November 2019 Faculty of Science University of Cape Town Vol. 8 Issue 2

Science Matters

Science Faculty Newsletter

Message from the Dean

In this final edition of Science Matters for 2019, I would like to thank staff and students for their contributions to another successful year in the Science Faculty.

We celebrate the many and varied awards attained by staff and students, who make us proud with their innovative and cutting-edge research. Congratulations to staff on their well-deserved Ad Hominem promotions. We celebrate our retirees who will be sorely missed!

In this edition of Science Matters we are inspired by the accolades of women researchers: Emma Platts and Regina Esinam Abotsi at the L'Oreal-UNESCO awards; Dr Katye Altieri, Prof Janet Hapgood and Dr Robyn Pickering for their UCT grants and the BIOGRIP award spearheaded by Dr Sarah Fawcett. Prof Isabelle Ansorge launched another successful SEAmester voyage which was also featured on a documentary, *On the Edge of Change*, a new series on oceanographic research and climate crisis, aboard the SA Agulhas II.

Astronomy continues to hit headlines for new discoveries in our galaxy and also recently launched a new teaching telescope on Upper Campus.

We have made 1816 conditional offers to first time entering students for 2020 and hope to have a full complement of 460 new students.

To staff and students who graduated in December, we say congratulations.

Wishing you all well over the festive season. May you find time to relax and unwind and come back refreshed and ready for 2020.

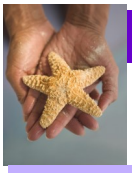
Best wishes

Maano Ramutsindela

Vice-Chancellor's Award for Service Excellence

Monique Muller, Chemical safety officer in the UCT Departments of Chemistry and Chemical Engineering, won the Vice-Chancellor's Award for Service Excellence.

Monique describes herself as a big picture person. Of necessity, she must be. On the floors above and below her upper campus office is a repository of 5 500 chemicals – many toxic, explosive or flammable. There are also 14 permanent chemical waste streams just in the chemistry department that must be managed. Muller spends most of her time here; a 'people' complement that currently includes 16 professional, administrative and service staff, 25 academic staff and a whopping cohort of 81 postgraduates. It's her job to ensure the chemicals are safely housed and used, to reduce the risk of accidents and threats to people and expensive infrastructure. Health and safety are her watchwords. And her diligence, meticulousness and dedication to her job have now been recognised via a Vice-Chancellor's Award for Service Excellence. This annual award acknowledges "outstanding service by staff who have contributed to the delivery of exceptional and significantly improved services to UCT's staff and students".



Our Science Stars:

Professor Luigi Nassimbeni receives award from European Crystallographic Association

The European Crystallographic Association awarded **Prof Luigi Nassimbeni,** Department of Chemistry, the 1st International Alajos Kálmán Prize in recognition for his outstanding scientific contributions in the field of structural sciences within the last 5-10 years; for his outstanding activity in supramolecular chemistry, revealing aspects of thermodynamics, kinetics and separation of inclusion compounds, and discovering the relevance of certain weak bonds in significant industrial processes.

Prof Nassimbeni presented a 30 minute scientific lecture in Vienna, where his prize was awarded. This took place during the European Crystallographic Meeting in Vienna.

The Alajos Kalman Medal

Dr Petra Bombicz, Chair of the Prize Committee; Professor Udo Heinemann, President of the ECA; Professor Luigi R Nassimbeni receiving his award.

Professor Rebecca Ackermann named one of M&G's Women Changing South Africa

Every year for Women's Month, the *Mail & Guardian* has profiled the transformative work done by women – a celebration of excellence, and a testimony to the tireless work done by South African women. **Professor Rebecca Ackermann**, from the Department of Archaeology at UCT, was named as one of their Women Changing South Africa.

"Openness might not completely eradicate prejudice, but it's a damn good place to start." 'Diversity leads to better science," is part of Rebecca Ackermann's ethos and approach to science. As a professor in the department of archaeology, and deputy dean of transformation in the faculty of science at the University of Cape Town (UCT), Ackermann has been instrumental in creating policies and spaces to eradicate the barriers that women — especially black women — face in science, education and research.

Accolade for archaeologist Professor Shadreck Chirikure

Professor Shadreck Chirikure, Department of Archaeology, recently had his research "Archaeometry and urbanism at Great Zimbabwe" selected for the 2019 Shanghai Archaeology Forum. This award recognises individuals who have achieved distinction through innovative, creative and rigorous works relating to our human past, and have generated new knowledge that has particular relevance to the contemporary world and our common future.

Young Researcher Awards

At the annual Fellows dinner, the Young Researcher Awards, which honours the significant contributions that UCT's young researchers have made to scholarship in their fields, were presented. **Dr Alastair Sloan**, *(pictured on left of photo)* from the Department of Geological Sciences was one of this year's recipients and is seen here being congratulated by VC Prof Phakeng.

2019 Women in Science winner

A UCT professor and two postgraduate researchers were among the winners at this year's South African Women in Science Awards (SAWiSA). Department of Astronomy postgraduate researcher **Julia Healy** received a TATA Scholarship. She received her award at a gala dinner hosted by the Minister of Higher Education, Science and Innovation, Dr Blade Nzimande. Healy (pictured left) is enrolled for a joint PhD degree at UCT and the University of Groningen. She is investigating the neutral hydrogen gas content of galaxies in galaxy clusters to understand the processes that drive galaxy evolution. Her research can be viewed as a pilot project for the studies that will be conducted as part of the upcoming large surveys using the MeerKAT radio telescope.

UCT researchers excel at L'Oréal-UNESCO awards

Gilles Antoine (L'Oréal South Africa) , Professor Martiale Zabaze-Kana (UNESCO), Emma Platts, Dr Phil Mjwara (South African Department of Science & Innovation)

Four women researchers from UCT were recognised by the L'Oréal-UNESCO For Women in Science South African National Programme for their excellent contributions to science. **Emma Platts** from the Department of Mathematics & Applied Mathematics was given an award for her work on *Machine learning and data clustering techniques to probe fast radio bursts and constrain cosmological parameters.* "I've always been fascinated by physics and the universe. They feel so far removed from our everyday reality and yet govern our existence," Platts says. "I was led here by curiosity, existentialism and a desire to contribute to our understanding of the universe." She adds that being a recipient of this award seems almost surreal and that she sees it as a testament to her supervisor, Professor Amanda Weltman, "who saw something in me (even when I didn't) and has continuously supported and encouraged me. I'm interested in astrophysics and cosmology, and how we can use data science and machine learning to advance our understanding in these fields. I find maths and coding to be a great escape from everyday life, and that I can apply these skills to study some of life's biggest questions is a privilege."

PhD Candidate Regina Abotsi wins L'Oreal-UNESCO for Women in Science Sub-Saharan Africa Young Talents Award

Regina Esinam Abotsi, a PhD candidate in the Department of Molecular and Cell Biology, and the Institute of Infectious Disease and Molecular Medicine, was awarded a grant of EUR10 000 (about ZAR162 350) to further her research. Abotsi was among 20 women scientists (15 PhD candidates and five post-doctoral researchers) from 15 countries chosen for the 10th edition of the L'Oréal-UNESCO For Women in Science Sub-Saharan Africa Young Talents Awards. Through her PhD, she seeks to investigate antibiotic resistance in HIV-infected children with chronic lung disease (CLD). Some of her team's recent research in sub-Saharan Africa has shown that a novel type of chronic lung disease, known as obliterative bronchiolitis, is present in 30% of all HIV-infected children. Chronic lung disease is responsible for about 50% of all death and illness in HIV-infected children. One of the aims of her research is to establish whether administering an antibiotic called azithromycin promotes resistant pathogens in the same way many other antibiotics do. The findings from her research will influence the recommendation of azithromycin as treatment for CLD in HIV-infected children.

Klaus-Jurgen Bathe Leadership Scholarship awarded to Chemistry Undergrad Student

Mustapha Singlee, an undergraduate student in Chemistry and Human Anatomy & Physiology, is one of ten talented UCT undergraduate students who have been awarded Klaus-Jürgen Bathe Leadership Scholarships for 2020. The primary goal of the Klaus-Jürgen Bathe Leadership Programme is to produce graduates with outstanding leadership qualities and with a strong sense of social justice, who will go on to play leading roles in business, government and civil society in South Africa and the African continent.

UCT's 2020 Mandela Rhodes scholars

Seven UCT students have been honoured among the Mandela Rhodes Foundation (MRF) Class of 2020, joining another 47 inspirational young leaders from across Africa. The year-long programme offers postgraduates from across the African continent the opportunity to further their tertiary studies at any South African university. Applicants are required to demonstrate strong leadership qualities and reflect in their character a commitment to the four principles of education, reconciliation, leadership and entrepreneurship.

Joshua Mirkin, from the Department of Oceanography was selected for this esteemed programme. Mirkin is studying towards a master's degree in oceanography at UCT. He was an orientation leader through both the Faculty of Science and the International Academic Programmes Office. Through his studies, he wishes to gain a rounded, in-depth understanding of the physical world, and has an interest in examining the way humans interact with, adapt to, influence and change their environment. In addition to his studies, Mirkin is a peer mediator, student support officer, tutor and radio talk-show host. He previously held positions such as content manager at UCT Radio and logistics coordinator for the Thethani Debating League.

UCT invests in women academics

The University of Cape Town (UCT) has kept to its commitment to create more opportunities for women by offering a total of R22.5 million in individual grants over five years. Five substantial grants have been awarded to women researchers to make space for more women's voices to be heard – both for their own advancement and for the advancement of others. These are aimed at postgraduate students and postdoctoral research fellows. The winning research projects are:

Dr Katye Altieri: enabling South Africa's black oceanographers

Along with three co-investigators, Altieri from the Department of Oceanography aims to enable a cohort of postgraduate black women and transgender oceanographers to become the leaders of oceanography in South Africa – and the global south.

Professor Janet Hapgood: informed choices for women's contraception

Women in sub-Saharan Africa are at high risk of being infected with HIV. They also need access to effective, safe and affordable contraception. However, the hormonal contraceptive that's most widely used in the region has a potential side-effect: it may increase the risk of HIV infection by about 40%. Sub-Saharan Africa is also the region with the highest use of this injectable contraceptive – called depo-medroxyprogesterone acetate or Depo-Provera – and the highest prevalence of HIV.

Dr Robyn Pickering: transforming the field of paleoanthropology

South Africa has a rich record of human evolution spanning fossils of our early ancestors through to more recent evidence for the emergence of modern humans and their complex behaviours. Research into human evolution in South Africa has been substantial and has received international attention for nearly 100 years. However, the leading researchers in South Africa have always been men: women are under-represented and black women are virtually absent. Pickering and her co-investigators, Professor Rebecca Ackermann and Dr Jayne Wilkins, want to take the first step towards transforming the field of paleoanthropology. They plan to build up the Human Evolution Research Institute (HERI) at UCT to make it a world-class and enabling research environment where excellence shines and the next generation of great South African black women palaeoanthropologists can thrive.

UCT awarded funding to host Biogeochemistry Research Infrastructure Platform (BIOGRIP)

"Biogeochemistry" is the study of how biological, geological, chemical, and physical processes interact to shape natural environments over time and space. It covers a range of interdisciplinary research foci, from the origin and diversification of life, to how anthropogenic drivers alter modern environments, to the response of natural systems to environmental change. Biogeochemistry was identified by the Department of Science & Innovation's South African Research Infrastructure Roadmap document as an emerging interdisciplinary field of strategic importance. While some South African research groups currently undertake research that can be defined as biogeochemical, their efforts to-date have largely been isolated and/or fragmented. Moreover, biogeochemistry requires high precision data and measurements of a vast range of inorganic and organic chemical components, some of which cannot currently be made in South Africa.

From 2020, UCT will host the Biogeochemistry Research Infrastructure Platform ("BIOGRIP"). Funded by the Department of Science & Innovation, BIOGRIP was conceived by a team of researchers in the Faculty of Science, along with collaborators at Stellenbosch University, North-West University and the University of the Free State. **Dr Sarah Fawcett**, Department of Oceanography and Professor Jodie Miller (Stellenbosch University) are the co-champions of BIOGRIP, who led the development and writing of the proposal, as well as presenting it and defending it to the DSI's scientific steering committee. The UCT team that assisted includes: **Dr Katye Altieri** (Oceanography), **Prof Judy Sealy** and **Dr Vincent Hare** (Archaeology), **Dr Robyn Pickering**, **Prof Chris Harris** and **Dr Petrus le Roux** (Geological Sciences). Professor Sealy is currently the acting Director of BIOGRIP.

The central goal of BIOGRIP is to enhance South Africa's existing biogeochemistry research capabilities by modernizing, integrating, and optimizing extant facilities, developing new infrastructure where essential measurement capacity is lacking, and driving knowledge creation through investment in training, capacity building, and scientific leadership. BIOGRIP will consist of a network of new and existing research laboratories housed in one of four Nodes, each hosted by a different South African university. Each Node will specialize in an aspect of biogeochemical research, with a central Hub based at UCT that manages and coordinates the platform. The Nodes will support both discipline-specific research and larger-scale integrated and interdisciplinary efforts, and will be accessible to all researchers across the country.

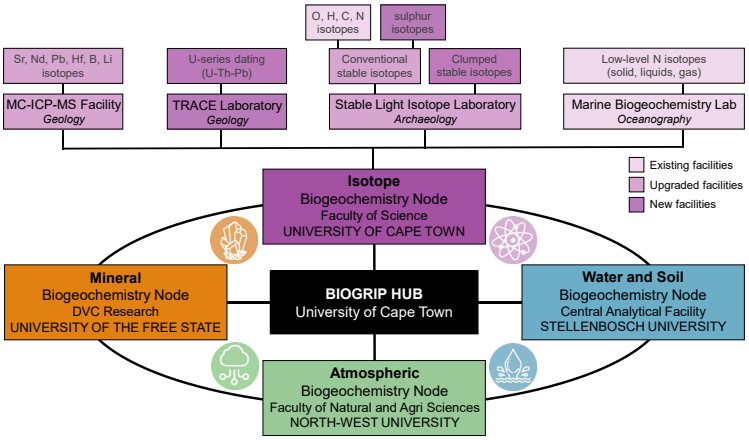
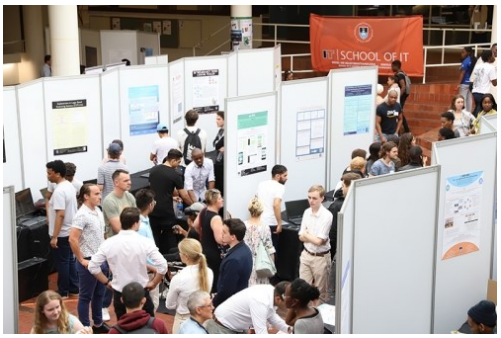


Figure 1: *Representation of the Hub and Node structure of BIOGRIP showing the main thematic areas of the platform and their host universities. The major analytical facilities – both existing and to be upgraded and developed as part of BIOGRIP – are shown for the UCT Isotope Biogeochemistry Node. The BIOGRIP Hub will fall under the Office of the DVC of Research and Internationalization, while the Node will be hosted by the Faculty of Science.*

EVENTS IN THE FACULTY

Launch of the School of IT



The School of IT's annual showcase of student work and innovations.

The Fourth Industrial Revolution (4IR) is not coming, it is already here, and UCT's new School of Information Technology is already well positioned to prepare students, says its director Professor Ulrike Rivett, who was speaking at the official launch of the school, which merges the innovative technological and multidisciplinary capacities and knowledge of the faculties of Science, Commerce and Humanities. The launch was accompanied by the annual School of IT showcase, a "show and tell" involving senior student projects and innovations, as well as the award of annual certificates and class medals.

Guest speaker at the launch, UCT's chief operating officer Dr Reno Morar, (pictured left) said the students' showcase and awards provided a more concrete picture of the relationship between UCT and technology, and especially the university's commitment to excellence. He added that the School of IT embodies one of UCT's strongest principles: the importance of multidisciplinary partnerships in approaching today's complex problems. "Because it is a virtual school, based not in a building but in a data cloud, it's reach can encompass many different disciplines." Everyone who uses a smartphone is part of that growth. We don't have to wait for innovative apps to trickle down to South Africa," Morar said. Already UCT students are leading the way by developing and driving those apps and their growth. Others have developed apps as solutions to food waste, water savings, language barriers, and many more. UCT student entrepreneurs are also putting their technology learning to good use in new businesses that serve South Africans. Mvelo Hlope and Denislav Marinov won prizes from the national Entrepreneurship Intervarsity Competition in September for technology applications they developed during their studies. "These students are examples of UCT's response to 4IR: We're not going to wait for the changes it will bring, but we're going to lead the change," said Morar. "The School of IT is the latest example of UCT's mission to create positive change to serve our society."

STAFF NEWS

WELCOME TO NEW STAFF

Department of Astronomy
- Professor Paul Groot
- Dr Itumeleng Monageng—Lecturer

Department of Computer Science
- Dr Jan Buys—Lecturer

ACDI
- Dr Christopher Trisos—Senior Lecturer
- Mr Kagiso Keantimilwe—Research Support Manager

H3D
- Dr Andani Mulelu—Research Scientist
- Ms Alacia Armstrong—Research Support Specialist

Department of Mathematics & Applied Mathematics
- Dr Sheikh Shajidul—Lecturer

Department of Molecular & Cell Biology
- Mr Enrico Damascio—Senior Technical Office

Department of Physics
- Mr Michael van Heerden—Scientific Officer

Science Faculty Office
- Nomahlubi Tinzi—Junior Finance Specialist
- Masuda Galsoolker—Junior Finance Specialist

FAREWELL TO STAFF

H3D
- A/Prof Rudolf Mueller

MCB
- Ms Lara Donaldson
- Ghakiema Salie

Chemistry
- Mrs Karin Badenhorst

FAREWELL TO RETIRING STAFF

The Faculty says goodbye to staff retiring who have been involved in the faculty for many years:

Department of Biological Sciences
- Professor Jeremy Midgley

Department of Chemistry
- Professor Roger Hunter
- Mr Andre de Jager
- Mr Peter Roberts

Department of Environmental & Geographical Science
- Professor Michael Meadows
- Mrs Sharon Barnard

Department of Mathematics & Applied Mathematics
- Assoc Prof Charles Hellaby

Congratulations to the following staff on their Ad Hominem Promotions

Name	Department	Promoted to
Dr Robyn Pickering	Geological Sciences	Senior Lecturer
Dr Alastair Sloan	Geological Sciences	Senior Lecturer
Dr Claire Blackman	Mathematics & Applied Mathematics	Senior Lecturer
Dr Ruan Moolman	Mathematics & Applied Mathematics	Senior Lecturer
Dr Ann Meyers	Molecular & Cell Biology	Senior Research Officer
Dr Katye Altieri	Oceanography	Senior Lecturer
Dr Petrus le Roux	Geological Sciences	Chief Research Officer
A/ Prof Muthama Muasya	Biological Sciences	Professor
A/Prof Hussein Suleman	Computer Science	Professor
A/Prof Rachel Wynberg	Environmental & Geographical Science	Professor
A/Prof Jeff Murugan	Mathematics & Applied Mathematics	Professor
A/Prof Amanda Weltman	Mathematics & Applied Mathematics	Professor
A/Prof Isabelle Ansorge	Oceanography	Professor
A/Prof Saalih Allie	Physics/ Centre for Higher Education Development	Professor
Mr Mark Christians	Physics	Chief Technical Officer
Mr Devilliers Basson	Geological Sciences	Principal Technical Officer
Dr Raymond Roman	Oceanography	Principal Scientific Officer

UCT Chemistry – Gun Run for CHOC by Dr Wade Petersen

On 20th October the Department of Chemistry at the University of Cape Town assembled a team of brave warriors called the 'Runaway Reactions', to participate in the Gun Run. The team comprising of both staff and students consisted of 14 runners across the various races – 5 km, 10 km, and 21 km. The initiative was aimed specifically at raising funds to be donated to cancer awareness and thanks to the support of all our donors, the Department manged to raise R5 000.00 and this was donated to CHOC (Childhood Cancer Foundation South Africa).

The Department of Chemistry would like to thank everyone for their support and helping with promoting this cause, and a special thanks to FluoroChem for their sponsorship of the running T-shirts. Congratulations to all the runners!

Team members were:

Dr. Wade Petersen, Kim Jackson, Assoc. Professor Anwar Jardine, Tomas Bruce-Chwatt, Mokhitli Morake, Professor Susan Bourne, Diana Melis, Dr. Monica Clements, Dr. Donald Seanego, Dr. Lebu Taleli, Larnelle Garnie, Fatima-Zahra Ishmail, Simoné Renga, and Dr. Dalielah Jappie.

Celebrating Octogenarian Emeritus Professor Luigi Nassimbeni by Professor Susan Bourne

A symposium was held in October to celebrate E/Prof Luigi Nassimbeni's 80th birthday. Jointly organised by the Supramolecular Chemistry groups at UCT and Stellenbosch, the full-day symposium included talks by 15 of Luigi's former students and/or colleagues from around South Africa, paying tribute to the impact he has had on their careers and lives. A further 40 messages were collated from colleagues around the world. Several common themes emerged, including Luigi's careful mentorship of young scientists which continues to this day, and his ability to see through a "mess of data" to the big questions, as well as Luigi's unerring ability to find an Italian restaurant in any city. The Head of Department, Prof Timothy Egan, presented Luigi with a framed document tracing his "academic pedigree." (pictured right)

Alexios and Giselle Vicatos, both PhD students in the Chemistry Department, baked a crystallographic tribute to Luigi in the form of a "geode cake" with a cascade of coloured sugar crystals. (pictured left).

The day ended with a celebration dinner at naturally – a local Italian restaurant.

Women in Physics Lunch

Physics recently hosted a Women in Physics lunch, where two physicists shared their journeys. Doctoral student **Chilufya Mwewa** (pictured right) described how physics had taken her from a poor background in Zambia to conferences in Cuba and Korea. She spent the last two years working at the Large Hadron Collider at CERN in Geneva. UCT physics lecturer **Dr Trisha Salagaram** described how the kindness of her supervisor had encouraged her in her career as a solid state physicist. Both speakers admitted that they had not started out wanting to study physics.

At the event, about twenty undergraduates, postgraduates and staff enjoyed the opportunity to connect over a delicious lunch. Globally, women are underrepresented in physics, comprising about 20 % of physicists worldwide, thus Women in Physics in South Africa is an organisation which strives to encourage women to study and work in physics.

NEW IN THE FACULTY

Reimagining Physics Honours at the d-school

By Trisha Salagaram

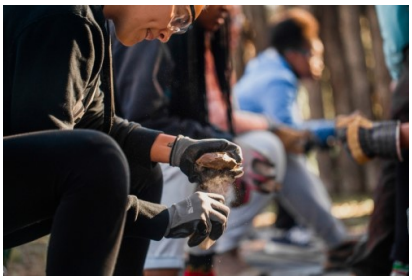
Academics and postgraduate students from the Department of Physics met recently at the Hasso Platner School of Design Thinking (d-school) at UCT to kickstart the review process of the current Physics Honours programme. Devising a modern programme that reflects the research identity of the Physics Department is no small undertaking considering the diversity of views on the purpose of Honours, how tightly the curriculum should be set down and how much flexibility should be given to students in module selection according to their interest in theory, computation and experiment. The shifting landscape in student funding and the need to reassess how we assess students also emerged as key issues.

The d-school, with its Google-esque workspace and stunning views of Table Mountain and Table Bay Harbour, provided an idyllic environment in which creative thought could be catalysed. With buckets of Lego, bags of random bits and bobs, an endless supply of luminous sticky notes and lots of sweets, the d-school coaches challenged the physicists to think laterally (also known as "mindwashing" in the design thinking world) and construct models (a favourite pastime of physicists that goes hand-in-hand with lateral thinking). A key question was "How might the Physics Honours programme be designed in a world where students could experience Physics as a coherent whole?"

After a full day of mindwashing and model building at the d-school, and the consumption of two urns of coffee (a first for the d-school), the physicists started to reach consensus on what to keep and what to change in our

Honours programme. While there is much to be done before the final product is ready for 2021, the d-school intervention helped the Physics Department chart a path towards a programme that will meet the broad needs of prospective Physics Honours students, while also reflecting the identity of the Physics Department and UCT more broadly.

Science code tackles discrimination, harassment

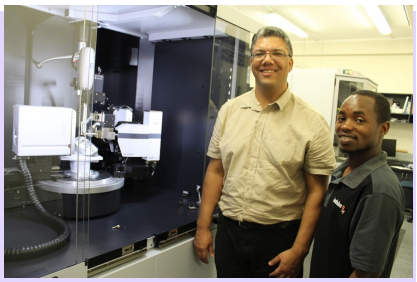


The Faculty of Science's new code of conduct promotes safety and well-being among staff and students, by tackling discrimination and harassment in classrooms, laboratories, during field camps and in other settings. The newly minted code is aligned to UCT's policy on discrimination and harassment, and linked to the university's Office for Inclusivity and Change's online reporting tool. It also includes broader links to UCT's transformation plans and policies. The development comes in the wake of growing rates of gender-based violence, and issues of equity and transformation at national and university levels.

Part behaviour guide, part action guide, the code of conduct was drawn up by **Professor Rebecca Ackermann**, the faculty's new deputy dean for transformation, a post created by **Dean Professor Maano Ramutsindela** after he took office. Transformation, he said, is more than equity appointments; it needs clear policy guidelines on how the faculty conducts itself.

The code includes an agreement on behaviour and attitudes for all members of the faculty – staff, students and visitors alike. It takes two forms: There is a general code for all situations, as well as templates for more specific laboratory/research groups, and field contexts.

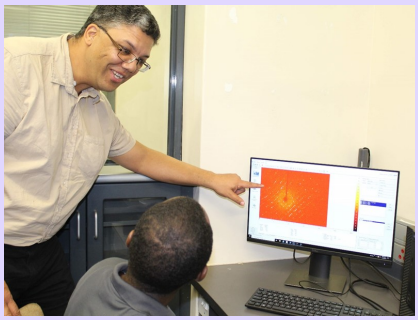
New X-ray diffraction equipment for the Centre for Supramolecular Chemistry Research of the Department of Chemistry



The Centre for Supramolecular Chemistry Research (CSCR) within the Department of Chemistry recently acquired a state-of-the-art single crystal X-ray diffractometer to the value of more than R10 million rand. According to **Dr Oliver**, who is one of the principal investigators within the CSCR, "X-ray diffraction allows us to determine the accurate and precise positions of atoms within solid-state materials. Structure is directly related to function, which is a fundamental scientific principle spanning all sciences, from the physical to the biological sciences. In the CSCR we apply this to supramolecular materials, in other words materials where the spatial relationship of molecules or ions is under investigation.

Dr Clive Oliver with PhD candidate Adrien Ndamyabera at the doors of the state-of-the-art dual wavelength single crystal X-ray diffractometer. Note: the X-rays are off!

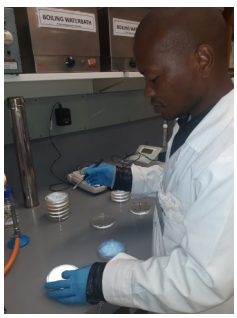
The CSCR projects include supramolecular materials involved in energy- and environmentally relevant applications such as hydrogen storage, carbon dioxide capture and the sensing of harmful, volatile vapours, those materials which aim to improve the properties of active pharmaceutical ingredients and those which are able to separate structurally closely-related molecules which are of industrial relevance." He excitedly adds, "Our new equipment is several generations ahead of our older equipment in terms of X-ray brilliance and detector sensitivity with the dual wavelength capability allowing additional versatility in the samples that we can study. Unfortunately, the bottle neck of single crystal X-ray diffraction studies is still the growth of good-quality crystals which produce suitable diffraction. However, these advances not only allow our previous data collection times of several hours to be reduced to minutes, but a large percentage of our previous weakly-diffracting crystals, which may have required synchrotron access, can now be studied in-house." Interestingly, and coincidentally, the CSCR bought the 1000th X-ray source from the world-leading producers of this equipment (Bruker and Incoatec) and this will be celebrated with a manufacturer-sponsored 1-day symposium in January 2020 at UCT.



Dr Clive Oliver showing PhD candidate Adrien Ndamyabera the image of an X-ray diffraction pattern (white spots on orange background) which is unique to the internal structure of the crystal under investigation.

Laboratory Courses

The Department of Molecular and Cell Biology hosted Laboratory Assistant Courses for Beginners and Advanced staff at UCT in 2019. The workshops were facilitated by MiChem Dynamics that ensured staff receive a training course on International standards recognised in industry and laboratories worldwide. In 2018, we applied for Staff Development funding for upskilling and developing laboratory skills of staff at UCT.



The courses were structured to allow entry level attendees, staff from Campus Cleaning Staff from various departments as well as Departmental Assistants across campuses to partake and upskill themselves. The training went well and feedback from staff was very positive. We hope to run more training courses in the future to continue to develop and train staff.

SEAmester 4 years on and thriving on the oceans… by Professor Isabelle Ansorge

DST's Global Change Grand Challenge programme calls for platforms that will *"attract young researchers and retain them by exciting their interest in aspects of global change, while developing their capacity and professional skills in the relevant fields of investigation"*. To meet these challenges in marine science *SEAmester– South Africa's Floating University* and a UCT Oceanography initiative was started by **Professor Isabelle Ansorge** in July 2016. Now into its 4th year and with 176 students from 23 universities all over South Africa having participated in these cruises, we take a look at how successful this programme has been and what has become of some of the students.

The need for a Floating University

"In the past access onto the SA Agulhas II was only through the SA National Antarctic Programme (SANAP). So traditionally, this meant that Universities such as UCT, SUN, Wits, Pretoria could go to sea on this vessel through their various Antarctic and Southern Ocean research projects. But South Africa is bigger than these handful of Universities – and the problem has always been how do students at the Universities of Venda, Limpopo, Walter Sisulu, Free State and many more get onboard?" asks Isabelle "The SA Agulhas II is South Africa's pride and joy polar research vessel and a National Facility and therefore must be open to all students and researchers wishing to get involved and experience a research cruise. SEAmester is about breaking these boundaries and allowing everyone access to the ship. So SEAmester is a fair and open process that anyone studying an Earth systems related subject from any University across South Africa can apply to. It allows both students and researchers to get involved, gain hands-on training and establish new collaborations". The strength of SEAmester is that postgraduate students from all over South Africa combine theoretical classroom learning with the application of this knowledge through ship-based hands-on research. The course outline is intense throughout the cruise and would not have been possible without the dedication and commitment of the 25 lecturers from UKZN, NMU, UCT, UP, Wits, CPUT, RU, UJ, Bayworld Museum, SANSA, SAIAB, SAEON, DEA, Varsity College and many more. "The state-of-the-art SA Agulhas II provides an ideal teaching and research platform for this programme, its size, comfort and shipboard facilities including two auditoriums allow large groups of students and lecturers to productively interact over a period of 10 days" says Isabelle.

What do the students say?

Mr Gerhard de Jager a SEAmester student in parasitology from UFS in 2017, became a SEAmester lecturer in 2018 and will now be participating on the end of the year cruise to Antarctica as a researcher to collect parasites across the Southern Ocean. He says… *"SEAmester opened incredible doors for me to study how parasite communities respond to differing ocean regions – from the sub-tropics off South Africa to the harsh Antarctic continent. If it had not been for SEAmester and meeting so many scientists none of this exciting and novel research would have been possible"*

Miss Gracious Ncube from UFH who joined SEAmester in 2019 is now studying at the Ocean University in Qingdao in China, her travels to China were funded through SEAmester; while **Miss Sizewaki Yapi** a SEAmester 2017 student from UKZN is now a recipient of the VCs Womxn in Science grant under the leadership of Dr Katye Altieri at UCT. Other students have gone onto international cruises including **Miss Rudzani Silima** an MSc student at NMU who will be participating in the Antarctic city youth cruise to the Antarctic Peninsula in February 2020. **Miss Thobile Dlamini** a SEAmester 2018 student studying for an MSc in Nature Conservation at TUT, spent 2019 working with a number of research groups at UP, TUT and UCT and also joined the 2019 Marion Island expedition as an oceanographer. **Mr Sean Evans** a joint UP/UCT MSc student who joined SEAmester in 2017 is now living on Marion Island as a sealer collecting seal foraging data for his MSc in Oceanography. A Btech student at CPUT in 2017, **Miss Jordan van Stavel** is working at SAEON and heads up the science arm of the SEAmester cruises. During SEAmester 2019, Jordan was in charge of all science planning as co-chief scientist.

Research Bytes

The highest energy light from a gamma-ray burst detected

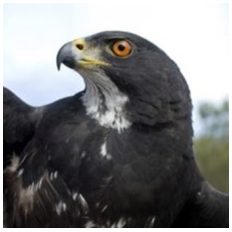
Professor Patrick Woudt and MSc student **Reikantseone Diretse**, (pictured left), from the Department of Astronomy are part of an international team of more than 300 researchers that has gained further insight into the physical processes at work during gamma-ray bursts (GRB). The team accomplished this through the observation of a GRB with an afterglow featuring the highest energy photons ever detected in these events: photons a trillion times more energetic than visible light. GRBs are the most luminous explosions in the cosmos. These explosive events last several seconds and during that time they emit the same amount of gamma-rays as all the stars in the universe combined. Such extreme amounts of energy can only be released during catastrophic events like the death of a massive star, or the merging of two compact stars, and are accompanied by an afterglow of light over a broad range of wavelengths (or equivalently energies), that fades with time.

On 14 January 2019 researchers detected GRB 190114C. It is unique in that researchers were able to observe for the first time in its afterglow emission photons with teraelectronvolt (TeV) energies, using the Major Atmospheric Gamma Imaging Cherenkov (MAGIC) telescope in the Canary Islands. This emission of TeV photons was 100 times more intense than the brightest known steady source at TeV energies, the Crab Nebula. As expected, the very high energy emission faded quickly – in about half an hour after the event onset – while the afterglow emission in other parts of the spectrum persisted for much longer. The discovery triggered an extensive campaign of observations across the electromagnetic spectrum, mobilising more than 20 observatories and instruments around the world. This collaborative effort allowed researchers to gather the most information ever collected about a GRB, capturing the evolution of the GRB afterglow emission across 17 orders of magnitude in energy. Woudt and Diretse were part of a team responsible for tracking the emission of radio waves in the afterglow of GRB 190114C. The team used the new MeerKAT radio telescope in South Africa to record the emission. While gamma rays are very high energy photons, radio waves are found at the other energy end of the electromagnetic spectrum. “The rapid response of the MeerKAT telescope to observe this extreme stellar explosion, combined with its excellent sensitivity, has allowed us to detect the radio afterglow within 24 hours of the explosion,” Woudt explained. Diretse continues to monitor the radio afterglow of this event using MeerKAT. “The recording of TeV energies for GRB190114C and its continued monitoring with radio telescopes such as MeerKAT helps us to untangle the high energy astrophysics of these exciting transient events. Being part of such a discovery was ecstatic and highly motivating,” he said.

His study is supported by a postgraduate scholarship from the Inter-University Institute for Data Intensive Astronomy (IDIA), a partnership between UCT, the University of the Western Cape and the University of Pretoria. The research cloud computing infrastructure of IDIA has contributed towards the fast analysis of the MeerKAT observations of GRB190114C.

“This amazing scientific achievement underscores the importance of the ability of South African researchers to rapidly analyse large MeerKAT data sets with the data-intensive research cloud developed at IDIA,” said **Professor Russ Taylor**, director of IDIA.

A predation risk experiment: What makes prey an easy snack for predators?



By **Carina Nebel**, FitzPatrick Institute of African Ornithology

Predation is a strong evolutionary force that will shape the behaviour of both prey and predators. In nature, predation risk varies depending on the environment, in a spatial and also temporal context, and prey will avoid whereas a predator will exploit areas or times of the day when prey is especially easy to catch. An additional component determining predation risk or foraging success is added when the predatory species is colour polymorphic: Differently coloured predators can be easier or harder to spot depending on environmental conditions. For example, white Barn Owls, have a higher foraging success in moon-lit nights and dark Red-tailed Hawks are more difficult to see when they are perched in more densely vegetated areas.

The Black Sparrowhawk, *Accipiter melanoleucus*, is a colour polymorphic *Accipiter* hawk and occurs in two colour morphs: a dark and a light one. Previous research has shown that dark morphs forage more and deliver more prey items when there is dark or overcast weather whereas light morphs forage independently of ambient light but deliver more when it is bright. These observations lead us to the hypothesis that foraging success must be linked to different light levels, with dark morphs having a higher foraging success under low-light and light morphs under bright conditions.

An experiment should help question this hypothesis: A pulley experiment was set up that allowed us to control ambient light and background conditions. A taxidermy mounted Black Sparrowhawk was "flown" at a feeding Feral Pigeon and its response to this predatory attack was recorded by a high-speed camera. For our hypothesis to be accepted, we would predict that Feral Pigeons would react slowest to a dark morph under low light levels and to a light morph under bright light levels. Slower reaction times would result in higher predation rates in nature, the pigeon would thus be an easy snack.

Pigeons react depending on light levels. Our results show a clear pattern: Feral Pigeons react slowest under low light levels, but independently of the morph of the hawk. They did not react slower to a dark morph than to a light morph under low light conditions; thus, the main hypothesis of our experiment had to be rejected.

What do the results mean for the Black Sparrowhawk system? To summarise our previous and new findings, dark morph Black Sparrowhawks bring more food to the nest during low light conditions, however, they also hunt more during this time. This higher foraging effort might be the reason for more food being delivered to the nest. Contrary, light morphs deliver more food when it is bright and sunny, but they do not forage more. We would expect a foraging success here, but this our experiment failed to find.

Extinct plant rediscovered after 200 years

Psoralea cataracta was discovered by Brian du Preez.

One of the first recorded species to have been lost to forestry and agriculture in the Western Cape in the 1800s, a type of fountain bush from the pea family that used to grow next to mountain streams in the Tulbagh region, has been rediscovered. *Psoralea cataracta* was discovered by **Brian du Preez**, a PhD student in the Department of Biological Sciences at UCT, when he accidentally stumbled upon a population on a narrow track close to a river on a farm near Tulbagh.

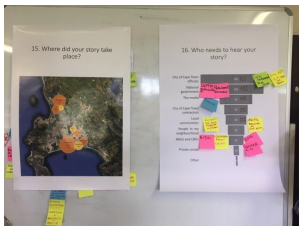
Until now, *P. cataracta* was only known from a single specimen collected from "Tulbagh waterfall" in 1804, and in 2008, after many fruitless searches, it was officially declared extinct on the Red Data List of South African Plants. Thus far, the 26-year-old student is building up quite a reputation for finding long-lost species. As a BSc Honours student in botany at Stellenbosch University (SU) in 2016, he rediscovered two presumed extinct species in the pea family, *Polhillia ignota* and *Aspalathus cordicarpa*, last seen in 1928 and the 1950s respectively, and subsequently completed an MSc on *Polhillia* in 2017, also at SU.

This year, he collected a new species of *Aspalathus* growing on sand dunes on the banks of the Riet River in the Swartruggens Mountains north of Ceres.

He is now in a rush to get the species described, as this part of the Riet River is earmarked for orchard expansion. "We can only conserve what we have described. Only a species that has been formally described can receive a Red Data List status, which by law then protects it from development, depending on its conservation status," he warns. For this reason, Brian has decided to tackle a revision of the genus *Indigofera* in the Greater Cape Floristic Region (GCFR) for his PhD. This diverse genus comprises over 100 species in the region, with at least 30 new species to be formally described.

Community stories give voice to water issues in Cape Town's low-income areas

by Assoc Prof Gina Ziervogel



Water and sanitation issues continue to frustrate residents of the Cape Flats, with people reporting that they struggle to get help from local government. This is what a new collaborative study by the University of Cape Town, Stellenbosch University, the Environmental Monitoring Group, and the Western Cape Water Caucus – a community organisation working in Cape Town's informal settlements and townships – has found.

The Community Resilience in Cape Town (CoReCT) project, as the collaboration is known, collected stories and hard data from 314 people living in Mitchells Plain, Du Noon, Makhaza, Joe Slovo, Green Park and other low-income areas. The project used a data collection tool called SenseMaker. Through this tool one can view the broad patterns in the dataset – for example, how experiences differ by location, age, gender and the kinds of services that people have in their homes – and also zoom in to the stories behind each datapoint to get a more nuanced understanding of the problems being described.

"The SenseMaker methodology is powerful because of its ability to capture the stories of people as well as the numbers behind the stories, giving both depth and breadth to the lived reality of dealing with water in Cape Town," said **Gina Ziervogel**, Associate Professor at the University of Cape Town, and the project's principal investigator. Central to the approach was the co-design of the data collection tool, facilitated by the researchers, but actively shaped by the Western Cape Water Caucus members. As part of this, a four-day workshop allowed space to decide what questions to ask and how to ask them. Over the following 3 months, twelve members of the Western Cape Water Caucus were appointed as story collectors, and interviewed people from their own communities.

"This process balanced the academic and community expertise needed to gain insight into matters related to water in low-income settlements," said Ziervogel. The analysis found that more than half the respondents admitted that in order to solve water-related problems they either had to bypass the law, or work through unofficial channels. Nonetheless, the majority of people still believed that their water situation would be improved if local government took more responsibility. Those who tried to report their problems to local government either didn't know who to call, couldn't reach the right person, or got no help even when following the correct procedures. As a result, only 14 percent of respondents had their problems resolved.

"The project's findings and processes offer considerable value to local government and can directly inform the new Cape Town Water Strategy", Ziervogel said.

Travels across the Globe

Communicating Science to make it more accessible

Sameshan Perumal, (2nd from right in photo) a Masters student in the Science Faculty, recently returned from presenting his research in Switzerland at CERN Open Days with the assistance of SA-CERN and his supervisor, **Tom Dietel**.

Sameshan is researching the visual representation of complex data in high energy particle physics, with the assistance of his co-supervisor **Michelle Kuttel**. He started the project with the aim of helping scientists visualise data from the Transition Radiation Detector (TRD) – one of the detectors in ALICE. Once he started working on this project, he realised that his work could be valuable to people who are not in that field and produced a web-based interface which is accessible to anyone. His software shows cutaway views of the detector, and interprets experimental data to display the tracks followed by particles as they travel through it.

CERN Open Days take place every 5 to 6 years when the Large Hadron Collider (LHC) at CERN is shut down for upgrades and repairs. This year, over 80,000 people visited the eight sites over two days. Sameshan enjoyed the opportunity to chat with people from around the world about Science, CERN and UCT – for which he was a true ambassador. It was also a rare opportunity to guide visitors through part of the LHC ring to see the ALICE detector and equipment.

For Sameshan, an important takeaway from his experience, was that his display helps translate complex ideas into something that the general public can understand. Previously, past event displays were focused on communicating only with scientists, whereas now there is capacity for outreach and taking these concepts to schools. The highlight for Sameshan was being at a world class institution where he felt proud and confident to be able to say that at UCT we are doing good work. This unusual event aligned perfectly with his research and he thoroughly enjoyed the opportunity to participate in the CERN Open Day and hopes to continue working with CERN and ALICE

Uganda birding extravaganza

by Dr Rob Little

Dr Rob Little from the FitzPatrick Institute at UCT travelled to Uganda for a birding extravaganza and was amazed at the number of unique birds added to his life list…

Although I have birded in five West African and three East African countries, having never been to Uganda, our 10-day Escape to the Wild birding tour was an overdose of lifers. The Mabamba Swamp west of Entebbe on the north shore of Lake Victoria is an extensive marshland of papyrus, water lilies and other wetland grasses, which hosts over 300 bird species. The relatively small Nkima Forest on Nansubuga Hill overlooking the Mabamba Wetlands offered good views of Madagascar olive bee-eater, little greenbul, sooty chat, black-and-white vanga flycatcher, blue malkoha, olive-bellied sunbird and exciting African lifers for me that included red-shouldered cuckooshrike and the elusive white-spotted flufftail.

We then headed to Queen Elizabeth National Park (QENP), which boasts over 500 bird species. We also visited the Kalinzu Forest, home to more than 414 tree species as well as chimpanzees and other primates. The forest proved to be the bumper birding day of our trip. I recorded no less than 16 African lifers, which included black bee-eater, yellow-throated tinkerbird, yellow-spotted barbet, joyful and toro olive greenbuls, Lühder's bushshrike, Fraser's forest and also dusky crested flycatchers. With a Southern Africa life list of 864 species and having visited 16 countries in Africa, I was impressed to add 273 bird species to my list and to garner 57 new lifers for Africa during our trip to Uganda.

Journeys of SCALE (Southen oCean seAsonaL Experiment)

An MSc and Honours student from the Department of Oceanography share their experiences of going on the Southern oCean seasonal Experiment research expedition:
Sejal Pramlall:

UCT oceanography students Sejal Pramlall (right) and Riesna Audh (left) extracting an ice core.

My first step on the Antarctic sea ice felt like landing on the moon. The four-person basket acted as the slow rocket that hoisted me from the comfort of the SA Agulhas II, and into the world of the Antarctic sea ice. I stepped onto the ice, and noticed an immense silence; the only sound being the crunch of the snow under the weight of my oversized pumpkin boots. The warm polar attire bore close resemblance to a space suit, both limiting mobility but nevertheless being highly necessary. The seemingly limitless expanse of the ice attested to the fact that I had now entered an environment that was untouched and uninhabited by man. Other human life is thousands of kilometers away, with the nearest life forms being wild and pristine. I took a breath; the air was crisp and clean. In that instant, I was cognisant of the fact that my past aspirations as an oceanographer were materializing at that very moment. My journey of the SCALE Spring Cruise 2019 had finally begun.

I was recruited to the SCALE research expedition as a member of the Sea Ice team, which is made up of a combination of UCT oceanographers and engineers under supervision of **A/Profs Marcello Vichi** and Sebastian Skatulla. Our goal was to perform ice-coring operations, and to collect snow and water samples from the various Marginal Ice Zone (MIZ) stations. Each station began with the implementation of thorough safety procedures to ensure the ice could bear the weight of the team. The collection of samples was conducted efficiently and in accordance with sound scientific procedures. We treated each station as an opportunity to improve, surpassing the previous days achievements at each chance we had to get onto the ice. When not on the ice, I would be in the bridge conducting ice observations, which consisted of a thorough observation of sea ice conditions every 10 minutes, rolling over every 24 hours. This provided valuable information, which could be incorporated into the validation of satellite data. These in situ observations are a fundamental contribution to sea ice information.

Not only did I accumulate invaluable skills in the realm of sea ice data collection, but I was also exposed to numerous scientific fields during my voyage. I was fortunate enough to witness the tagging of two Ross seals, which is an exceptionally rare sighting. Down in the environmental hanger where the UCT biogeochemists dwelled, the CTD's (Conductivity, Temperature Depth) and Bongo nets were deployed. The CTD uncovered data from the various ocean depths, which are used to discern the different water masses that make up our inhomogeneous ocean, along with the inherent chemical and biological signals within them. Through the microscope the contents of the Bongo nets were revealed – colourful krill and alien-like critters were the catch of the day, proving that an area that appeared barren to the untrained human eye was bursting with life and productivity.

Oceanography honours students, Wayne de Jager (left) and Sejal Pramlall (right) enjoying the Antarctic snow during their first SCALE expedition

SCALE has proven to be the umbrella under which numerous disciplines can thrive, as shown by the extensive cooperation between research fields. Witnessing the different teams work together with the common goal of furthering our understanding of the Southern Ocean was truly inspiring. The success of the SCALE cruise confirms my belief that a multidisciplinary approach is the key to progress. This is how all science should be approached, by exuding benevolent support and inclusivity for researchers from various backgrounds. I am grateful to have been involved in such an expedition, where I was part of a team that became family, I've learnt lessons that could only be taught by experience, and made memories that will last a lifetime. This experience reminds me of an African proverb I have heard that goes: 'If you want to go fast, go alone; if you want to go far, go together.'

Jonathan Rogerson: **The real SCALE cruise experience**

The field of pancakes (Taken by Felix Paul)

Nervous glances and suppressed exhilaration stirred as 92 unlikely musicians took to their places on the odd stage that was the SA Agulhas II. Without a dress rehearsal, the curtains lifted in early October and we began our voyage down to the Antarctic. Inherently, an Antarctic vessel is no place for an orchestra, yet it was the perfect platform for what would be a rousing performance.

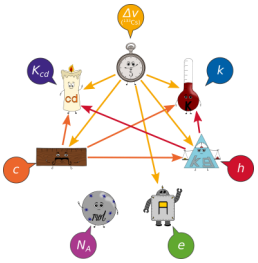
The iambic pentameter of the expedition was the science itself, to which the musicians were well versed in their pieces. The allure of the ice was multi-faceted for all as it held information relevant to the pressing and turbulent times of the 21st century as well as being an alien-like landscape that presented a virgin experience of adventure. Following in the wake of Shackelton and the Endurance as well as the undertakings of Scott and Amendson, the ice-covered wasteland beckoned its dangerous presence with strong storms and towering waves that left most of us pale and off-key. Like an impatient audience, the scraping and grouching of ice against the hull of the ship made for an unpleasant and constant murmur during our recital. As the musicians played their various pieces, the loud percussion of the ice-coring melded with the soft and careful work of the biogeochemical teams. All the while, the ebbing vocal choirs of quiet observers and raucous crew created the symphony that was the scientific act of the expedition.

As intermission was called, the weary musicians retired away from the labs and computer screens to indulge their tired brains with frivolous activities. For some, the warm and quiet embrace of a soft bed was sufficient; while for others, the playful and mindless banter with fellow performers acted as a welcome distraction from the stress. Inevitably, a few maverick individuals sought solace in the confines of the sauna. A harsh juxtaposition to the surrounding environment, where heat and humidity alleviated the aches and pains of performing with cool bodily sweat that dripped like a facet on the back of one's neck which sent a slight pleasurable tingling through the spine. However, all the musicians enjoyed a stiff drink at the end of a long day which sometimes lead to humorous scenes of gallivanting, slight inebriation and communal drunkard chorus to familiar and homely tunes. Like a stalker, the activities and traditions of land were able to eke their way onto the ship when the victory of the Springboks punctuated the lethargic ship-time with orgasmic explosions of pride and patriotism. Similarly, the celebration of Halloween with intricate and obscure costumes left a sense a homeward yearning.

As the performance came to an end and the curtains closed, one was left elated with the realisation of shared accomplishment. No longer just fellow musicians, it was difficult to look from one face to another and not see a friend; united together in the love of science and knowledge. In the end, a cacophony of major and minor experiences was able to chaotically amalgamate together to create a seamless masterpiece of an adventure

The ice team analyzing a recently extracted ice core, with the SA Agulhas II in the background.

The ice team in transit, via the man basket



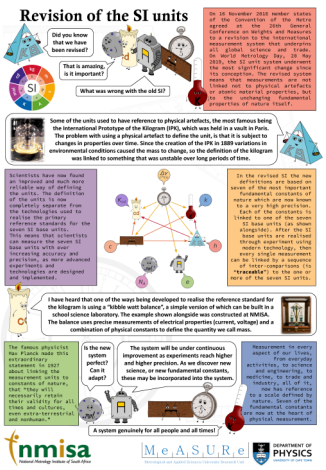
Physics gets creative designing new set of posters to herald revised SI units

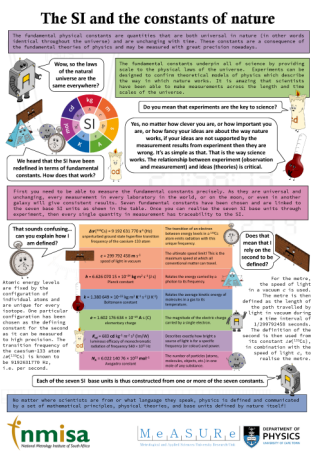
In November 2018 member states of the Convention of the Metre agreed at their General Conference on Weights and Measures to revise the international measurement system that underpins all of science and trade globally. On World Metrology Day, 20 May 2019, the SI unit system underwent the most significant change since its conception. The revised system means that measurements are no longer linked to physical artefacts or atomic material properties, but to the unchanging fundamental properties of nature itself. Some of the SI base units used to have reference to physical artefacts, the most famous being the International Prototype of the Kilogram (IPK). The problem with using a physical artefact to define the unit is that it is subject to changes in properties over time. Since the creation of the IPK in 1889 variations in environmental conditions caused the mass to change, so the definition of the kilogram was linked to something that was unstable over long periods of time.

Scientists have now found an improved and much more reliable way of defining the seven SI base units: the second, the metre, the kilogram, the ampere, the kelvin, the candela and the mole. The definition of the units is now separate from the technologies used to realise the primary reference standards for the seven SI base units. This means that scientists can measure the seven SI base units with ever increasing accuracy and precision, as more advanced experiments and technologies are designed and implemented. In the revised SI the new definitions are based on seven of the most important fundamental constants of nature which are now known to a very high precision. Each of the constants is linked to one of the seven SI base units. After the SI base units are realised through experiment using modern technology, then every single measurement can be linked by a sequence of inter-comparisons (is “traceable”) to the one or more of the seven SI units.

The Metrological and Applied Sciences University Research Unit (MeASURe) within the Department of Physics had its first birthday this year, and as part of the celebrations a set of posters were designed to herald the revised SI units and explain the fundamentals of modern measurement. The Director of MeASURe, **Professor Andy Buffler**, explains that “the 4 posters were designed to reach a wide audience and it is our goal for them to be distributed to all high schools in South Africa, and then beyond.” The posters were finalised in collaboration with the National Metrology Institute of South Africa and may be downloaded and distributed freely from here: http://www.measure.uct.ac.za/msr/education

Andy Buffler explains, “Measurement in every aspect of our lives, from everyday activities, to science and engineering, to medicine, to trade and industry, all of it, now has reference to a scale defined by nature. Seven of the fundamental constants are now at the heart of physical measurement. The physicist Max Planck made this extraordinary statement in 1927 about linking the measurement units to constants of nature, that they will necessarily retain their validity for all times and cultures, even extra-terrestrial and nonhuman.”





OUTREACH IN THE FACULTY

Mathematics Teacher's Workshop: Taking the sting out of Numbers

The Science Faculty Marketing Committee hosted a workshop for Mathematics teachers across the Cape Flats and invited lecturers from the Department of Mathematics & Applied Mathematics and the Department of Statistical Sciences to give a window glimpse into Mathematics and Statistical Sciences research and education at UCT. The workshop received an overwhelming response of 70 teachers from a wide range of schools, who enjoyed the opportunity.

Presenters provided stimulating food for thought with topics such as "A very short introduction to public key cryptography: How to send me a secret message if you've never met me before"; The Art of Gallery theorem"; "How statistics helps answering pressing ecological questions" and "Scientific Superpowers: Mathematical modelling and simulation to the rescue".

UCT and CodeSpace expose high school learners to the world of coding

High school learners were given a chance to tackle coding and robotics during the winter school holiday in a one-week intensive programme run jointly by the UCT's School of Information Technology and CodeSpace, a software training institute in Cape Town. The six-day #RoboCampCT was a resounding success with 65 Grade 10-12 learners building a strong foundation to further their technology skills and being prepared for more advanced coding courses, including web development and robotics.

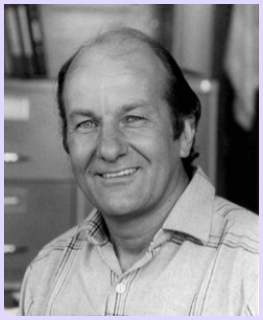
"As the School of IT, we see this as a fantastic opportunity to get more learners exposed to coding. A key challenge for many schools remains the missing infrastructure to create coding classes and make it part of the core curriculum. Availing our labs during the university holidays is a good use of the facilities but even more so, it allows students to come to campus and get inspired about what is possible!" said Professor Ulrike Rivett, Director of the School of IT.

A key aim of #RoboCampCT was to provide an environment in which learners had the time and space to think about why they might want to learn to code. They also learned how to use 'Design Thinking' – a methodology used to tackle complex problems – to create solutions to real-world issues. The learners came from the Western Cape and beyond, with organisations such as the Allan Gray Orbis Foundation enrolling a group of learners. The camp focused on enabling students to learn the basics of the new language of technology. Learners can begin to code in any programming language. Once they understand programming principles and how to do the basics, they can transfer that to the specific use of programming robotics. This is a crucial skill for future professionals as it allows them to use technology to enhance whatever job they are doing.

Several tech professionals from various fields joined the camp to share how they use technology and coding in their careers, from 3D printing and graphic design to medicine and finance. "It was a really fun and engaging experience. You'll learn valuable skills you didn't know existed, and it will provide you with good insight into the careers you can pursue in the realm of technology," said Luqmaan Ryklief, one of the learners participating in the project

Learners at #RoboCampUCT watch one of their robots "come to life" and move around the laboratory.

In Memoriam



Emeritus Professor John Gurney passed away in October 2019. He was associated with UCT for over 60 years, starting as a student in Chemistry in 1959, and working his way up to being an NRF A-rated researcher and Professor (first in the Dept. of Geochemistry, then in the Dept. of Geological Sciences after the amalgamation of the Mineralogy & Geology and Geochemistry departments in 1990) at his retirement in the early 2000s. John supervised 20 BSc (Honours), 17 MSc and 16 PhD students at UCT, many of whom went on to become important figures in research and the mineral exploration industry.

He was one of the best known and most highly respected researchers in the field of the petrology and geochemistry of the Earth's mantle, as well as diamond geology, in the world. He was one major reason why Geological Sciences at UCT enjoys a reputation for excellence, particularly in geochemistry. He organised the first International Kimberlite Conference at UCT in 1973 (which oddly enough came about partly because John was also working on analysing lunar samples from the Apollo moon landings with Prof Louis Ahrens), and this conference has continued to be held every 4 or 5 years, most recently being held in Gaborone in 2017 (and will be held in 2021 in Yellowknife, NWT, Canada), where leaders in academic research in mantle petrology and diamond geology, and industry leaders in diamond exploration and mining, get together to share research results and insights.

Perhaps less well known to the UCT community is that he was highly successful in business and industry, as the founder of the Mineral Services Group of companies and, particularly, he played an instrumental role in the discovery of diamonds in Canada. John was also a very generous and progressive person who was supportive of people from disadvantaged groups in both his academic and commercial endeavours, and he hired and trained many in his business ventures, and helped a number to set up independent business ventures of their own.

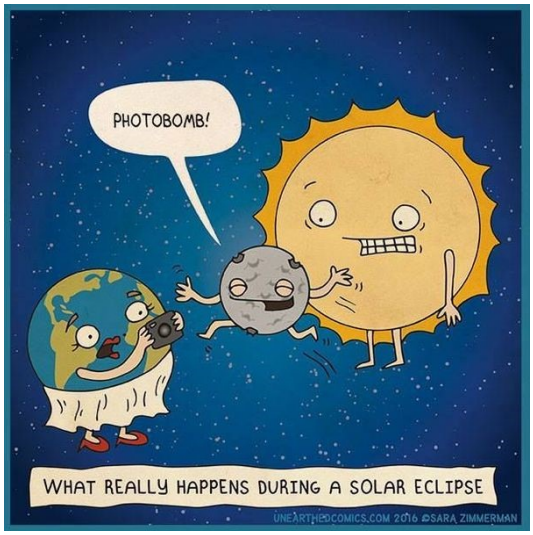
Dr Alissa Myrick was an infectious disease molecular biologist and Chief Investigator at UCT's Drug Discovery and Development Centre (H3D). She had over a decade of experience studying the molecular mechanisms of drug resistance in both malaria and tuberculosis, with a particular interest in the basic biology of efflux pumps and defining their role in modulating resistance. She joined H3D from Harvard University (USA) in January 2016 and used her wealth of biological expertise to establish and grow TB biology drug discovery efforts at H3D.

Most unfortunately, Dr Myrick was diagnosed with cancer in April 2019, received successful treatment thereafter, but very unexpectedly and suddenly died in November 2019 from resulting complications.

Mr Zamikaya Jikumlambo (58), a laboratory assistant in the Department of Biological Sciences passed away very suddenly during August 2019. Zama started working at the University of Cape Town in 1996 as a departmental assistant in the Department of Botany. In 2012 he was appointed as a laboratory assistant in the Department of Zoology, now known as the Department of Biological Sciences.

Colleagues describe him as a kind-hearted, gentle, humble and loyal person who carried out his duties with diligence and much dedication to the department, and who often inconvenienced himself to accommodate others. He was loved and respected by his colleagues and students alike, especially the postgraduates who he willingly assisted even at very short notice.

LAST LAUGH….


PHOTOBOMB!
WHAT REALLY HAPPENS DURING A SOLAR ECLIPSE
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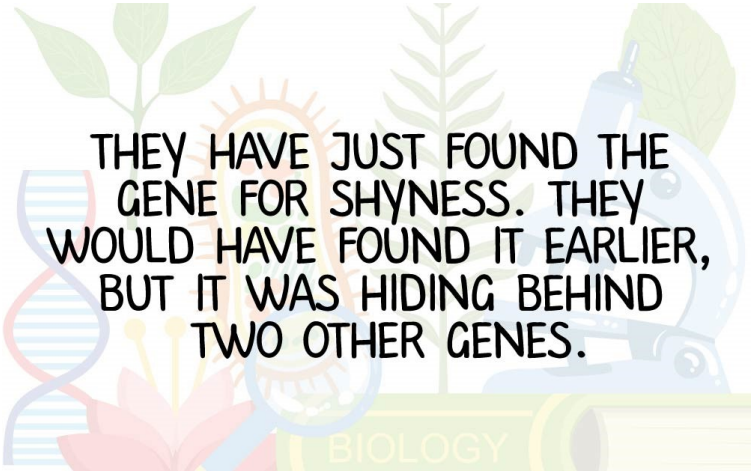
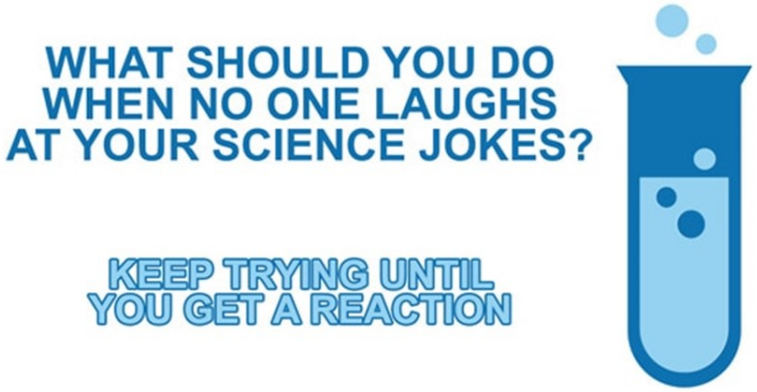

THEY HAVE JUST FOUND THE GENE FOR SHYNESS. THEY WOULD HAVE FOUND IT EARLIER, BUT IT WAS HIDING BEHIND TWO OTHER GENES.
BIOLOGY


WHAT SHOULD YOU DO WHEN NO ONE LAUGHS AT YOUR SCIENCE JOKES?
KEEP TRYING UNTIL YOU GET A REACTION