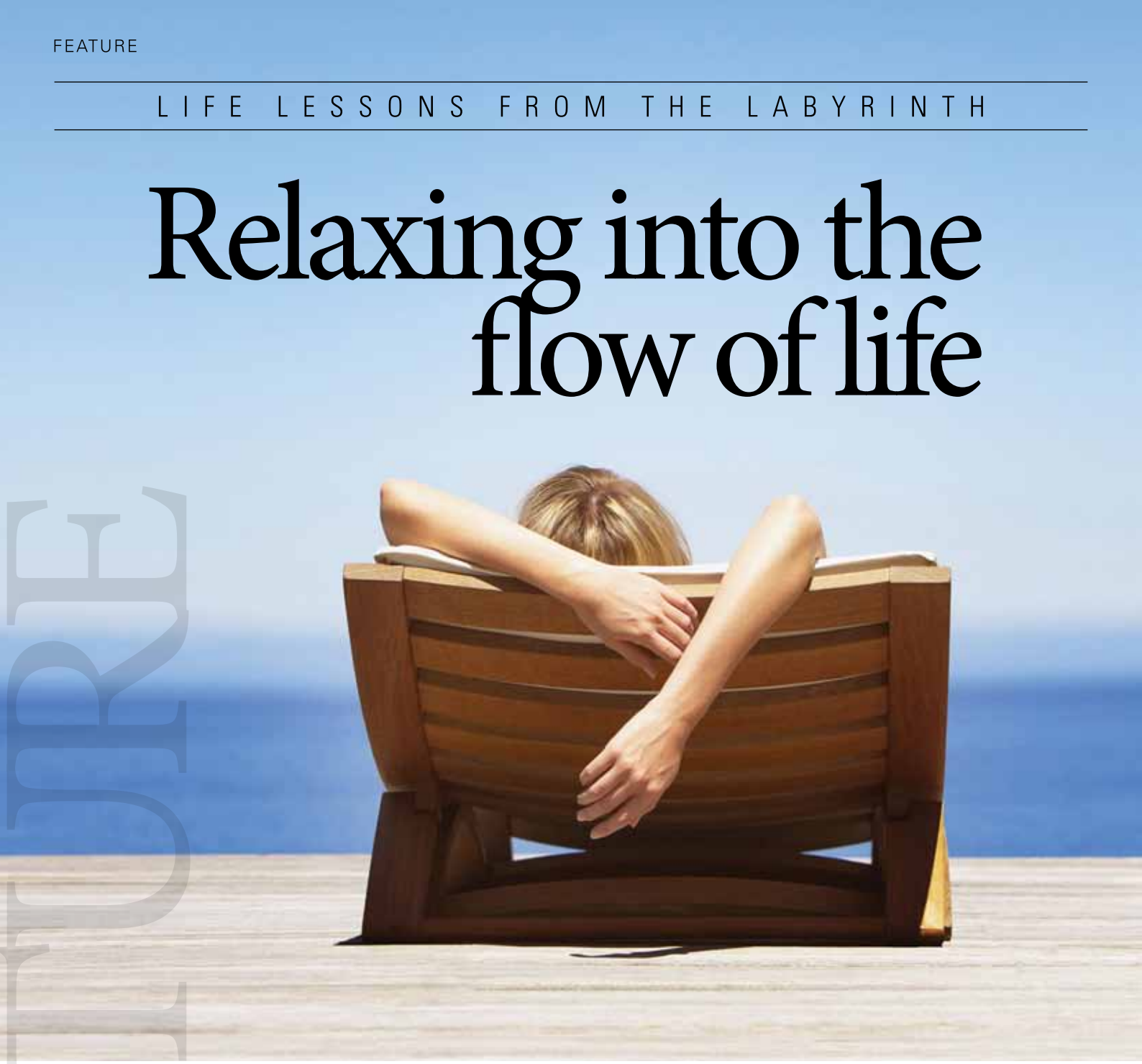
As at 06/07/2015

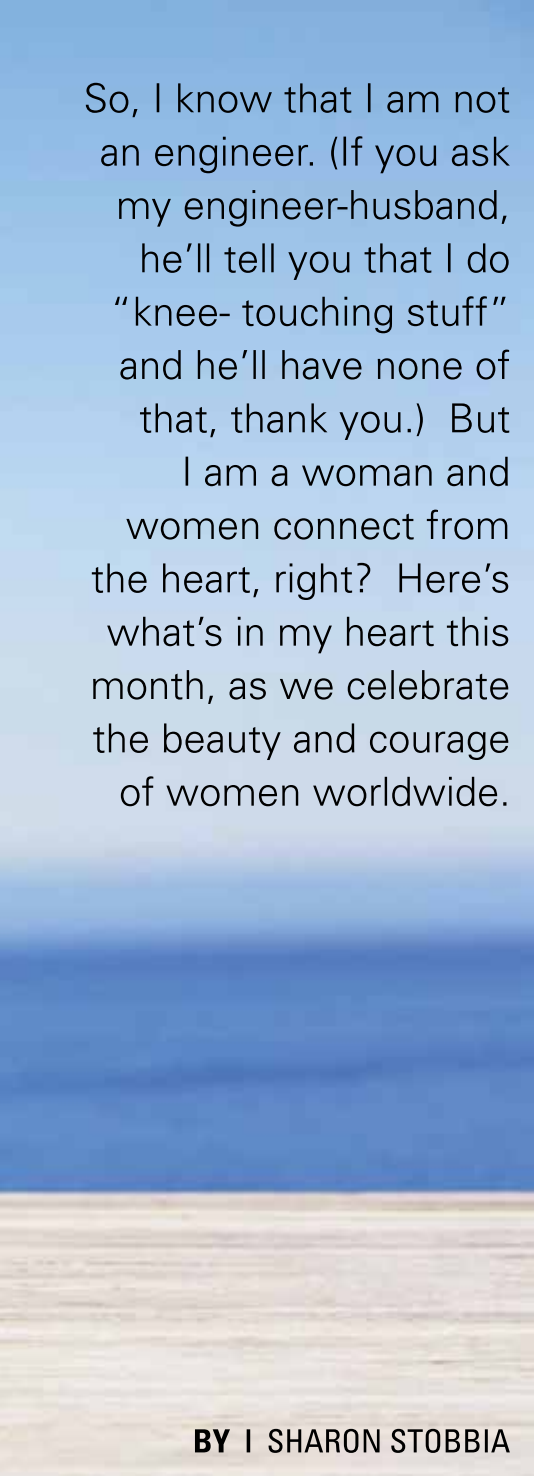
LIFE LESSONS FROM THE LABYRINTH

Relaxing into the flow of life



Earlier this year, I decided to go to a retreat. I partly did it, because I wanted to support a friend, who was one of the facilitators. The other part did it because I had anger issues. You know the kind where you behave totally inappropriately for your age and slam doors? The retreat claimed to be a game changer and give you answers to questions you didn't even know you had. Firmly believing that life is an inside job and that I am responsible for the changes I want to see in my life, I went off into the deep, desolate, completely off-the-grid, (but beautiful) bowels of the earth, Baviaanskloof - on a mission to uncover some questions and answers about my life.

The defining questions, and answers, came as I walked the labyrinth, skilfully sculpted with stones from the area and nestled between mountains, on my last day at the retreat. For clarity, a labyrinth is different from a maze, as it has only one circuitous path that leads to the centre and then out



So, I know that I am not an engineer. (If you ask my engineer-husband, he'll tell you that I do "knee- touching stuff" and he'll have none of that, thank you.) But I am a woman and women connect from the heart, right? Here's what's in my heart this month, as we celebrate the beauty and courage of women worldwide.

BY | SHARON STOBBIA

again. As I walked the labyrinth that last day, I was really enjoying the walk, aware of the beauty surrounding me, and there was an inner calmness. I knew that I just had to stay on the path and I would arrive at the centre.

Seven days earlier, in stark contrast, I walked the same labyrinth and all I could think was, "*When will I ever get to the centre? Did they really have to try to get the record for the biggest labyrinth in Africa? Will it matter if I skip a few paths?*" There was an urgency, dissatisfaction, forcefulness and I was hardly aware of the surroundings. The same labyrinth, the same me, but a vastly different experience.

It struck me how walking the labyrinth was a metaphor for the sacred journey of life that we are all on. I knew which of the two experiences I wanted in my life. I want to share the three things that I realised on reflection, had allowed me to relax into the flow of life and make some suggestions on how we can achieve that in our day to day lives. We can't all stay in the Baviaanskloof forever!

CREATE SPACE

What the retreat gave me was space, time for myself.

We live in a fast-paced, permanently connected society, where BUSY is the new four letter word. I know that we have a career, we're Mom and Wife, but "Busy" has also become an excuse and cover up for things we do not want to do or face. If we stay busy, we don't have to admit how sad or lost or angry we are. We're on this rollercoaster and life goes faster and faster... until...

We have to make time for ourselves. We have to do what makes us happy. We have to STOP and make time for reflection. Take an hour, take a day or take a week, BUT take a break and think about your life. Why are you doing what you are doing? Are you enjoying the ride?

I can hear you all shouting, "I don't have time!" This is about choosing, prioritising and letting go of Perfection, and allowing time to expand as you need it.

Journaling is a very helpful practice that allows you to reflect on a regular basis. You can do this in a mere 10 minutes a day and I promise it will make a huge difference.

BE WITH BEAUTY

The retreat allowed me to be in beautiful natural surroundings. Being with beauty calms and inspires my soul. Finding the perfect moment in every day has become one of my success habits. I suggest you be with beauty daily, whether it is a drink in cosy coffee shop, a visit to an art gallery, or a walk on the golf course. Those perfect moments are easy to find once we start looking and help us above all, to remain grateful.

DREAM

One of the gifts of the retreat was that it allowed me to reconnect with my dreams through visualisations. I experienced it as if it had already happened. I could smell it, taste it, feel it. It made me happy, because I know that if I can go there in my mind, I can go there in body.

I don't know your dreams or desires, but I know that you are destined to WOW.

Don't doubt yourself and don't settle for mediocre. Have the courage to live your dreams. What is one small step you can take today to move towards your dream? wn

PS: Next time there is load shedding, you can "walk" the finger labyrinth at www.lessons4living.com

Why women need insurance

With South Africa celebrating women's month in August, we believe that this is a good opportunity for you to visit or revise your thinking on insurance. A report prepared by the United Nations Development Program (UNDP) that maps gender equality progress in South Africa (2010) states that "women outnumber men in higher education." In the past 5 years there has been a steady increase in the number of graduating females. 55.2% of postgraduate enrollments are female.

We have seen significant strides being made by women in the workplace, and more are becoming breadwinners for their families. There is, however, a disconnection between providing for their families now, and having insurance in place to provide for them when they no longer can.

At PPS only 39% of our members are female. This means that it is time to get more women protected with life insurance.

SO WHY DO WOMEN NEED INSURANCE?

WOMEN'S FINANCIAL RESPONSIBILITY IS GROWING

Women are primary caregivers and breadwinners, more economically active, and have debt, such as bonds and cars. The non-financial contributions that women make in the home are not fully quantified, but need to be catered for when doing a financial plan. Life insurance provides a safety net for this provision.

BEING SINGLE

Whether through never being married, divorce or widowhood, women will find themselves single at some point in their lifetime. It is a fact that generally women will outlive men. It is critical that they learn about, and are in control of their finances, as they will have to manage their own money.

YOURS, MINE, OURS

With a high rate of divorce (one in three marriages end in divorce), and many women choosing to delay having a family until after they are established in their careers, blended families are becoming more common.

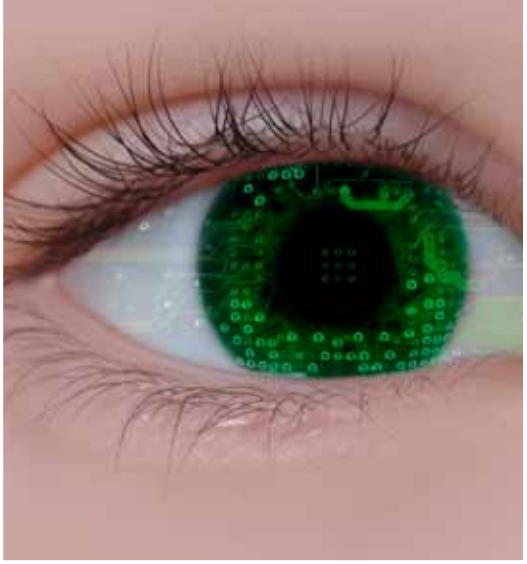
It is vital for women to have enough cover for themselves, their children, his children (e.g. what happens if your partner losses everything, dies or is disabled), and any other dependents arising from the new relationship. Relying on the husband's financial plan alone could lead them into trouble, as his assets might have to be shared with an ex-spouse and children from a previous relationship.

WOMEN WITH RETIREMENT PLANS GENERALLY SAVE 5% OF THEIR SALARY, VERSUS 15% SAVED BY MEN

Women will live longer than men, therefore, their pension needs to last longer, yet very few have enough retirement savings. Women would rather help an adult child in need, than stick to their savings plan. Isn't it ironic that whilst their best intention is to provide for and protect their children, they could inadvertently end up being a burden on them?

THE IMPORTANCE OF A WILL

Women are sentimental, so the importance of a will cannot be over-emphasised. Women want to have control as to how their assets are distributed, as this is often an emotional decision. wn



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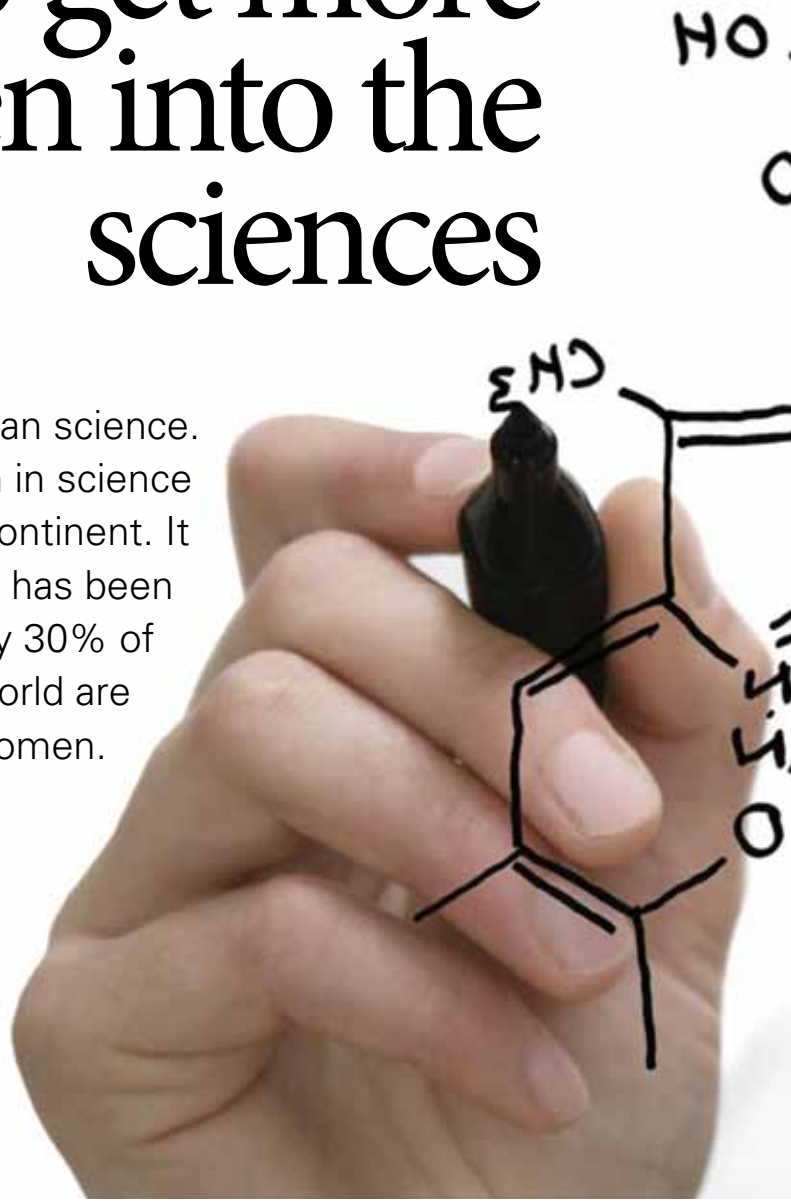
Africa has a long way to go to get more women into the sciences

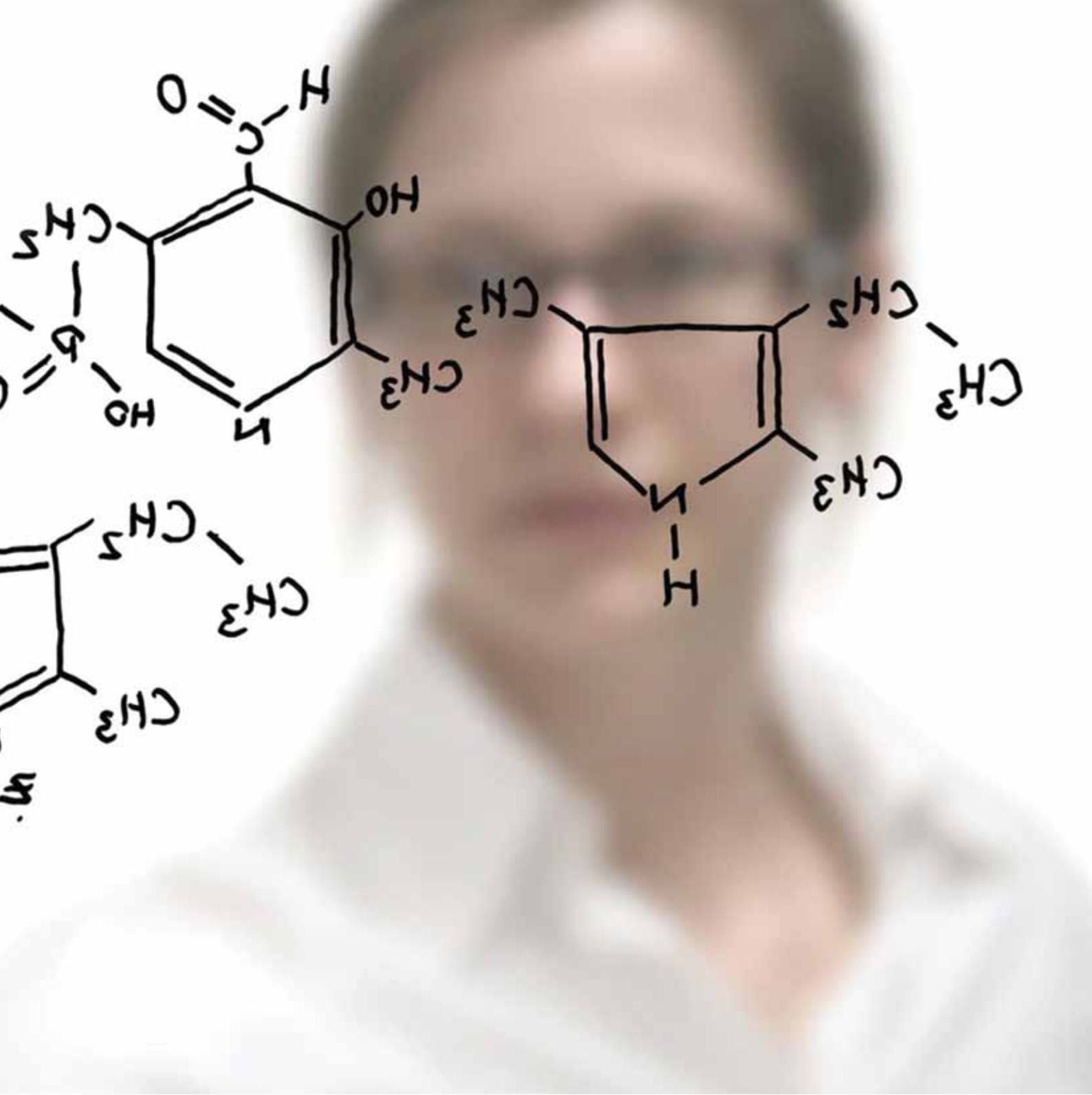
It's still a man's world in African science. The marginalisation of women in science is not unique, though, to the continent. It is a pattern around the globe. It has been estimated that, on average, only 30% of science roles throughout the world are held by women.



BY | JOHN BUTLER-ADAM

In the 114 years over which Nobel Prizes have been awarded, 47 women have received prizes, with 16 being honoured in what is termed the disciplinary areas of the awards (that is, not including literature and peace). Two of these prizes were in physics, five in chemistry, eight in physiology and medicine, and one in economics.

The Fields Medal, which is awarded to outstanding mathematicians under 40, has only once in the past 70 years been



given to a woman, Maryam Mirzakhani, in 2014. The Abel Prize (instituted since 2003 for mathematicians) has never been won by a woman.

Representation of women in the sciences is even more dire in Africa. Reliable and recent data, beyond South Africa, is scant. This in itself is an indictment on the limited attention paid to women in the sciences.

FEW AND FAR BETWEEN

The reasons for the poor representation of women in science in Africa are a mixture of the barriers women face all over the world, combined with some added complexities.

Where data becomes available, it does not paint a positive picture. Only three of the 13 members of the council of the Academy of Science of South Africa (ASSAf) are women, although a woman leads the academy as its executive officer.

In most other academies of science across the continent, the norm is that there is one (or no) female council members. In

Women into Sciences

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Celine Nobah of the Association of Women Researchers in the Ivory Coast conducts research to ensure that fish in the lagoon Ebrie are safe for consumption. Reuters/Thierry Gouegnon

April 2015, the University of Cape Town appointed chemical engineer Alison Lewis as the first female Dean of Engineering and the Built Environment in the 186-year old institution. She is only the second woman in South Africa to hold such a post.

The Association of African Women in Science and Engineering estimates that women make up no more than 20% of the academics in these fields in Africa. In South Africa, slightly fewer than 40% of scientists, engineers and technologists are women – and, as in the US, the figures are lower in the physical sciences. South Africa's science statistics look a little better than the continent because it includes health sciences professionals.

In the US, women are also a minority. 46% of academics in science and engineering are women. The number is bolstered by the 16% in life sciences.

South Africa, at least, has a host of distinguished women scholars who, like Alison Lewis, are admirably suited to lead departments, faculties, universities, research foundations and institutes. Three of South Africa's six world-leading researchers in their fields, as determined in 2014, are women.

WHAT'S KEEPING WOMEN OUT?

This gloomy outlook may be attributed to at least four fundamental causes:

Historically, girls and women have not had the same access to education as their male counterparts have enjoyed.

Methods of teaching science have not considered gender equality in teacher education and curriculum development. There is a lingering tradition in some schools of encouraging boys to study physical science and girls to focus on biology and become teachers. While the situation is serious in South Africa, it is often more severe in other parts of the continent. In Kenya, for example, the number of women in engineering remains very low.

Institutional structures, and a persistent lack of support in the workplace, have disadvantaged women in their quest to progress in scientific careers.

Deliberate and persistent, although often hidden, discrimination remains – in academia as elsewhere in society.

Sexism is still a major barrier to women. A recent review of an article submitted to open access science journal *The Public Library of Science* suggested that female authors find a man to work with if they wanted a paper to be accepted. This is just one example of blatant sexism. The journal's editors either did not notice the reviewer's comment or thought it reasonable – until the female authors drew it to world's attention by tweeting the remark.

Overall, these factors ensure that it remains true that women remain the minority members of science and engineering disciplines in academia.

MORE WOMEN IN THE SCIENCES MAKES SENSE

There is a strong case to be made for having more female scientists. Increasing women's involvement, input and access to science and technology is essential to reducing poverty, creating job opportunities and increasing agricultural and industrial productivity. It is also key to tapping into human potential in rapidly changing areas and improving how we use technology,

especially in the vital developmental areas of water resources management, food production and processing, and sanitation.

Some steps are being taken to remedy the disparity. The aim of one ASSAf project is to conduct a series of studies to highlight the role that women are playing in various aspects of science. Still in its infancy, the initiative also plans to look at how science and technology can support both women and men and promote the leadership of women.

The continent has a great deal to do to encourage women to take up careers in science, technology and innovation – starting from school level. First and foremost, attitudes towards girls and women need to change. Nearly 30 million girls on the continent between the ages of six and 15 are not in school, most of whom will never set foot in a classroom.

Getting women into the sciences is not possible unless we deal with this problem first. wn

Rita Yao Kakou belongs to the Association of Women Researchers, which works to raise the profile of women in science in the Ivory Coast.

About the Author: John Butler-Adam is Editor-in-Chief of the South African Journal of Science and Consultant, Vice Principal for Research and Graduate Education at University of Pretoria

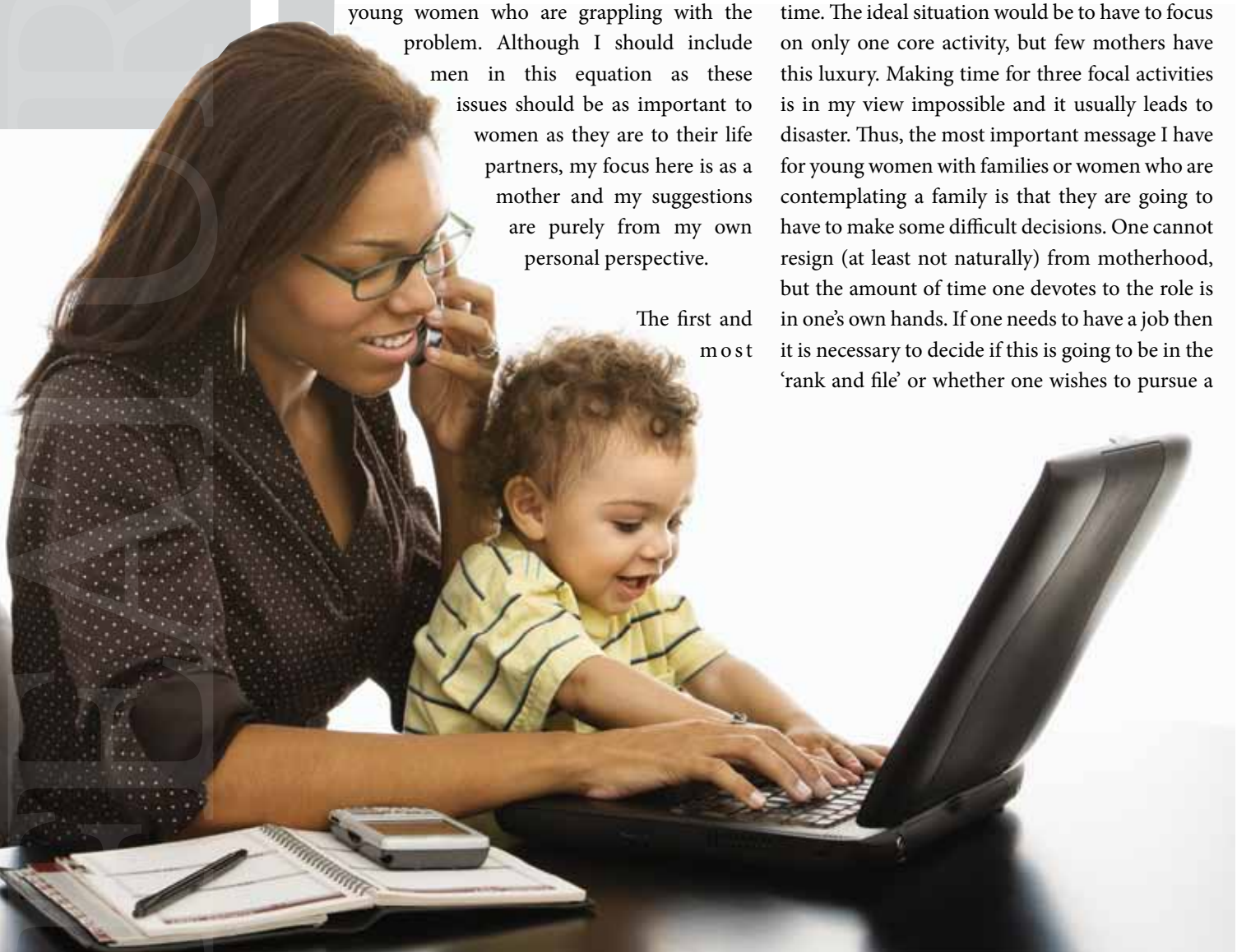
Juggling the demands of a career and motherhood

One of the questions that I am regularly asked is how I have managed to juggle the demands of both a family and a career in science.

BY I BRENDA WINGFIELD

The short answer to the question is 'with difficulty' and while this is the easy truthful answer, it does not really help to guide those young women who are grappling with the problem. Although I should include men in this equation as these issues should be as important to women as they are to their life partners, my focus here is as a mother and my suggestions are purely from my own personal perspective.

The first and most important advice I can add to this well-debated topic is that few people are able to focus on more than two time-consuming activities at any one time. The ideal situation would be to have to focus on only one core activity, but few mothers have this luxury. Making time for three focal activities is in my view impossible and it usually leads to disaster. Thus, the most important message I have for young women with families or women who are contemplating a family is that they are going to have to make some difficult decisions. One cannot resign (at least not naturally) from motherhood, but the amount of time one devotes to the role is in one's own hands. If one needs to have a job then it is necessary to decide if this is going to be in the 'rank and file' or whether one wishes to pursue a



career in science. If one chooses the latter then it is necessary to understand that one's hands will be incredibly full juggling these two very rewarding and demanding occupations. And, to add to this, there will be no time for anything else and often little time for sleep.

How successful a mother or career scientist one can become is then dependent on how one manages to divide available time between the two activities. I do not think that motherhood and career building are mutually exclusive, but managing both roles involves a huge learning curve. I find that most career professional mothers are very well organised and that they use their time very carefully. My observation is that people who cannot manage their time have the greatest problem dealing with all the demands placed on them. It is for this reason that I often prefer to employ mothers. Although this might sound a touch sexist, my experience has been that women who can juggle motherhood and a career successfully are usually much more effective than their male peers. Likewise, women who remain confused as to how to manage the two are disastrous in the work place, and often cause themselves and their colleagues distress and angst.

Mothers are usually better at multitasking in the work environment than their male counterparts, as they have had more experience in doing so. In addition, I have observed that mothers are more easily able to 'think out of the box'. They do not have to take expensive courses to teach them to think laterally – they do so every time they go home to their children. Young children do not care whether you have had a hard day at work; they typically are very selfish and self centred. Thus, mothers are forced, once at home, to think about things that are very different to the issues that have occupied their focus during their work hours. For example, many children have hobbies that necessitate very steep learning curves for mothers. I certainly know more about drums and cycling than I had ever wished to learn about. My children have stretched me in ways that I would not have achieved on my own. It is in this manner that I believe my children have forced me to become a more balanced person and probably also a better professional scientist. Tackling a career in science and being a mother is not for the faint-hearted. If one is not sufficiently passionate and competent in one's area of specialisation, succeeding will probably be very difficult.

The reality is that trying to juggle a career and motherhood requires one to be better than average at one's career. Ironically this sometimes means that you appear to be only average as the result of the constraints of your 'other' job. I should cover myself here by saying that this does not mean that all women who choose not to work do not have what it takes. Quite to the contrary, I sometimes think (during a long weekend at home) that it is probably harder to stay at home full time with one's children than to go to work.

Being average is probably not what the normal successful career professional would usually aspire to be. That this is often the reality for working mothers is because the criteria by which women are judged have been established largely by men. Some of these are unfairly discriminatory to women and although attitudes are changing, we still have a long way to go. Given this inherent discrimination, why would any woman in her right mind try to climb the career ladder? Why not opt for a nine-to-five job that has fixed hours and is not nearly as demanding? The obvious answer to this is job satisfaction. The second answer is that while a career in science can require at least 60 hours a week of one's time, there is usually some flexibility. In the early years of motherhood the flexibility is in time, possibly being able to work at home when a child is sick or being able to watch that all important soccer match. Later, and as children grow older, the kind of flexibility that is important is often of a financial nature. You will be earning a better salary (than someone who has a technical or administrative job), enabling you to be able to afford some of the extras that children need – music lessons or a trip overseas with the hockey team.

The third reason for climbing that ladder is that if one succeeds with the parenting part, children usually leave home eventually. And here an important question arises in so many cases that I encounter – what do mothers do at home when their children have left? While mothers who have had careers do not escape the empty nest syndrome, at least they are occupied and stimulated.

One of the comments that I often hear is that the hours spent at work need to be balanced by being able to spend time with one's family. The thought of a balanced existence does have a nice ring to it, but it is unlikely to earn one substantial job satisfaction or promotion, at least in a highly competitive environment. My experience has been that there is nothing balanced about highly successful professionals. They are all, without exception, passionate about what they do and usually also somewhat obsessive. Such is also the case for successful business people, top sports people and high-profile musicians. It is for this reason that I find it rather confusing that people have the expectation that a successful scientist should fit the mould of what some people consider to be 'balanced'. My children laugh when I try to convince them that I am normal. I work long hours and love my work – how normal can that be? wn

Keeping the lights on in your smart building...

Intelligent, connected technology is a growing trend, and property owners and managers, particularly in the retail space, are either constructing smart buildings from the ground up or retrofitting existing buildings with smart solutions.

BY | MARCO DA SILVA | MD | POWER SOLUTIONS

These include connected security, surveillance and access control, heating and cooling systems, timed or motion sensor lights and building management systems that connect all of these systems and provide holistic data for improved building intelligence. However, all of these smart solutions rely on having available electricity in order to run, and are also often highly sensitive, which means that they require a steady supply of clean electricity. Power assurance and power quality solutions are thus essential for the continued operation of smart buildings.

As the power crisis in South Africa continues, retail outlets and businesses are seeing significant loss of revenue, being unable to operate when the lights (and other systems) go out. For some businesses, such as supermarkets selling fresh and frozen goods, the impact of power outages with no backup power are greater than just the loss of foot traffic. Spoiled perishable goods could cost these retailers potentially hundreds of thousands of Rands a year. For other enterprises such as banks, no power means no transactions can be processed and poor customer service, resulting in significant loss of revenue. Even in instances where generators are installed, providing power assurance and backup electricity in the event of outages, this only addresses half of the problem – the power assurance side. Generator power is subject to a diesel or petrol-driven motor, which can result in fluctuating power voltages. In addition, generators take a few seconds to start up when outlet power is lost, and in those seconds of zero power equipment can be damaged. Power quality is essential, not only during outages but at all times to protect sensitive equipment from voltage fluctuations that could damage circuits and corrupt data, and this requires the implementation not only of generators, but also Uninterruptable Power Supply (UPS) with Automatic Voltage Regulator (AVR) capability.

While smart buildings offer a number of benefits to property owners as well as tenants, they require special consideration in light of the current power situation. Smart building solutions are typically controlled by IT infrastructure and equipment such as servers, which are highly sensitive to power anomalies such as harmonics, surges,

dips and spikes. Protecting this equipment is essential or buildings face the risk of lost or corrupt data, including all feedback data from smart equipment as well as the programming that controls this equipment. In addition, in a smart building, if the building management system goes offline, the entire building is offline, potentially creating security issues and other challenges. Smart buildings need to ensure they have a UPS in place that interfaces with the building management system, to perform a controlled shutdown if the generator fails, or to provide a bridge between outlet and generator power. An AVR, which remains online at all times, will ensure that power supply to all connected equipment is constantly clean and stable, minimising the risk of damage.

In addition to protecting equipment and data, power quality and assurance solutions also have additional benefits for building owners. For example, property owners can maximise their rent per square metre, by offering an integrated solution of floor space with power assurance solutions. By guaranteeing customer uptime, landlords will attract a higher rental rate, while providing an essential service to their tenants. Furthermore, guaranteed uptime can be used as a competitive differentiator, as customers will be more likely to take up space in a building that can guarantee their continued operations during load shedding and power outages.

When it comes to implementing power solutions, it is beneficial to partner with an expert service provider, as there are a number of considerations that need to be taken into account. These include correct sizing of generators and identification of essential services to run off generator power, as well as the actual installation of the generator. This is often a complex process when generators are retrofitted, as the placement, environment and cable reticulation need to be taken into account. It is also essential to ensure adequate ventilation for the generator fumes, while ensuring it does not exhaust into a populated area, and if the generator will cause high levels of noise, soundproofing should also be included. In addition, access control for the generator area is essential.

As the unstable power situation in South Africa is set to continue for the foreseeable future, power assurance and power quality solutions are increasingly becoming essential business equipment. Ensuring businesses can continue to operate even during power failures is currently a competitive differentiator for building owners, but this is fast becoming a must-have for attracting tenants. In addition, a UPS and an AVR are essential equipment for keeping the lights on in any smart building. wn

Earn CPD Credits

Income Protection Policies – clarifying the consequences to the tax treatment

As of the latest tax year (starting 1 March 2015), companies are still struggling to come to grips with the consequences of the changes to the rules in respect of premiums paid to income protection policies for their payroll administration and payroll systems.

BY | ROB COOPER | TAX EXPERT

Income protection policies provide cover against the death, disablement (temporary and permanent), illness or unemployment of an individual. This individual could be the direct policyholder or employed by a company that holds the policy on his or her behalf.

THE OLD RULES

Up until 28 February 2015, premiums that employers paid into employer-owned income protection policies were regarded as a fringe benefit of the same value as the premium. This fringe benefit was deemed to be a premium paid by the employee and the total premium paid by the employee (including any employee-paid premiums) was allowed as a tax deduction. Annuity or lump-sum pay-outs from income protection policies were fully taxable.

A REVERSAL OF THE OLD ORDER

As of 1 March 2015, new rules that are essentially the opposite of the old ones came into effect. Now, an employer's payment into an income protection policy is treated as a fully taxable fringe benefit, while any payments the employee makes into an income protection policy of his or her own is not tax deductible.

Should the employee need to claim from the policy - perhaps due to illness, disability or unemployment - the pay-out (irrespective of whether it is a lump sum or a monthly annuity income) is not taxable.

CHALLENGES IN ADMINISTRATION

Here's where some confusion comes in: monthly annuity income from an income protection policy has changed from being taxable (i.e. remuneration) to being not taxable (i.e. not remuneration) from 1 March 2015.

This creates some unexpected difficulties in the administration of temporary disability since most of the employment Acts rely on the payment of remuneration to define an employee. If no remuneration is paid, the individual is no longer an employee.

If an employee is booked off from work for the reason of temporary disability, and the annuity pay-out from an income protection policy is the only income he or she receives during this time, the annuity income is no longer remuneration. But not being defined as an employee must not be confused with the individual's employment status.

Prior to the temporary disability period, the individual was an employee, and employment can only be terminated by either the employer or the employee for reasons specified in labour law, and after following proper procedures. The individual remains employed, even though he or she is no longer an employee by definition.

What does the rather contradictory situation of a person not being an employee but still being employed mean in practice?

Let's consider this by means of an example.

TEMPORARY DISABILITY SCENARIO

1. An employee is booked off from work for six months from 1 June 2015 until 30 November 2015.

2. During this period, the employee does not work and no remuneration is paid or payable to him or her by the employer.

3. The insurance company pays monthly annuity income to the employer under

Income Protection Policies

continues from page 53

the terms of an income protection policy.

4. The employer essentially acts as an administrative agent for the insurance company by paying the monthly annuity to the individual.

In this scenario, the company should treat the temporary disability lay-off period as a form of unpaid leave. Employers should apply the various employment laws as follows:

BASIC CONDITIONS OF EMPLOYMENT ACT (BCEA)

1. BCEA Annual leave
   Section 20(2) states that an employer must grant an employee at least one day of annual leave for every 17 days "… on which the employee worked or was entitled to be paid;". This individual is not entitled to annual leave accumulation because he or she did not work and was not entitled to be paid.

2. BCEA Sick leave
   The individual is entitled to sick leave in terms of section 22(1) that refers to the sick leave cycle of "... 36 months' employment with the same employer ...".

   Employment did not come to an end; therefore the entitlement over the 36 month period remains valid. However, sick leave cannot be taken concurrently with the temporary disability layoff period.

3. BCEA Family Responsibility Leave
   The individual retains his entitlement to family responsibility leave under conditions specified by the BCEA. Again, it cannot be taken concurrently with the temporary disability layoff period.

INCOME TAX ACT (FOURTH SCHEDULE)

1. The person is not an employee as defined by the Fourth Schedule for the temporary disability period.

2. The person remains in employment for the temporary disability period.

3. The employee will be taxed on the six months of remuneration paid during the three months of work before and after the temporary disability period. This income will be reported on the tax certificate in the normal way, and on assessment will be spread over the 12 months of the tax year.

4. The six months of non-taxable annuity income from the income protection policy must be reported as code 3602 on the tax certificate.

In other words the individual must be kept on the payroll during the six month temporary disability period because there is still an employment relationship and because the annuity income must be reported on the tax certificate.

If the six-month temporary disability period had started on 1 December 2014, then the annuity income for the last three months of the 2014/15 tax year would have been taxable (code 3601), and the annuity income for the first three months of the 2015/16 tax year would have been not taxable (code 3602).

UNEMPLOYMENT INSURANCE CONTRIBUTIONS ACT (UICA)

1. The person is not an employee as defined by the UICA for the temporary disability period.

2. The person remains in employment for the temporary disability period.

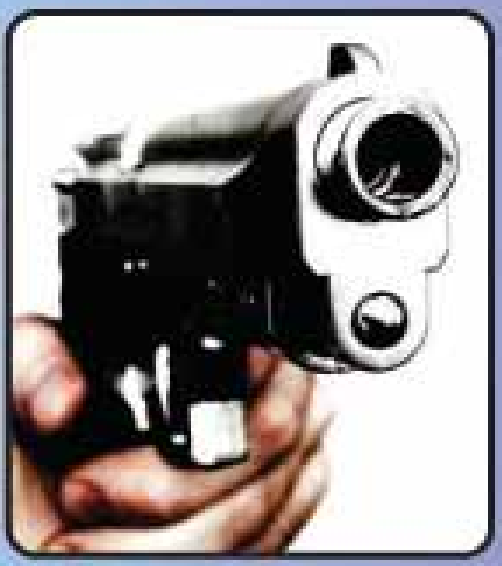
3. No contributions are paid because the individual is not an employee, and there is no remuneration on which to calculate the contribution.

UNEMPLOYMENT INSURANCE ACT (UIA)

1. In terms of section 56(4) of the UIA, the employer must declare the individual to the Unemployment Insurance Commissioner on a monthly basis during the six month temporary disability period.

2. The following code values must be used while declaring an employee who is on temporary disability:
   · Code 8280 (Employment Status code) = 10 (Illness leave)
   · Code 8290 (Reason Code for Non-Contribution) = 06 (No income paid for the period).

There are some things that stop you in your tracks .....



.... and then there are things that keep you going like .....

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WATT?

EXPERT INDUSTRY ADVICE

WATT? is a newly established forum related specifically to the industrial and commercial electrical sector.

Do you have any burning questions, topical issues or points of interest about the electrical industry, from the perspective of a contractor, supplier or professional service provider? Submit your comments, thoughts, ideas, suggestions or questions for the attention of our industry experts, and these will be addressed in a future issue of the magazine. This is your forum, and we would like to hear from you!

The rapid pace of technological change and product development is a global trend that affects entire economies. We may have access to more information than ever before, but is this information readily understandable? Does it give us insight into the fundamental issues? Is it precise and based on technical clarity?

WATT? is an opportunity for people on the ground to engage with each other and related professionals in an informative and friendly manner. This is a platform for you to discuss anything related to your particular sector, to highlight anything new, or to ask a specific question related to a technical topic or to engage in general industry issues. . Please note that we will not be considering anything related to the domestic sector, such as residential wiring.

We hope that this section of the magazine not only becomes a regular feature, but that it is widely read and distributed among your peers. Remember, it can only become a success with the full participation of our readers! Send your burning questions to minx@saiee.org.za - subject 'WATT?'.

We look forward to hearing from you.
- Ed

QUESTION ONE

When my plant was established over thirty years ago, we installed a customised Medium Voltage (MV) electric motor to run a key area. Over the years we have done repairs to it a number of times, however the OEM who supplied the machinery is no longer in business and the product has been discontinued. To purchase a replacement motor will likely necessitate large reconstruction of the system surrounding it. This down time we can hardly afford. What are my alternatives?

ANSWER ONE

There is a solution to retrofit motors to replace exhausted MV machinery that has reached its life expectancy. MV motors often drive the most critical part of the plant process and are often just repaired continually. Continual motor repairs reduce motor efficiency and increase running costs, this can be very detrimental to the customer's bottom line.

Experience in the industry over the last few decades has grown the list of industry specifications substantially. New machinery is required to conform to improved specifications and efficiency expectations these may include additional fittings such as vibration monitoring, surge protection and current transformers.

A reputable MV motor supplier will visit the site to measure the existing equipment and investigate the application requirements. This may necessitate the inclusion of special terminal boxes designed to suit the existing cables on site and special motor frames to match critical dimensions.

The existing machinery can be analysed in situ, to determine the mechanical data such as shaft sizing and critical mounting dimensions.

Design drawings are then prepared and the motor is built, hand-in-hand with the site engineers input. Modifications can be made right through the manufacturing process. Machinery is able to be tested both witnessed and unwitnessed and commissioning of the machinery can be assisted or supervised.

Ensure to engage with a motor manufacturer who understands the old motor, the driven equipment and the updated technical requirements and specifications.

QUESTION TWO

Running the older MV machinery has negatively impacted on the efficiency of our plant. Is there any way to measure and reassess this during the replacement process?

ANSWER TWO

In the case of MV machinery efficiency, there is no IEC or SABS specification, this often translates into each instance being very unique as the machinery has been built to customer specifications.

Thus specific load application detail can be investigated for the possibility to optimise the system, rather than purely replacing the motor, there may be an opportunity to incorporate an automated solution to further increase system efficiency as a whole.

Reassessing the system can, and almost always does, reduce overall plant running costs, improve process efficiencies and increase the lifespan of the equipment.

For the motor alone, where there is no option to improve the process or system efficiency, one can measure the motor efficiency during the next service at a testing facility. A comparison can then be made between the existing efficiency readings and preliminary design data by a reputable motor manufacturer.

In conclusion, as we are aware that rewinding electric motors reduces the motor efficiency, it is almost always recommended to replace the old repaired motors to improve efficiency and reduce running costs.

Make sure you are using a motor manufacturer who is able to understand your application correctly, ensuring you get the best possible solutions. wn

Answers provided by Zest WEG Group

IN MY OPINION : JANE BUISSON-STREET & MINX AVRABOS

August, aka Women's Month...

For the first time since the inception of the monthly Opinion Piece, I've decided to co-write with a friend and colleague, who also happens to be a 'true' female engineer. Here's our opinion…

BY | MINX AVRABOS & JANE BUISSON-STREET

OPINION

JANE'S OPINION:

Looking back on the last 26 years of being one of those women in engineering, things have changed dramatically in some ways, and many have remained the same.

It seems that the issue of being a wife, lover, mother and domestic goddess has not gone away; in fact according to Prof Hannelie Nel, Extraordinary Associate Professor at the Faculty of Engineering at North-West University, a female engineer is most productive from the age of 40 to the age of 65. Why? In most cases it seems to be related to the fact that most women want to have children.

One would have thought that a man, who has a wife and children, would understand about the processes involved. So why do we have to project plan the conception, gestation and other related events around work?

As young graduates in the late 1980s we all, male and female, had to get out there and prove that we could design, build, commission and project manage. I worked on sites where there wasn't separate toilets, did call outs, got told I was stifling some of the male colleagues growth because I was too quick and even expected to make tea.

Somewhere, in the early 2000s this bit of training seems to have disappeared. It was about this time as well, when male students realised that their female counterparts were being awarded the bursaries. Unfortunately, the selection criterion and processes, in their opinion and mine, were not always based on merit.

Many young graduates, particularly women, seem to be fast tracked into management. Ladies, do you realise you are missing out on the fun times of your training? Overalls can be glamorous, but best of all, you don't have to pay for them yourself.

Also, how can you expect someone to do something if you can't do it yourself?

Again in my opinion, if we had more women directly involved in some of the country's major engineering projects, for example commissioning the generation plants, chances are, there would not have been so much project slippage: we're used to having deadlines such as picking the sprogs up from school at 4pm, solving arguments, making sure everyone has clean clothes and being prepared for tomorrow's meetings, etc. We have an amazing built-in skill, multitasking!

According to the Oxford dictionary an engineer is:

- A person who designs, builds, or maintains engines, machines, or structures.
- A person qualified in a branch of engineering, especially as a professional
- A person who controls an engine, especially on an aircraft or ship.

I chose to work my way up the ranks, I challenged people who couldn't deal with it, got my knuckles rapped but I did it my way.

Ladies, there is more to engineering than being up the corporate ladder wearing designer clothes. It's in our nature to make a tangible difference to people's lives, let's do that at work as well!

MINX' OPINION:

My worst is August – I dread it with a passion. Along comes Women's Month, and I am invited to a few high profile Women's events. I have to pick carefully, as there are a myriad of events. The speakers are crucial. When I attend these events, I expect to walk away with a bit more knowledge. Low-and-behold, I have to sit through one speaker after the other, listening of their poor upbringing, how they had to fight to get to the top, they are a mother, a wife, a-this, a-that, etc.

You know, I want to seriously bang my head against the wall!! So what??? Most of us (females) have hit the gravel road before. What would you say if I told you that I was shot at, through my car's windscreen and drove 10kms to my office with a bullet lodged in my inner-thigh during a normal working day? What would you say if I told you I was an abused wife in my previous marriage, with two little children? What would you say if I told you that after my divorce, I was a single parent without any support and had to work three jobs just to keep the roof over my children's heads? No, because I don't need sympathy from anyone – I'm here to do my job, and that's what I'm getting paid for!

To make matters even worse, you Google the speaker you are listening to, and can't find anything of interest about her. Self-glorification is rife at these events – half the information about the speaker is most likely embellishment.

So, I please urge women to stop with the sole-destroying mental mantra "Let's burn our bras" and get on with the job.

If you are trying to find a solution in the engineering industry, then ask us how we can help, don't tell me how difficult it's been in your life – only you care! wn

August

Movers, shakers and female history-makers

COMPILED BY | JANE BUISSON-STREET
FSAIEE | PMIITPSA | FMIITSPA

1 AUGUST

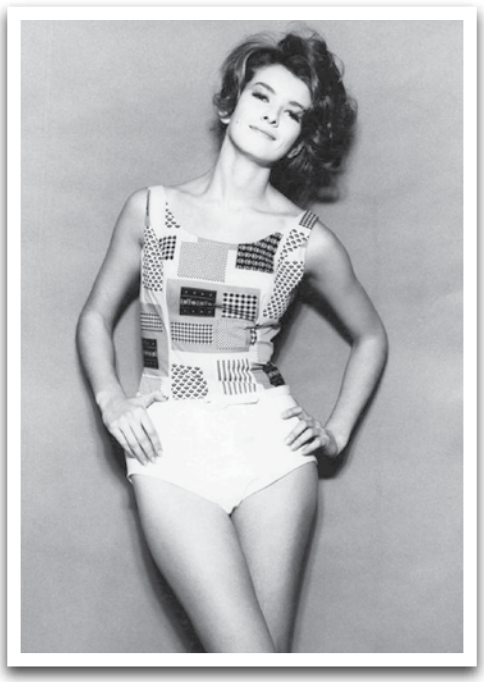
1818 Birthday of Maria Mitchell (d.1889) an American astronomer who, in 1847, by using a telescope, discovered a comet that became known as "Miss Mitchell's Comet". She was the first American woman to work as a professional astronomer.

2 AUGUST

2008 "Breaking Dawn", the 4th book in Stephanie Meyer's "Twilight Saga", was published by Little Brown at midnight with a print run of 3.7 million copies.

3 AUGUST

1941 Birthday of Martha Helen Stewart, the Domestic Empress, is an American businesswoman, writer, and television personality.



4 AUGUST

1900 Birthday of Elizabeth Angela Marguerite Bowes-Lyon who was the wife of King George VI and the mother of Queen Elizabeth II and Princess Margaret. She was better known as Queen Elizabeth The Queen Mother.

5 AUGUST

1884 The cornerstone for the Statue of Liberty is laid on Bedloe's Island (now Liberty Island) in New York Harbour.

6 AUGUST

1911 Birthday of Lucille Désirée Ball, an American actress, comedienne, model, film studio executive, TV producer and singer. She was the star of the sitcom "I Love Lucy".

7 AUGUST

1987 Lynne Cox becomes first person to swim from the United States to the Soviet Union, crossing from Little Diomede Island in Alaska to Big Diomede in the Soviet Union (4.3km) in very, very cold water (3.3°C). Her swim has been described as 'The Swim that broke the Cold War ice curtain'.

8 AUGUST

1950 Florence Chadwick swims English Channel, from France to England, in a time of 13 hours and 23 minutes. She was the first woman to swim the English Channel in both directions.

9 AUGUST

1930 Betty Boop, an animated cartoon character, debuts in Max Fleischer's animated cartoon Dizzy Dishes

10 AUGUST

1984 South African/British Zola Budd's Olympic dreams ended during the 3000m final when American Mary Decker tripped over Zola's bare-footed leg. Although Budd was initially disqualified, a panel ruled that she wasn't to blame, it occurred due to Becker's 'aggressive tactics'.

11 AUGUST

1897 The birthdate of Enid Blyton, the British author of children's books and creator of series such as the 'Famous Five', the 'Secret Seven' and the 'Magic Faraway Tree'.

12 AUGUST

1927 "Wings", the only silent film to win an Oscar for best picture, opened starring Clara Bow. Clara was an American actress who rose to stardom in silent film during the 1920s. She went on to personify the Roaring Twenties and is described as its leading sex symbol.

13 AUGUST

1910 Florence Nightingale died. Known as the 'Lady with the Lamp' during the Crimean War, transformed the appalling conditions in military hospitals, which led to founding of the nursing profession.

14 AUGUST

1961 Birthday of Sarah Brightman, an English classical soprano, actress, song-writer and dancer.

15 AUGUST

1970 Patricia Palinkas became the first woman to play professionally in an American football game.

16 AUGUST

1858 U.S. President James Buchanan inaugurated the new transatlantic telegraph cable by exchanging greetings with Queen Victoria of the United Kingdom.

17 AUGUST

1906 Birthday of Hazel Bishop, a famous chemist and cosmetics manufacturer who invented the first smear-proof lipstick and the first woman featured in Business Week magazine.

18 AUGUST

1883 The birthday of Gabrielle "Coco" Chanel, the French fashion designer who founded The House of Chanel.

19 AUGUST

1922 36th US Women's Tennis: Molla Mallory beat Helen Wills Moody (6-3 6-1). Molla was a Norwegian-born tennis player and a naturalized American. She won a record eight singles titles at the U.S. Championships.

20 AUGUST

1922 The 1922 Women's World Games (Women's Olympic Games) were the first regular international games for women, and was hosted on this day, in Paris. The games were organized as a response to the IOC refusal to include women's events in the 1924 Olympic Games.

21 AUGUST

1976 Mary Langdon joined the East Sussex fire department to become Britain's first female "fireman".

22 AUGUST

1961 Ida Siekmann was the first person to die at the Berlin Wall, only 9 days after the beginning of its construction.

23 AUGUST

1942 Birthday of Letta Mbulu, a South African jazz singer born and raised in Soweto, now living in the USA.

24 AUGUST

1932 Amelia Earhart became the first woman to fly across the United States non-stop (from Los Angeles to Newark, New Jersey).

25 AUGUST

1950 Althea Gibson became the first black competitor in international tennis at the United States National Championships (now the U.S. Open) at Forest Hills. She made her debut on her 23rd birthday.

26 AUGUST

1910 Birthday of Blessed Teresa of Calcutta, commonly known as Mother Teresa, a Roman Catholic religious sister and missionary who spent most of her life in India.

27 AUGUST

1855 Clara Barton (USA) becomes the first female federal employee to achieve equal status when she was hired by the Patent Office as a clerk.

28 AUGUST

1913 Wilhelmina, Queen of the Netherlands (1890 – 1948), opened the Peace Palace in The Hague. Her reign saw WWI and II, the economic crisis of 1933, and the decline of the Netherlands as a major colonial power. Outside the Netherlands, she is primarily remembered for her role in WW II, in which she proved to be a great inspiration to the Dutch resistance.

29 AUGUST

1915 Ingrid Bergman, born and died (1985) on this day, was a Swedish actress who starred in a variety of European and American films. She won numerous awards. She is still ranked as the fourth greatest female star of American cinema of all time by the American Film Institute.

30 AUGUST

1797 Mary Shelley, an English novelist, short story writer, biographer, and travel writer, best known for her Gothic novel Frankenstein (1818), was born this day.

31 AUGUST

1870 Maria Tecla Montessori (1870-1952) was an Italian physician and educator best known for the philosophy of education that bears her name, and her writing on scientific pedagogy. Her educational method is still in use today. wn

Women & Engineering

In days gone by, finding a needle in a haystack would have been easier than finding a female in any engineering discipline.
Well, not if you had a magnet that is….

BY I ANGELA PRICE

And if you were some kind of Hardy Boy type character who 'just so happened' to have a magnet, some string and so forth in his pocket - well then, you would likely be an engineer.

However if you actually remembered what you had in your pocket and thought of using the magnet to search for the needle - well then you my friend are most likely a female engineer!

So here's looking at you babe (wink).

Thankfully *'times they are a-changing'* and we now have a sprinkling of women brightening up the engineering world. One can only hope that they manage to 'go where no man has gone before' and rid the engineering fraternity of their age old reputation as appalling communicators and shoddy dressers!

Just because you are a woman in a male dominated industry does not mean you have to abandon your 'womanly ways'. Think about the unique benefits you can bring to a previously testosterone fuelled industry, a little bit of oestrogen may well go a long way towards polishing up a few dull spots.

Females are by nature usually keen communicators and their contribution to communication in the engineering workplace can only be beneficial to all parties. It should be part of every engineering firm's communication budget to hire handfuls of female engineers. Those female engineers currently exhibiting poor communication skills have likely been tainted by the male dominance in their chosen profession and are possibly now more 'man' than 'woman' - a sad state of affairs indeed. Wouldn't it be wonderful if the women could influence the men instead, think what a positive impact they could have on their male peers' woeful excuse for work wear!

I suspect many clients would feel far happier when greeted by a confident, well dressed woman instead of a monosyllabic male counterpart wearing nipple height jeans (held in place by that homemade leather belt) topped off with a khaki coloured, supplier branded, button up shirt - with short sleeves (yes, that one you are wearing now!)

Before I sound sexist, let me say that I strongly feel both sexes bring a lot to the table. Let's not pretend we are the same for the sake of being all 'correct' - because we are not and this fact should be celebrated and leveraged upon, for the benefit of all. Ultimately engineers are here to save the world from going to hell in a hand basket - aren't they?

All this 'woman in engineering' stuff made me wish I had pursued a career in engineering. Luckily for us all I didn't, but having looked into it I believe I could be awarded an Honorary Doctorate in Engineering; for the following reasons:

- All the men (barring a few) in our families are engineers and since it is a 'qualification by association' I can confidently tick this box
- I come from a long line of engineers - I then married into a family with an even longer line of engineers, and when you join two lines you get, well, an even longer line!
- Engineering is in my blood - after being hauled around numerous factories as a youngster by my father (an engineer) and left to 'scrat' in his man-cave/garage I virtually have machine grease coursing through my veins.
- Dinner table conversation over the years has usually been 'shop talk' and I like to think I am fluent in engineering talk.
- I own (and look good in) a hard hat
- I watched all the Star Wars movies - a lot.
- Lastly, I'm married to an engineer.

Heck I have earned it! Wouldn't you agree ladies? wn

calendar

AUGUST | SEPTEMBER | OCTOBER | NOVEMBER

AUGUST 2015

12-13	Microsoft Project Professional 2013	Johannesburg	www.saiee.org.za
18-21	Managing Projects Effectively	Johannesburg	www.saiee.org.za
18-21	Insulating Oil Management	Johannesburg	www.saiee.org.za
27	Gauteng Centre Launch	Johannesburg	www.saiee.org.za
27-28	Radio Theory, Calculation & Practice	Johannesburg	www.saiee.org.za

SEPTEMBER 2015

9-10	Environmental Crimes Conference	Johannesburg	www.intelligencetransferc.co.za
9-10	Fundamentals of Power Distribution	Johannesburg	www.saiee.org.za
9-10	Fundamentals of System Calculations	Johannesburg	www.saiee.org.za
10-11	Generators Power Conference	Johannesburg	www.mongirosicommunication.co.za
15-18	Bauma ConExpo Africa 2015	Nasrec, JHB	www.bcafrica.com
16-18	Fundamentals of Long Term Evelution Mobile Communication	Johannesburg	www.saiee.org.za
17	Power Transformer Unit Protection and Testing	Johannesburg	www.saiee.org.za
18	Power Transformer Operating & Maintenance	Johannesburg	www.saiee.org.za
21	64th Bernard Price Memorial Lecture - Sustainable Engineering	Central Centre, Freestate	www.saiee.org.za
21-22	New Engineering & Construction Contracts Course	Johannesburg	www/saiee.org.za
21-22	Advanced Microsoft Excel for Engineers	Johannesburg	www/saiee.org.za
22	64th Bernard Price Memorial Lecture - Sustainable Engineering	Southern Cape Centre, George	www.saiee.org.za
23	64th Bernard Price Memorial Lecture - Sustainable Engineering	Western Cape Centre	www.saiee.org.za
28	64th Bernard Price Memorial Lecture - Sustainable Engineering	Eastern Cape Centre	www.saiee.org.za
29	64th Bernard Price Memorial Lecture - Sustainable Engineering	KZN Centre	www.saiee.org.za
30	64th Bernard Price Memorial Lecture - Sustainable Engineering	Gauteng	www.saiee.org.za

OCTOBER 2015

3	SHELL ECO Marathon - Registrations are open!!	Johannesburg	esther@uj.ac.za
4-7	SAIEE National Student's Competition	Bloemfontein	www.saiee.org.za
11-13	FILTECH 2015	Cologne, Germany	www.filtech/de
14-15	Effective Technical Document Writing For Engineers	Johannesburg	www/saiee.org.za
20-21	Fundamentals of MV Protection	Johannesburg	www/saiee.org.za
21-22	Fundamentals of AC ARC Furnace Electrics	Johannesburg	www/saiee.org.za
21-23	SSA Power Summit	Cape Town	www.ssapower.com
26-30	CIGRE Symposium	Cape Town	www.cigre.org

NOVEMBER 2015

7	SAIEE Annual Banquet	Johannesburg	geyerg@saiee.org.za
11-12	Photovoltaic Solar Systems	Johannesburg	www.saiee.org.za
18-19	Leadership & Management Principles & Practice In Engineering	Johannesburg	www.saiee.org.za
25-26	Fundamentals of Power Distribution	Johannesburg	www.saiee.org.za

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Left: CEO, Ernest Ngubo - Pr Eng SMSAIEE Right: Managing Director, TC Madikane - Pr Eng, FSAIEE, FSAAE

Company Background

Igoda Projects, was established in 1999 and is an integrated engineering consulting firm providing electrical, electronics engineering services as well as project management.

The company is 100% black owned and managed. Both shareholders and directors are Professional Engineers. Igoda Projects is a Level 2 BBBEE generic contributor.

Our People

We are a people and results-oriented business that matches the right people to the right project for best outcomes. We have a staff compliment of 70, which comprise of Professional Engineers, Professional Engineering Technologists, Professional Engineering Technicians, Technical Support, HR and Finance staff.

Our Services

- Electrical Engineering
- Electronics Engineering
- Energy Management
- Project Management

Corporate Social Responsibility

High on our Social Responsibility initiatives, is our support and sponsorship of engineering students at Mangosuthu University of Technology (MUT) and Durban University of Technology (DUT).

Specifically, over the past four years, we have provided over R500 000 towards educational grants and in-service programmes.

Key Clients

- Department of Public Works
- Department of Health
- Independent Development Trust (IDT)
- Eskom
- Ethekwini Municipality
- Umngeni Water
- ABSA
- Tiger Brands

Our Track Record

We have succesfully delivered several projects. Some of the major projects includes Durban International Convention Centre, Moses Mabhida Stadium, Sibaya and Suncoast Casinos to mention a few.

Corporate Membership

- Consulting Engineering of South Africa (CESA)
- Green Buildings Council of South Africa (GBCSA)
- South African Association of Energy Services Companies (SAAEs)
- Illumination Engineering Society of South Africa (IESSA)
- Durban Chamber of Commerce

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- Cape Town
- Port Elizabeth

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