LECTURES

The high-profile lecture programme lends the festival its trademark international flavour, and proudly welcomes esteemed international and South African scientists and researchers to this celebration of science.

AUDIENCE:	Grade 10+
CAPACITY:	200/900
PRICE:	R25

Start	End	**Speaker,** Organisation *Title*	Venue
WEDNESDAY, 7 MARCH			
13h00	14h00	**Danielle Taljaard,** Antarctica Engineer, SANSA *Space Science on Ice – the life of an Antarctic adventurer*	Monument Olive Schreiner Hall
15h00	16h00	**Professor Henrietta de Kock,** University of Pretoria *Some live to eat… others eat to live: who cares most about the taste of food*	Monument Olive Schreiner Hall
18h30	19h30	**Komal Kumar, U.S. Fulbright Researcher, Groote Schuur Hospital** *HIV-to-HIV Kidney Transplantation*	Monument Olive Schreiner Hall
THURSDAY, 8 MARCH			
11h00	12h00	**Theda Minthe,** City of Hannover Municipality, Germany (via Skype) *How the Leibniz biscuit and Calculation with "1" and "0" made the Difference*	Monument Olive Schreiner Hall
13h00	14h00	**Professor Lesley Cornish,** DST-NRF Centre of Excellence in Strong Materials, School of Chemical and Metallurgical Engineering *Why Should I be interested in Materials?*	Monument Olive Schreiner Hall
15h00	16h00	**Jonathon Rees,** STEAM Foundation NPC *Making it real – harnessing a challenging environment for dynamic STEAM education*	Monument Olive Schreiner Hall
18h30	19h30	**Andy Mathis,** Oculus, USA *Virtual Reality*	Monument Olive Schreiner Hall
FRIDAY, 9 MARCH			
11h00	12h00	**Timothy Harrison & Professor Dudley Shallcross,** University of Bristol, UK *A Pollutant's Tale - a Lecture Demonstration*	Monument Olive Schreiner Hall
13h00	14h00	**Kamogelo Ragketse,** Abraham Serote Senior Secondary *Maglev Power Station* **Nozipho Zikhali,** Manor Gardens Primary School *The Real Truth behind Bottled Water*	Monument Olive Schreiner Hall
15h00	16h00	**Professor Petri Vaisanen,** SAAO *Hey, Were those Ripples in the Space-time Continuum? Or perhaps Life in the Universe?*	Monument Olive Schreiner Hall
Brian Wilmot Lecture **Please note: This lecture forms part of the Scifest Africa Official Opening**			
18h30	19h30	**Dr Tiisetso Lephoto,** University of Witwatersrand *Entomopathogenic Nematodes: Biological control agents to aid South African Agricultural industries*	Guy Butler Lecture Theatre
SATURDAY, 10 MARCH			
13h00	14h00	**Dr Jeanita Pritchett,** National Institute of Standards and Technology, USA *NIST: Promoting U.S. Innovation and Industrial Competitiveness*	Monument Olive Schreiner Hall
Christina Scott Memorial Lecture			
18h30	19h30	**Toby Shapshak,** Maven Media *Why Innovation is Better in Africa*	Monument Olive Schreiner Hall
SUNDAY, 11 MARCH			
13h00	14h00	**Professor Ryan Blumenthal,** Forensic Pathology Services, University of Pretoria *Death and Adventure in Africa – Tales of an African Forensic Pathologist*	Monument Olive Schreiner Hall
15h00	16h00	**Dr Anne Verbiscer,** University of Virginia, USA *Exploring the Solar System Beyond Neptune: Pluto and Other Distant Worlds*	Monument Olive Schreiner Hall
18h30	19h30	**Professor Etheresia Pretorius,** Stellenbosch University *Why do so many of us die from blood clots?*	Monument Olive Schreiner Hall

MONDAY, 12 MARCH			
13h00	14h00	**Professor Mike Bruton,** Mike Bruton Imagineering *What a Great Idea! Awesome South African Inventions*	Monument Olive Schreiner Hall
18h30	19h30	**Tshiamo Legoale,** Mintek *Small Scale Mining: Small step or giant leap?*	Monument Olive Schreiner Hall
TUESDAY, 13 MARCH			
13h00	14h00	**Professor Philiswa Nosizo Nomngongo,** University of Johannesburg *Why Waste Wastes? - Using waste tyres to remove pollutants from water systems*	Monument Olive Schreiner Hall
15h00	16h00	**Professor Thomas Eugene Cloete,** Stellenbosch University *The Intelligence Trap - Unlocking your Genius*	Monument Olive Schreiner Hall

WEDNESDAY, 7 MARCH

13H00 ····· 14H00

Danielle Taljaard

Antarctica Engineer, SANSA

Space Science on Ice – the life of an Antarctic adventurer

Antarctica, a continent often described as the coldest, windiest, driest, least populated and most remote corner of the world, is not a place for the faint-hearted. Yet, those brave enough to journey there will forever have a deep connection to this icy wonderland.

As part of the South African National Antarctic Programme (SANAP), South Africa maintains a permanent research base in Antarctica for scientists to participate in various research programmes. The South African National Space Agency (SANSA) operates a wide suite of specialised instruments and systems from the South African base to monitor our near-earth space environment. SANSA engineers live at the base throughout the year in order to maintain and develop these systems, while ensuring that meaningful data is transferred back to the Space Agency.

Not many of us know Antarctica as much more than the big white chunk of ice at the bottom of the world… But the life and science in Antarctica is booming! There are as many as 45 year-round operated research stations scattered widely across the continent, with 30 additional field camps only active during the summer period, supporting specific scientific projects.

This presentation will attempt to let you into the elite circle of what it is like to call Antarctica home. The rich culture, traditions, unique challenges, raw beauty and critical sciences are but a few of the key points I will be sharing with you based on my 15 months spent on ice.

This lecture is supported by the South African National Space Agency

15H00 ····· 16H00

Professor Henrietta de Kock

University of Pretoria

Some live to eat… others eat to live: who cares most about the taste of food

The food we choose to eat and drink is a major factor contributing to our nutritional and health status. The sensory quality of food relates to the look, smell, taste, feel and sound of products and plays a huge role in the daily lives of all consumers. Sensory properties of food are important drivers of our selection and consumption of food. They guide us to judge safety and suitability of food products, affect general wellbeing and our state of happiness. However, how our senses perceive food also contribute to overconsumption of unhealthy food choices and may hinder control over logical reasoning. Food manufacturers are acutely aware of the importance of optimising the sensory properties of food products to promote sales and customer loyalty. The reality is that South Africa is one of the countries in the world with the most unequal distribution of income. A large percentage of the population has very limited food options to choose from due to poverty or other factors affecting food sources.

Prof de Kock is an Associate Professor at the University of Pretoria involved with the development of future food scientists. In her research, she explores the look, smell, feel, taste and sound of food materials and is always searching for novel sensory food experiences. In 2016, she was recognised as a distinguished woman scientist by the Ministry of Science & Technology for her outstanding contribution to research and innovation leading to socio-economic impact and woman empowerment. She consults with food companies to ensure that the products that they sell to consumers have desirable sensory properties. This year she became the co-owner of a food start-up aiming to manufacture nutritious snacks and to provide employment opportunities for the youth. She swims to stay fit and use the time under the water to reflect and to find some silence.

This lecture is supported by the Department of Science & Technology's Women in Science Award programme.

18H30 ····· 19H30

Komal Kumar

U.S. Fulbright Researcher, Groote Schuur Hospital

HIV-to-HIV Kidney Transplantation

The demand for organs has expanded every year with the increase in non-communicable diseases, however the supply has remained the same. Due to this, recent efforts have focused on creative ways to expand both living and deceased donation. One of these innovations was pioneered here in South Africa.

In 2008, the world's first HIV positive-to-HIV positive (HIV-to-HIV) deceased donor kidney transplantation was performed at Groote Schuur Hospital in Cape Town. While the political climate in South Africa at the time was characterised by AIDS denialism, the use of HIV positive donors for HIV positive patients offered a treatment option that gave people hope, and also addressed some of the social barriers, ethics, and stigma surrounding the disease of HIV.

Komal Kumar is a Fulbright researcher from Johns Hopkins University working within the Groote Schuur Hospital's transplant unit to investigate knowledge and perceptions of HIV-to-HIV-positive transplantation. She is a graduate of both Johns Hopkins University's Krieger School of Arts and Sciences and Bloomberg School of Public Health. Her training has been in Epidemiology and Biostatistics with the Epidemiology Research Group in Organ Transplantation at Johns Hopkins. Her research focuses on various aspects of organ donation transplantation, specifically access, systematic barriers, and interventions to increase live donor kidney transplantation.

This lecture is supported by the US Embassy in South Africa.

THURSDAY, 8 MARCH

11H00 ····· 12H00

Theda Minthe

City of Hannover Municipality, Germany

How the Leibniz biscuit and calculation with "1" and "0" made the difference

Gottfried Wilhelm Leibniz and his hometown Hannover have one thing in common. Both are connected to images that neither universities or municipality nor stakeholders in Hannover like. Ask people about "Leibniz", and they will most likely refer you to a popular biscuit produced in Hannover. Enquire about the City of Hannover, and the answer might be "boring", an attribute often quoted in German media. But mathematician and philosopher Leibniz invented the binary calculation with "1" and "0" over 300 years ago which is the basis of our digital life today and Hannover, state capital of Lower Saxony, provides nine universities for 48,000 students, the world's largest trade fairs and digital excellence. Ten years ago deacons of universities, CEO's of scientific institutions and the Lord Mayor established the Hannover Science Initiative in the spirit of Leibniz: "It is worthwhile to study the discoveries of others as for ourselves arises a new source of ideas." The network brought together commitment, creativity, money and sustainable structures of governance. New science edutainment and participation projects were developed in the benefit of Leibniz and the City. Ideas and experiences we will to share with Grahamstown - in the spirit of Leibniz.

Theda Minthe started her career as a journalist for science radio programmes after studying Protestant Theology (Master), Sociology and Communication. In the nineties, the reunion process of Germany brought her to the Mecklenburg-Western Pomerania's Ministry of Economic Affairs in Schwerin as press- and communication officer and later head of "Economic Development Coordination". Finding her big love in Hannover, she works directly for the Lord Mayor in leading positions as counselor in the field of science networking, politics, communication and integrated urban development. Thanks to the NUCLEUS project on Responsible Research and Innovation, funded by the EU, Theda enjoys working together with SAASTA and SAIAB. Theda Minthe has established several political and social networks and initiatives in Hannover.

13H00 ····· 14H00

Professor Lesley Cornish

DST-NRF Centre of Excellence in Strong Materials, School of Chemical and Metallurgical Engineering

Why should I be interested in Materials?

Materials are part of our everyday life, and we often take them for granted. Few people think about why certain materials are used in their cars, cell phones or even for the kettle! This talk unpacks the properties of certain materials, and why these materials have those properties. From there, it shows why certain materials are used for certain applications. The talk also shows how materials can be manipulated to change their structures and therefore their properties, and some examples will be given. The talk will finish by showing how materials can solve some of our environmental problems

Some people think that Prof. Lesley Cornish does not know where she's at; she's British, born in Uganda, and has lived in South Africa for 28 years. She obtained her BSc (Metallurgy and Materials), MSc (Computer Science) and PhD (Metallurgy and Materials) from the University of Birmingham, UK. She is a Physical Metallurgist and has been working on alloy development almost continually since her PhD, at the United Kingdom Atomic Energy Authority, University of the Witwatersrand and Mintek. Her research has focused mainly on platinum-based alloys, cermets, as well as the derivation of phase diagrams.

Prof. Cornish is currently supervising or co-supervising 12 postgraduate students, mainly at Wits University, with 30 MSc and 20 PhD students already graduated. When not working, she enjoys travelling to places without cell phone coverage, and is a very keen birder. She has recently returned from a birding trip in Kazakhstan, Uzbekistan and Mongolia, with an unscheduled stop in Kyrgystan on the way home. She is also a keen photographer, especially of wildlife. She is an Honorary Officer for the North West Parks and Tourism Board, and has had the privileged of working with rhinos, lions and wild dogs.

Prof Cornish is a NSTF-South 32 award winner.

This lecture is supported by the National Science & Technology Forum.

15H00 ····· 16H00

Jonathon Rees

STEAM Foundation NPC

Making it real – harnessing a challenging environment for dynamic STEAM education

The STEAM Foundation NPC is a registered non-profit company which focuses on science education through practical experimentation by learners and educators. It trains educators to teach scientific concepts and deliver co-operative learning. The foundation was established in 2017 and is aligning the Siemens Stiftung's Experimento science education kits to the South African curriculum to ensure high impact and affordability.

This will be an interactive talk about how science can be related to the daily experience of children and adults. Science should not be put in a box marked 'difficult'. Science is all around us. Children are naturally inquisitive and experience physics, chemistry, mechanics and multiple other disciplines in their daily lives. This understanding can be the basis for more effective education.

Jonathon is a science communicator who works on things that are complex, important and true. He helps people and organisations to communicate more effectively; and believes that good STEAM education is one of the foundations of a successful society. Jonathon is the founder and director of Proof Communication Africa, a dedicated science communication company.

FRIDAY, 9 MARCH

18H30 ····· 19H30

Andy Mathis

Oculus, USA

Virtual Reality

Join Andy Mathis, Oculus Director of Business Development and Partnerships for an explanation of what virtual reality is and how it may very well change our future! Virtual Reality has entered mainstream technology as the next major disruptive tool alongside the smart phone, the personal computer and the internet. From NASA to medicine, high tech industry is getting ready for the impact total immersion will have on business and society. Oculus makes state of the art virtual reality equipment that is popular around the world. Come for an interactive description and discussion of what the next wave of innovation may look like! There may even be a chance to experience VR for yourself!

A 17-year industry veteran, Andy has held leadership roles in business development, account management, and sales at Motorola, Esmertec (a mobile technology startup), Google, and now, Oculus from Facebook. In his current role at Oculus, he leads mobile partnerships and business development, working with a range of partners to drive VR distribution and engagement. Prior to this, Andy worked at Google for over seven years where he led the Android Carrier Partnerships team from the early stages of the platform through the growth of over 1B Android users globally. Andy holds a BA and an MBA from the University of Texas.

This lecture is supported by Oculus, USA

11H00 ····· 12H00

Timothy Guy Harrison & Professor Dudley Shallcross

University of Bristol, UK

A Pollutant's Tale - a Lecture Demonstration

'A Pollutant's Tale' is a lecture-demonstration about atmospheric chemistry and climate change performed by Tim Harrison and Dudley Shallcross from the School of Chemistry at the University of Bristol, UK. This lecture covers areas which include the composition of the Earth's atmosphere in comparison to other planets; a brief description of the structure of the atmosphere; investigation of some of the chemistry and properties of nitrogen and oxygen; and a few of the tropospheric pollutants, including carbon dioxide. Throughout the humorous lecture on a very serious topic there are chemical demonstrations including those involving liquid nitrogen, oxygen foam, dry ice and a few explosions. The lecture has been given in 26 countries and over 2000 times in the last 12 years and has been seen by more than 250 000 people.

Tim Harrison is the Science Communicator in Residence and Director of Outreach at Bristol ChemLabS (University of Bristol) in the UK. He has a passion for communicating chemistry and pursues this through performing lecture demonstrations, writing articles for school students and teachers and in delivering teacher training in practical chemistry. For 23 years Tim was a secondary school teacher in London, Gloucestershire and Australia. When he was younger he was a beer tester in London and once drank a brewery dry!

Dudley Shallcross is a Professor of Atmospheric Chemistry and CEO of the Primary Science Teaching Trust. He has wide-ranging interests in atmospheric science and science education. One of his children will start as a primary school teacher in September, two are training to be Pharmacists and the last is a football referee.

13H00 ·····

Kamogelo Makgobo Rakgetse

Abraham Serote Senior Secondary

Maglev power station

There is currently a global need for clean and renewable energy sources. Fossil fuels are non-renewable and require finite resources, which are running out because of high cost and environmentally damaging retrieval techniques. So, the need for cheap and obtainable resources is greatly required. An efficient and more feasible alternative option is the Maglev Power Station. Maglev derived from the term 'magnetic levitation'. The Maglev Power Station uses a self-propelled levitating power shaft supported by either attraction or repulsion of superconducting magnets. For this study, the technique is used to produce electrical energy through a special kind of maglev tesla coil generator.

Maglev Power Station incorporates a basic fact about magnetic forces such as that *LIKE* magnetic poles repel each other and *OPPOSITE* magnetic poles attract each other to lift, propel and guide the levitating shaft in terms of acquiring rotation from it. The Levitating Technology (LT) comes from an application exploiting the principle of magnetic induction between materials with different permeability. The LT allows the drive shaft to levitate in a stable and extremely safe way, without the need of an external power source and with a cost that is lower than fossil fuel based power stations.

Kamogelo Rakgetse is a 17-year-old learner from Abraham Serote Senior Secondary. His passion lies in designing and generating solutions to proposed problems for the upcoming future. He enjoys fixing things in his spare time. He is also a huge fan of cars and he one day wishes to start his own Auto-ECU (engine control unit) car company. He hopes to study Mechatronics Engineering as he enjoys working with a combination of all engineering fields. He is proud enough to call himself a young scientist and his work speaks for itself. Kamo is also a motivational speaker and enjoys encouraging others to 'dream big' just like him.

Kamogelo and Nozipho are ESKOM EXPO for Young Scientists Awardees of the Science Communication Prize supported by Scifest Africa.

14H00

Nozipho Zikhali,

Manor Gardens Primary School

The real truth behind bottled wate

Is bottled water purer than tap water? …that is the question. In 2005, it was estimated that 196-million litres of bottled water were drunk in South Africa. Recently in America, news reported that bottled water contained substances that were not approved by International Standards. Nozipho tested the properties of bottled water in South Africa with the understanding that most people assumed that bottled water is pure and healthy for consumption.

Microbial testing, using microbial monitors, was undertaken on 12 bottled water brands, tap water, and deionised water (control) samples. The filter membranes were incubated in Total Count Broth at 370C for 48 hours, and thereafter colonies were counted. The pH level and conductivity of each water sample was then tested. Ion chromatography was used to test the presence of ions (metals and chemicals) that could result in toxicity if consumed in large quantities or over long periods. The study showed that 9 out of 12 brands contained microorganisms, which is not acceptable by South African National Standards (SANS) and International Standards for drinking water. These results indicated that most of the tested bottled water brands are less pure than tap water.

Nozipho Zikhali is a 12-year old learner from Manor Gardens Primary School. She aspires to become a molecular biologist, vet or scientist one day and enjoys participating in science expos. At school, her favourite subjects are History, Maths, English Literature and Science and she loves writing stories and reading books in her spare time. Her extramural activities include gymnastics, judo, ice skating, karate and swimming. She has dual citizenship for South Africa and America and hopes that on her next trip to America she will be able to take Jojo and Jayjay, her pet dogs, with her.

Kamogelo and Nozipho are ESKOM EXPO for Young Scientists Awardees of the Science Communication Prize supported by Scifest Africa.

15H00 — 16H00

Prof. Petri Sami Mikael Vaisanen

South African Astronomical Observatory

Hey, were those ripples in the space-time continuum? Or perhaps life in the Universe?

The last couple of decades have seen phenomenal discoveries in astronomy, from the first detection of planets outside our Solar System to dark energy and the weirdly accelerating universe. The 2017 Physics Nobel Prize was awarded to the detection of gravitational waves proving Prof. Einstein right, once again. To add to the excitement of the past year, researchers witnessed the birth of a totally new field of astrophysics, with a set of those gravitational waves traced back in visible light to an unimaginably violent explosion resulting from a merger of two neutron stars. That explosion 130 million light years away shook our space-time continuum, also creating gold and platinum in real time. Meanwhile, astronomers are finding new planets by the thousands in the Milky Way. The next grand quest is thus to find habitable planets, perhaps even life in the universe, as we all look for our place in the universe. South Africa is right in the thick of front-line astronomy research with a successful 10-m class SALT telescope pouring out results, with plans to modernise other SAAO Sutherland telescopes into an intelligent network, and the MeerKAT nearing completion.

Prof. Petri, originally from Finland, fell in love with the night-sky and stars as a child in Ethiopia. He got his first telescope when he was 14 years old, and never truly considered other careers than astronomy. Pursuing the study of galaxies and working with very large telescopes from Atacama to the Karoo meant that, with his wife, he raised four kids on four continents. After working for years for SALT, he now serves the SA astronomical community as the Director of the SAAO in Cape Town, which operates SALT and a host of other telescopes in Sutherland. He still has a passion for observing the universe, for education, outdoors and deserts, especially at night, and is a big fan of science fiction and literature in general.

This lecture is supported by the South African Astronomical Observatory.

18H30 — 19H30

Dr Tiisetso Lephoto

University of Witwatersrand

Entomopathogenic Nematodes: Biological Control Agents to aid South African Agricultural Industries

Brian Wilmot Lecture

The use of synthetic chemical pesticides has several negative implications for the Agricultural industry, which include the development of resistance to the insecticides, crop contamination and the killing of non-target insects. This has motivated research into the potential of entomopathogenic nematode as biological control agents of insect crop pests. A nematode belonging to the Oscheius genus was isolated from a grassland in South Africa. The technology and informatics aspect was incorporated to sequence the whole genome of this microscopic worm and also its pathogenic symbiotic bacteria belonging to the genus Serratia. The draft genome of Oscheius nematodes will support the improvement and initiation of further studies intended to help us understand the molecular and metabolic processes in this genus. Furthermore, it will provide more genomic insights about the insect-nematode interactions and thus help improve their ability possible as biological control agents in agricultural industries.

Dr Lephoto is one of the youngest PhD graduates in the field of cell and molecular biology. She is a multi-award winning, trailblazer scientist and has published papers in international journals. She obtained her PhD at the age of 26 in Nematology, Genomics and Biotechnology with an emphasis in Bioinformatics at the University of Witwatersrand. She is one of SA's brightest young researcher's who is passionate about science, agriculture and innovation. One of her aims is to further annotate and analyse whole genomes of the nematodes and its endosymbiotic bacteria she isolated in her study. She is currently a postdoctoral research scientist at Wits University and is supervising five Masters students and three Honours students with Professor Vincent Gray in the school of molecular and cell biology. She has served as a committee member for the section of NRF postdoctoral, doctoral and masters fellowships and scholarships.

This lecture is supported by the Department of Science & Technology's Women in Science Award programme.

Please note: This lecture forms part of the Scifest Africa Official Opening

SATURDAY, 10 MARCH

13H00 ····· 14H00

Dr Jeanita Shauntae Pritchett

National Institute of Standards and Technology

NIST: Promoting U.S. Innovation and Industrial Competitiveness

From the smart electric power grid and electronic health records to atomic clocks, advanced nanomaterials, and computer chips, innumerable products and services, rely in some way on technology, measurement, and standards provided by the National Institute of Standards and Technology (NIST). Today, the NIST measurements support the smallest of technologies to the largest and most complex of human-made creations - from nanoscale devices so tiny that tens of thousands can fit on the end of a single human hair up to earthquake-resistant skyscrapers and global communication networks. NIST is one of the nation's oldest physical science and metrology laboratories founded in 1901.

Dr Jeanita Pritchett is an Academic Program Manager in the International and Academic Office and a Research Chemist in the Chemical Sciences Division at NIST. She manages the prestigious National Research Council Postdoctoral Program and the Graduate Measurement Science and Engineering Fellowship. She promotes organizational excellence by providing career development training for various levels of NIST staff and works with educational institutions at all levels to implement measurement science training and exposure to STEM subject areas.

Dr Pritchett began her tenure at NIST as a National Research Council Postdoctoral Fellow working on a number of forensics related projects. She transitioned into cutting-edge research involving developing reference materials and robust, analytical methods for clinical biomarkers, vitamins, nutritional constituents, and environmentally relevant substances. Her expertise has been drawn on for a number of media activities, including appearing as forensic science expert for HLN's documentary series, Beyond Reasonable Doubt (2017).

As the recipient of an Embassy Science Fellowship, she had the unique opportunity to work at Scifest Africa in 2015 to develop hands-on content for the programme as well as training resources for educators. Dr Pritchett has been the recipient of a number of awards including, in 2015, the Best Workshop Award: Curriculum. Dr Pritchett plays American Flag Football, is a Zumba fitness instructor, and paints in her spare time.

This lecture is supported by the US Embassy in South Africa.

18H30 ····· 19H30

Toby Shapshak

Maven Media

Why innovation is better in Africa

Christina Scott Memorial Lecture

Africa's unique problems have resulted in a unique brand of innovation, out of necessity, often using mobile technology. Africa's innovative spirit has produced mobile payment systems like M-Pesa (through which $148m a day or 40% of Kenya's GDP is transacted); mobile money (Africa has half of the world's such services); solar power like M-Kopa to Zipline drones delivering blood in Rwanda; and other ground-breaking inventions. Many of these great success stories have emerged because of the rapid uptake and innovative use of mobile. While the rest of the world is still grappling with how to transition to mobile payments and drone deliveries, Africa is already doing it. Africa is not just mobile-first, it is a mobile-only continent.

In this presentation, Toby Shapshak writes and speaks about how innovation is better in Africa. His TED talk on how Africa is solving real problems has had over 1,4-million views; and he has been featured in the New York Times. Toby is the editor-in-chief and publisher of Stuff magazine, contributor to Forbes and writes a weekly column for the Financial Mail. He has written on Africa, as a mobile-driven continent, for CNN, The Guardian in London and Forbes.

Toby has spoken four times at the South by South West (SxSW) conference in Austin, Texas, and has given presentations at The Guardian's Activate: Johannesburg, Intel's IDF conference in San Francisco, Germany's Zukunftskongress (Future Congress), Sweden's The Conference, AfricaCom in Cape Town, TEDxGateway in Mumbai, Pivot East in Nairobi, and Tech4Africa in Johannesburg.

As a news and political journalist, he ran the Mail & Guardian newspaper's website when it was the first news site in Africa, shadowed Nelson Mandela when he was president, and covered the Truth and Reconciliation Commission. Amongst many other distinctions, he won the ICT Journalist of the Year award in 2002. He has interviewed a range of tech industry luminaries, including Apple co-founders Steve Jobs and Steve Wozniak.

SUNDAY, 11 MARCH

13H00 ····· 14H00

Professor Ryan Blumenthal

Forensic Pathology Services , University of Pretoria

Death and Adventure in Africa – Tales of an African Forensic Pathologist

What does it mean to be a forensic pathologist? What does it mean to be a forensic pathologist in Africa? What kind of cases does one get to see? What does a 'day in the life' of a South African forensic pathologist look like? Ryan Blumenthal has performed between 250 and 450 autopsies per year for the past 15 years and has been involved in several high-profile cases. Learn how science and pathology can help catch murderers.

Prof. Blumenthal is the senior specialist forensic pathologist at Forensic Pathology Services, Pretoria and Associate Professor at the University of Pretoria's Department of Forensic Medicine. His chief field of interest is the pathology of trauma of lightning (keraunopathology). He has been involved in the publication of numerous articles and textbooks on lightning and electrothermal injuries and has helped generate international standard operating procedures and guidelines for lightning strike fatality and electrocution victims. He has also published widely in the fields of suicide and other areas involving the pathology of trauma.

His hobby is sleight-of-hand magic and he has been performing semi-professionally since 2001. Blumenthal also enjoys bird watching, mountain biking, squash, novel writing and adventure hiking.

MONDAY, 12 MARCH

15H00 ····· 16H00

Dr Anne Verbiscer

University of Virginia, USA

Exploring the Solar System Beyond Neptune: Pluto and Other Distant Worlds

What do worlds in the outer Solar System look like? What are they made of and what can they tell us about how our Solar System formed?

NASA's New Horizons spacecraft launched from Earth in January 2006 and after a 9-year journey flew past Pluto and its five moons on 14 July 2015. This lecture will give an overview of where the spacecraft is going after its Pluto flyby and beyond. New Horizons is headed into the Kuiper Belt to fly within 3500 km of an icy world known as "2014 MU69" on 1 January 2019. The lecture will look at what the spacecraft is doing in this year leading up to the flyby and highlight the importance of observations of "MU69" obtained in South Africa (in 2017) and Senegal (in 2018) to help us learn about "MU69" before the spacecraft arrives. In addition the importance of Planetary Science in Africa will be addressed as Dr. Verbiscer is a member of the Scientific Advisory Committee of the Africa Initiative for Planetary and Space Sciences.

Anne Verbiscer is a Research Professor at the University of Virginia where she explores icy surfaces in the outer Solar System. Fascinated by the exploration of the Moon by the Apollo astronauts in the 1960s, she wanted to follow in their footsteps and become an astronaut. There were no female astronauts then, so instead she pursued her dreams of exploration using robotic spacecraft. She is an Assistant Project Scientist for NASA's New Horizons mission and also a Participating Scientist on NASA's Cassini mission to Saturn. In 2017, she led an expedition of 28 astronomers with portable telescopes to the Western Cape Province of South Africa.

This lecture is supported by NASA's New Horizons mission.

18H30 ····· 19H30

Prof. Etheresia Pretorius

Stellenbosch University

Why do so many of us die from blood clots?

Cardiovascular conditions including diabetes, heart attacks and strokes are some of the leading causes of death, not only in South Africa, but in the world. This presentation will give insights into what is happening inside our bodies, inside our blood vessels, long before we actually suffer from e.g. a stroke. The presentation will take you on a journey through the lens of a super-resolution microscope to show you how your blood cells in your body react when they are exposed daily to too much sugar and fat, as well as smoking; the main causes of cardiovascular disease. Prof Pretorius will answer the question: can we prevent cardiovascular disease, heart attacks and stroke by looking at our diet and by reducing inflammation?

Professor Resia Pretorius is the Head of Department of Physiological Sciences at Stellenbosch University. She is an internationally recognised researcher with an NRF B-rating and has published over 280 research publications. She was runner-up of the prestigious Women in Science award in 2017 and won the African Union Women in Science award in 2011. Her main interest is physiological changes in the haematological (blood) system during cardiovascular disease. She has supervised numerous MSc and PhD students.

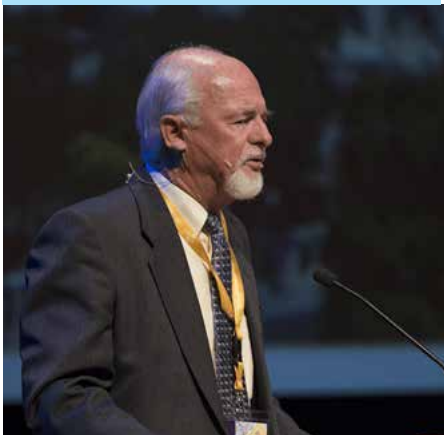
This lecture is supported by the Department of Science & Technology's Women in Science Award programme.

13H00 ····· 14H00

Prof. Mike Bruton

Mike Bruton Imagineering

Why is science important?



The nature of inventions has changed dramatically in recent decades with the rise of computers, the internet, information science and the digital economy. Many inventions now take the form of invisible digital services, apps on smart-phones, cloud-based services or techniques that serve the needs of new fields of endeavour. Some inventions are new ways of living sustainably, yet others are novel forms of music, art, sport or entertainment. Increasingly, technology has changed from being a handheld tool to a form of social intervention, even domination. Some modern inventions are processes that facilitate technology leapfrogs or new decision making protocols that bring modern technology into the hands of more people. Others offer new ways of dealing with the challenges that technology itself has thrown at us, such as hyper-connectivity, vast data fields and the environmental costs of our wasteful ways of living.

Professor Mike Bruton has always been a tinkerer and innovator who likes to question the status quo and promote creative thinking. Mikes professional interest in innovation was sparkled when he led a team of scientists in the Ichthyology Institute and needed to develop an environment that nurtured creativity and innovation. He realised that great scientists are not 'faithful formalists' but risk takers who think outside the box, hate rules, make mistakes but learn from them, dream big, and are often eccentric. Unlike artists, scientists do not have to create what they are working on as it is already there; scientific discovery is about revealing existing truths.

Mike Bruton has received many honours and awards for his contributions to science and technology education. He is an Honorary Research Associate of the South African Institute for Aquatic Biodiversity and an Honorary Life Member of the Two Oceans Aquarium and the South African Association for Science & Technology Centres. His hobbies include writing, watching fishermen, collecting clothes pegs and not using social media. He lives in Cape Town with his wife, Carolynn, three dogs, a cat and millions of bacteria that he has delegated to produce compost for his garden.

TUESDAY, 13 MARCH

18H30 ····· 19H30

Tshiamo Legoale

Mintek

Small scale mining: Small step or giant leap?

What was the mining sector historically like? Have there been any significant advancements and are they adequate? Have the technological changes benefited the miners, economy and environment in any way?

This lecture will look closely at the interventions of the public and private sector, with specific focus on phytomining as a tool in the mining sector. It will explore the use of plant hyperaccumulators to "mine out" metals of choice from substrates, the methods employed, the research conducted and possible applications thereof. Finally, the concept of science communication and possible application in small scale mining will be discussed. Case studies where science communication was used as a tool for efficient and environmentally considerate mining will be given.

Tshiamo is a geologist employed in Mintek, and the 2017 International FameLab Science Communication Champion. She is from the Platinum City of Rustenburg and obtained her undergraduate qualification in geology at the University of the Free-State, Mineral Resource Management at Wits University, and an MSc in Environmental Management at the University of the Free State.

She joined Mintek in 2012 as a scientist, and is based in the Small Scale Mining and Beneficiation Division, working with marginalised communities and assisting them in the legal mining of local geological orebodies. She is passionate about sustainability studies, community development through science, and wetland conservation and believes the best way to eat an elephant is one bite at a time. The world is facing many challenges, social, economic and environmental and she believes that it is the role of young scientists, such as herself, to change the doomed future through interventions, no matter how small. One such intervention is her current research focus, phytomining. It is the use of plant hypperacumulators to extract metals of interest from ore substrates to create bio-ores. This mining method is less capital intensive that the conventional and less environmentally detrimental.

This lecture is supported by Mintek.

13H00 ····· 14H00

Professor Philiswa Nosizo Nomngongo

University of Johannesburg

Why waste wastes? -Using waste tyres to remove pollutants from water systems

Environmental pollution is one of the major challenges worldwide because of the increase in contamination of water, soil and air by trace metals and organic based contaminants. The prevalence of inorganic and organic pollutants in the environment calls for urgent intervention and encourages the development of methods that are effective and efficient in the extraction, separation and preconcentration of trace metals and pharmaceutical drugs. In this study, the waste tyre was used as raw material to produce high performance activated carbons. The activated carbons were applied as an adsorbent in the removal of pharmaceuticals and trace metals, from wastewater and river water samples. The obtained results indicated that waste tyre is a promising precursor for the production of low cost carbon adsorbents with high specific surface areas and high adsorption capacities for the targeted contaminants.

Professor Nomngongo is an Associate Professor in the Department of Applied Science at the University of Johannesburg. Following a short stint as a postdoctoral fellow in the Department of Applied Chemistry she was appointed as a research and a lecturer in the department. She leads the analytical environmental chemistry group in the department and her research focuses on organic and inorganic pollutants in environmental, biological and other matrices. It also extends to the application of nanotechnology in environmental pollution monitoring, desalination and water treatment. Her research publications to date includes 43 articles in accredited international journals, two book chapters, two conference proceedings book chapters, and 27 conference papers. She is a mentor, supervisor and co-supervisor of a number of PhD, Masters' and postgraduate students, and is actively involved in various community engagement projects. Professor Nomngongo's achievements have been recognised through the award of a number of prestigious fellowships and awards, including, most recently the 2017 South African Women in Science award in the Distinguished Young Woman Research: Natural and Engineering Sciences category and the 2017 Vice-Chancellor's Distinguished Award: Most Promising Young Researcher of the Year.

This lecture is supported by the Department of Science & Technology's Women in Science Award programme.

15H00 ····· 16H00

Professor Thomas Eugene Cloete

Stellenbosch University

The intelligence trap – unlocking your genius

We all know the classic story of the tortoise and the hare. There are kids in school who are smarter than you in some ways. There are kids who are faster learners than you. However, that does not mean they are ahead of you. If you study at your own pace and keep on learning, you will pass people who learn quickly but then stop learning. Just because a child has good grades in school does not mean that child will do well in life. In a recent career survey conducted by the Harvard Business School, attitude came out as the most important criteria for success, followed by skill and knowledge and lifelong learning.

Research has indicated that people tend to act in harmony with whatever their mental self-portrait shows them. Often low self-esteem stems from uncertainty about whether you are accepted and often a person believes that they have to earn any acceptance they may get from others. Someone with a poor sense of self-worth is a slave to the opinions of others. Acceptance is when people come together and are able to take the other into his or her life completely, with no reservations, no pretence, no masks. Unlocking your multiple intelligences starts with accepting yourself and raising the expectations you have for yourself.

Prof Cloete grew up on a dairy farm in the Eastern Cape where there was no mains electricity and he had to study mostly by candlelight. He enjoyed science from a young age and read the Popular Mechanics magazine since he can remember. Vice rector for Research, Innovation and Postgraduate studies at Stellenbosch University, Prof Cloete holds a DSc degree in Microbiology from the University of Pretoria. He places a high premium on creativity, innovation and entrepreneurship holds nine patents, two of which received awards and a third appeared on the cover of 2010 Scientific American as one of 10 world-changing ideas. He is fond of classic cars and the proud owner of a 1962 Jaguar MKII.

This lecture is supported by the National Science & Technology Forum.