FEBRUARY 2018

SCIENCE @UJ

NEWSLETTER OF THE FACULTY OF SCIENCE

UNIVERSITY OF JOHANNESBURG

LEADING SCIENTISTS, INNOVATIVE TECHNOLOGISTS

UNIVERSITY OF JOHANNESBURG

A MESSAGE FROM THE EXECUTIVE DEAN

The Faculty had a great start to 2018 with the research of Professor Kramers' group putting UJ squarely in the international spotlight. So much so, that news feed reporting on the Hypatia stone research done here, was viewed by an estimated 350 million people. A short feature on this research and Prof Kramers' group is provided very early on in this maiden newsletter of our new Faculty Marketer, Mrs Ofentse Olunloyo. We look forward to what she will report on the Faculty in the coming months. Faculty newsletters will from now on build on what is usually provided in the Faculty Board Snippets, with two or more features on researchers whose international recognition is contributing to the improvement of the Institution's stature. Because the gravitational waves research of Professor Razzaque's group also garnered a lot of media attention last year, he is the second person featured in this newsletter. The rest of the content extols our faculty members' ability to obtain recognition in the form of awards and grants, as well as summaries of successful invited or public lectures and seminars given.

Unfortunately, the Faculty will not make its research output target for 2017 (which was a 5% increase on 2016 output) but I am happy to report that we still managed a marginal increase in units, currently standing at 380. For this new year, 2018, we aim to increase the number of academic staff and postgraduate students who contribute to research. We welcomed new undergraduate students during a short orientation program in late January, and I used their starry-eyed amazement at this 'new world' to encourage them to keep the bigger picture of solving problems through scientific intervention, in mind. New and ongoing research projects in the Faculty aim to contribute to sea water desalination methodology, food security and cancer drug leads. It is my hope that these and other research efforts will continue to bring the Institution and the Faculty well deserved national and international recognition. May this year be more productive and enjoyable than the last.

SHANGHAIRANKING'S 2017 GLOBAL RANKING OF ACADEMIC SUBJECTS RECOGNISED UJ RESEARCH IN GEOLOGY AND PHYSICS

On 28 June 2017, the ShanghaiRanking Consultancy released its latest Global Ranking of Academic Subjects. The University of Johannesburg (UJ) was ranked among the top 300 universities globally for Earth Sciences research, and among the top 400 universities globally for Physics research. UJ is one of four South African universities ranked for Earth Sciences and Physics.

56%

DID YOU KNOW?

In 2017, 28 out of the 50 most cited researchers from UJ, were from the Faculty of Science.

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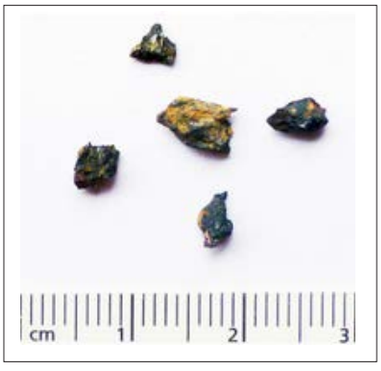
RESEARCH & INNOVATION

HYPATIA - THE EXTRATERRESTRIAL STONE THAT CONTAINS COMPOUNDS NOT FOUND ANYWHERE IN OUR SOLAR SYSTEM

Dr Georgy Belyanin (Left), Prof Jan Kramers (Centre), and Tebogo Makhubela (Right) who works on the homonim dating project of the group.

Prof Jan Kramers and Dr Georgy Belyanin's research on a small extraterrestrial stone from the Libyan Desert Glass strewn field in south-west Egypt, is getting international attention. The analyses on the Hypatia stone, as it is known, showed that the stone is not from our solar system and that its matrix transformed into diamonds smaller than one micrometer.

In 2013, Prof Kramers and his co-authors announced that the Hypatia pebble found in south-west Egypt, was definitely not from Earth. By 2015, other research teams had announced that the stone was not part of any known types of meteorite or comet, based on noble gas and nuclear probe analyses.



The Hypatia Stone

If the pebble was not from Earth, what was its origin and could the minerals in it provide clues on where it came from? Micro-mineral analyses of the pebble by UJ's Prof Kramers and Dr Belyanin have now provided unsettling answers that spiral away from conventional views of the material our solar system was formed from.

Conventional science says that our solar system's planets ultimately formed from a huge, ancient cloud of interstellar dust (the solar nebula) in space. The first part of that process would be much like dust bunnies coagulating in an unswept room. Conventional science also holds that the solar nebula was homogenous, that is, the same kind of dust everywhere. But Hypatia's chemistry challenges this view.

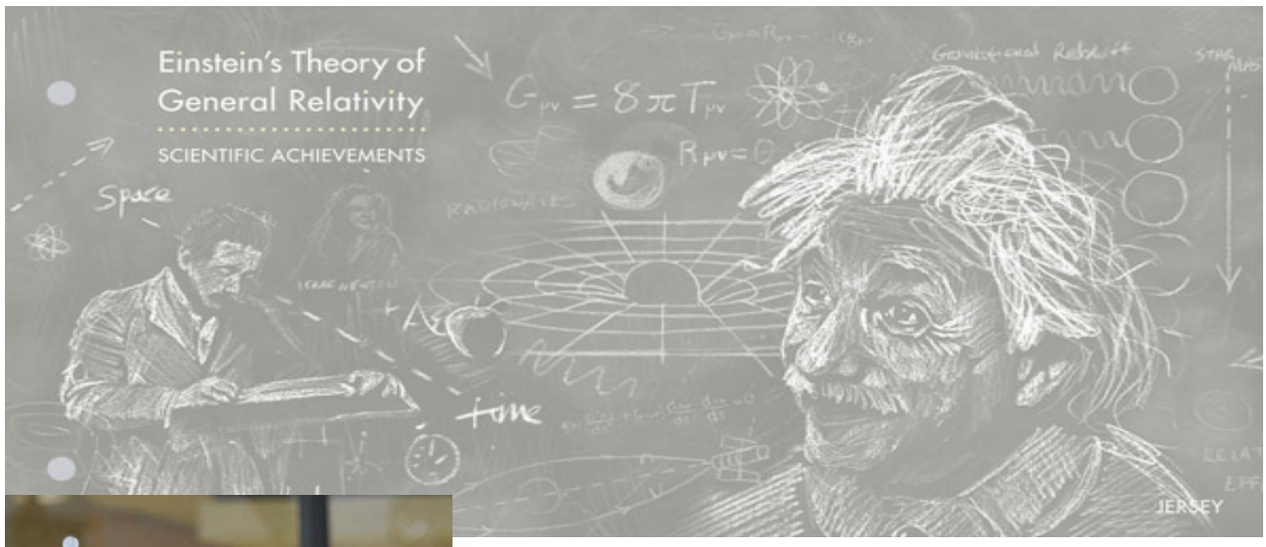
"For starters, there are no silicate minerals in Hypatia's matrix, in contrast to chondritic meteorites (and planets like the Earth, Mars and Venus), where silicates are dominant. Then there are the exotic mineral inclusions. If Hypatia itself is not presolar, both features indicate that the solar nebula wasn't the same kind of dust everywhere – which starts tugging at the generally accepted view of the formation of our solar system", says Prof Kramers.

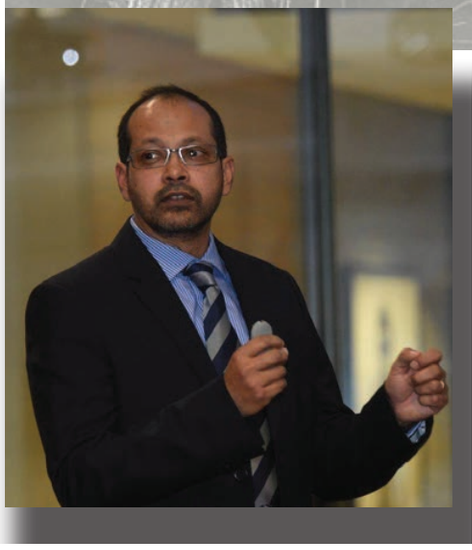
"What we do know is that Hypatia was formed in a cold environment, probably at temperatures below that of liquid nitrogen on Earth (-196 Celsius). In our solar system it would have been way further out than the asteroid belt between Mars and Jupiter, where most meteorites come from. Comets come mainly from the Kuiper Belt, beyond the orbit of Neptune and about 40 times as far away from the sun as we are. Some come from the Oort Cloud, even further out. We know very little about the chemical compositions of space objects. So our next question will dig further into where Hypatia came from," says Prof Kramers.

The little pebble from the Libyan Desert Glass strewn field in south-west Egypt presents a tantalizing piece for an extraterrestrial puzzle that is getting ever more complex.

The media release highlighting this research generated outstanding international and local media coverage. The story generated 284 online news stories and an estimated reach of 357.6 million. Read the media release on https://goo.gl/kZokKg

More good news for Prof Kramers was the NRF A-rating announced in December 2017. This confirms Prof Kramers as a Leading International Researcher in Geology. His work also includes hominin fossil dating, where Mr Tebogo Makhubela (pictured above) assists.





EINSTEIN'S GENERAL RELATIVITY PREDICTION HAS FINALLY BEEN PROVEN

A global scientific project with over 3000 researchers directly observed the collision of neutron stars, for the first time. This ground-breaking event, which took place on 17 August 2017, proves Einstein's general relativity prediction. UJ's Professor Soebur Razzaque contributed theoretical modelling of the expected behavior of gamma rays when neutron stars collide, to the discovery.

"In 1916, Albert Einstein predicted gravitational waves or ripples in space-time, squeezing and squashing of dimensions, due to violent movement of massive objects in the universe. Einstein predicted gravitational waves as part of his General Relativity Theory, in which he sought to predict how the force of gravity works in space and time." says Prof Razzaque

"However, gravitational waves are very faint and their detection is extremely challenging. It was only on September 14, 2015, that the first Gravitational Wave event, known among researchers as GW150914, was finally detected. Two instruments in the USA, called ALIGO, picked up the signals created by the collision of two huge black holes" he adds. "The one black hole was 36 times the mass of the sun, and the other 29 times the mass of the sun. After that, ALIGO detected several more black hole mergers. But a key puzzle piece to understand gravitational waves remained missing: the ability to detect the collision, or merger, of two neutron stars" adds Razzaque.

Prof Razzaque, along with thousands of other scientists working on the challenge, expected that a neutron star merger would produce gravitational waves and electromagnetic radiation, in the form of a burst of gamma rays emitted during the collision. "However, none of the scientific teams detected neutron star collisions, so the puzzle piece remained missing. Everything changed on Thursday 17 August 2017, when the gravitational-wave event GW170817 was observed by the ALIGO detector in the USA and the Virgo detector in Italy." he says. When the data from all the detected events was combined, it became clear that the 17 August events (GW170817 and GRB170817A) took place in the galaxy NGC4993, which is about 130 million light years away from us.

"Finally, the puzzle piece Einstein has been looking for came to light as it were. The combined data also showed that the 17 August gamma ray burst, which only lasted a few seconds, was created by the merging of two neutron stars, which then produced an explosion, called a kilonova" says Prof Razzaque. "Next, the kilonova emitted visible light from the burning of radio-active materials of the stars for several days. In that burning, which was a nuclear reaction taking place in a short period of time, gold and platinum were produced. The process is called rapid nuclear synthesis, the main mechanism to produce gold and platinum in the universe," concludes Prof Razzaque.

Prof Razzaque's Astroparticle Physics Group in the UJ Department of Physics conducts Gamma Ray Burst (GRB) and Gravitational Wave (GW) research. Prof Razzaque is a coordinator of the GRB and GW science group of the Fermi-Large Area Telescope (LAT) Collaboration. **Read the media release on https://goo.gl/UqjjLv**

AWARDS

Prof Nic Beukes (Left), Prof Tshilidzi Marwala, Vice-Chancellor and Principal, University of Johannesburg (Right)

NSTF HONOURED PROF NIC BEUKES WITH A LIFETIME ACHIEVEMENT AWARD

On Thursday, 29 June 2017, Professor Nick Beukes (Geology) received the prestigious Lifetime Achievement Award at the NSTF-South32 Awards. The National Science and Technology Forum (NSTF) stated that "Prof Beukes is a global expert on the origin of iron and manganese deposits and the nature of early earth environments. His work has led to improved exploration, mining and processing of these ores." The NSTF-South32 Awards showcase the excellent contributions made by nominees to the science, engineering, technology (SET) and innovation fields.

Prof.Sabu Thomas (Left), Prof Samuel Oluwafemi (Centre), Dr. Babu Sebastian (Right)

ERUDITE AWARD FOR PROF SAMUEL OLUWAFEMI

The Kerala Higher Education Council and the International and Inter University Centre for Nanoscience and Nanotechnology of the Mahatma Gandhi University in India, presented Prof Samuel Oluwafemi (Applied Chemistry) with the Erudite Visiting Professor Award. The award was presented by Dr Babu Sebastian, Vice Chancellor of Mahatma Gandhi University, in December 2017.

Dr Beric Gilbert (Left), Prof Annemarie Avenant-Oldewage (Centre), Quinton Dos Santos (Right)

PROF ANNEMARIE OLDEWAGE AWARDED THE ELSDON-DEW MEDAL

Professor Annemarie Oldewage (Zoology) and her lab received awards from the Parasitological Society of Southern Africa (PARSA) at the International Congress of Wildlife Parasitology in September 2017. Prof Oldewage received the Elsdon-Dew Medal, which is awarded on merit for contributions to parasitology in Africa.

Quinton Dos Santos (Prof Oldewage's PhD student) received the Angela Davies-Russell Award. Postdoctoral Research Fellow, Dr Beric Gilbert, was a runner up for the WO Neitz medal for a PhD thesis.

South African Women in Science Awards
17 August 2017

science & technology
Department: Science and Technology
REPUBLIC OF SOUTH AFRICA

SOUTH AFRICAN Women in science AWARDS 2017

2030 NDP

POSTGRADUATES AWARDED SOUTH AFRICAN WOMEN IN SCIENCE AWARDS

In August, Ms Valentine Saasa (Biochemistry) was awarded a DST Fellowship: Doctoral Degree and Ms Dorcas Lekganyane (Botany and Plant Biotechnology) was awarded a DST Fellowship: Master's Degree, at the 2017 South African Women in Science Awards (WISA).

Ms Lekganyane also gave a lecture at the 44th annual SAAB (South African Association of Botanists) conference, hosted at the University of Pretoria, titled "The Mystery of Muthi: Unveiling the identity of bulbous and perennial plants traded at the Faraday Medicinal Market, Johannesburg, using DNA barcoding".

FOUR FACULTY PROFESSORS HONOURED AT THE VICE-CHANCELLOR'S DISTINGUISHED AWARDS

On Wednesday, 15 November 2017, four staff members from the Faculty of Science were honoured at the 2017 Vice-Chancellor's Distinguished Awards. Prof Philiswa Nomngongo (Applied Chemistry) was honoured with the Most Promising Researcher of the Year award; Prof Ian Dubery (Biochemistry) was awarded the Outstanding Researcher of the Year award; Prof Wai Sze (Grace) Leung (ACSSE) received the VC's award for Teaching Excellence; and **Prof Gupta received the Special Vice-Chancellor's Award for Highest Cited Researcher 2017**. The Vice-Chancellor's Distinguished Awards acknowledge individuals who demonstrate outstanding achievements aligned to the University's vision, mission and values.

MOST PROMISING RESEARCHER OF THE YEAR

Prof Nomngongo was also awarded the Distinguished Young Woman Researcher: Natural and Engineering Sciences at the 2017 South African Women in Science Awards (WISA).

Prof Philiswa Nomngongo (Left), Prof Ihron Rensburg (Right)

OUTSTANDING RESEARCHER OF THE YEAR

Prof Dubery also received a UJ Long Service Award for his 35 years of service. In addition, Prof Dubery and colleagues established a Plant Metabolomics Research Centre in the Department of Biochemistry at UJ.

Prof Ihron Rensburg (Left), Prof Ian Dubery (Right)

TEACHING EXCELLENCE

In addition to the VC award, Prof Leung was promoted to Associate Professor and nominated for the Teaching Advancement at University Fellowships Programme.

Prof Wai Sze (Grace) Leung, Prof Ihron Rensburg (Right)

EXCELLENCE AWARDS PRESENTED AT FACULTY YEAR-END FUNCTION

The Faculty of Science held its 2017 Year End Function where staff members were recognised for their outstanding contributions in Research, Teaching and Learning, Community Engagement and Departmental Contributions. The event took place at the Johannesburg Country Club on Friday, 1 December 2017.

RESEARCH EXCELLENCE AWARD WINNERS

Prof Reinout Meijboom (Chemistry) was honoured with the Associate Professor/ Full Professor **Research Award.**

Prof Penny Govender (Applied Chemistry) was awarded the Lecturer/ Senior Lecturer **Research Award.**

Prof Michael Henning (Pure & Applied Mathematics) received the **Research Professor Award.**

FACULTY COMMUNITY ENGAGEMENT EXCELLENCE AWARD

Mr Patrick Monama from the Department of Applied Chemistry received this award. He was selected based on his involvement with various community engagement activities, including Soweto Science Centre, Physical Science experiments for Grade 10 -12 learners, and National Science Week.

Faculty Community Engagement Committee: Chair, Dr Cobus van Dyk (Left), Mr Patrick Monama (Right)

FACULTY TEACHING AND LEARNING EXCELLENCE AWARD

Dr Edwin Mmutlane from the Department of Chemistry received this award. He was selected based on his passion for teaching, enthusiasm towards lecturing and incorporating research into his teaching. Dr Mmutlane was also a Keynote Speaker at an event by the German Chemical Society (attended by nearly 2000 delegates).

Vice Dean: Teaching and Learning, Prof Ina Wagenaar (Left), Dr Edwin Mmutlane (Right)

THE DEPARTMENT OF APPLIED CHEMISTRY RECEIVED THE INAUGURAL AWARD FOR OUTSTANDING PERFORMANCE BY A DEPARTMENT

The prize for this award is a marketing brochure paid for by the Faculty. It should be used as a tool to educate and inform stakeholders about the department.

The Head of Department, Professor Penny Govender, received the award on behalf of the department.

NRF THUTHUKA GRANT

Congratulations to NRF Thuthuka Grant recipients announced in December 2017.

Dr Hope Serepa-Dlamini, Food Technology and Biotechnology
Dr Farhana Allie, Biochemistry
Dr Lungile Sitole, Biochemistry
Dr Charmaine Arderne, Chemistry
Mrs Rina Durandt, Pure Mathematics
Dr Kriveshini Pillay, Applied Chemistry
Dr Lee-Ann Sade Modley, Geography
Dr Nomvano Mketo, SPECTRUM Facility
Prof Penny Govender, Applied Chemistry
Dr Bheki Dlamini, Food Technology and Biotechnology

PUBLIC LECTURES: 2017

The Faculty of Science presented over 18 public lectures at the UJ Library and other venues, with presentations by more than 18 academics.

Topics varied widely and included, the ecological role of humankind, food myths and nutrition, DNA barcoding, and sexual selection - choosing the right mating partner. There were also provocative topics such as the Academy of Computer Science and Software Engineering's lecture on "Curse of the Password: Sex, Alcohol, and Insanity". Most departments used this opportunity to give students a glimpse into their areas ofexpertise.

Visiting Professors also contributed to special lectures. Distinguished Visiting Professor Suprakas Sinha Ray, who is almost a permanent staff member at the Faculty, presented on innovation and linking research with industry. A Visiting Professor from the University of California (Irvine), Professor Gregory Weiss spoke on "Making Enzymes Dance and Sing". Another Visiting Professor and Chemistry Nobel Laurette, Professor Michael Levitt, presented a lecture on the "Birth and Future of Multiscale Modeling of Macromolecules".

Please look out for exciting new public lectures, starting in March 2018.

TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS

57%

DID YOU KNOW?

In 2017, 4 out of the 7 Vice-Chancellor's Distinguished Awards, were awarded to academics at the Faculty of Science.

VICE-CHANCELLOR CIRCULAR: **CONGRATULATIONS GO TO THE FACULTY OF SCIENCE FOR 2017 MILESTONES**

"[December 2017] saw the THE release its Subject Ranking in Physical Sciences, and I am equally delighted to share with you the news that UJ has been ranked among the Top 400 in the world in this field (which includes Mathematics, Statistics, Physics, Astronomy, Chemistry, Geology and Environmental, Earth and Marine Sciences). This ranking also places us second in South Africa (after UCT) and third in Africa. And it means that UJ has racked up a respectable total of five subjects ranked by the THE for the 2018 academic year. In this Physical Sciences ranking, UJ achieved superlative scores for Citations, International Outlook, and Industry Income performance metrics. My warmest congratulations go to the Faculty of Science staff, Heads of Departments, Vice Deans, and the Executive Dean, Professor Debra Meyer."

Professor Ihron Rensburg, Former Vice-Chancellor and Principal, University of Johannesburg

STUDENTS, EVENTS & MORE

POSTGRADUATE SEMINAR ON MEDICAL GEOLOGY

On 1 December 2017, Prof Hassina Mouri organised a postgraduate seminar on medical geology. It was attended by medical geology postgraduate students, their supervisors and other participants.
In addition, Prof Mouri gave an invited plenary lecture on the same topic at the 6th International Conference on Medical Geology in Moscow in August 2017.

2017 BOTANY SYMPOSIUM ACTIVITIES

Dr Aleksei Oskolski, Prof Ben-Erik Van Wyk and Ms Courtney Long (an undergraduate student) attended the IX Apiales Symposium (31 July to 3 August) in Guangzhou, China. Forty botanists from nine countries shared results of their recent studies in the systematics, evolution, morphology, chemistry, and ethnobotany of the Apiales, the plant order. Dr Oskolski was the Chairperson of the organizing committee while Prof Ben-Erik Van Wyk was part of the scientific committee.

In other symposium activities by the Department of Botany and Plant Biotechnology, postgraduate student (Ms Claire Michelle Edwards) won the prize for best poster presentation at the 9th International Toxicology Symposium in Africa held in Benin City, Nigeria (7-8 September 2017). The symposium, hosted by the University of Benin, Hokkaido University and the Japanese Society for the Promotion of Science, was attended by delegates from nine African countries.

Another achievement for Dr Oskolski was being elected as a Council Member of the International Association of Wood Anatomists for 2018-2020. Meanwhile, Prof Van Wyk's SARCHi chair (Indigenous Plant Use) was renewed for the next five-year cycle, and the second revised and expanded edition of his book "People's Plants: a guide to useful plants of southern Africa" was published in 2017/18.

2017 SACI YOUNG CHEMISTS' SYMPOSIUM AND STUDENT AWARDS

The Departments of Chemistry and Applied Chemistry successfully hosted the annual South African Chemical Institute (SACI) Gauteng Central Section's Young Chemist's Symposium on Friday, 30 November 2017.

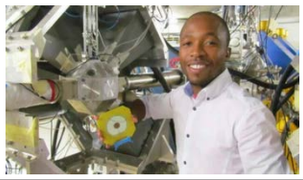
Presentations were given by 18 MSc and PhD students from UJ, University of South Africa, University of the Witwatersrand and Vaal University of Technology.

Mr Idris (PhD student under the supervision of Prof Arotiba and Dr Mabuba) won the first prize for oral presentation. Ms Mashile (MSc student under the supervision of Prof Nomngongo) won third prize for her oral presentation.

Mr Idris also won the first prize for an oral presentation in the South African Nanotechnology Initiative (7th Annual Gauteng Nanoscience Young Researchers Symposium) held at Tshwane University of Technology (October 2017).
In addition, Mrs. Ramutshatsha (PhD student under the supervision of Prof Nomngongo, Prof Ndungu and Prof Ngila) won the Excellent Shotgun Communication Award at the 2nd International Caparica Conference on Pollutant Toxic Ions and Molecules held in Portugal (November 2017).

IBOL CONFERENCE HOSTED ON THE AFRICAN CONTINET FOR THE FIRST TIME

The African Centre for DNA Barcoding (ACDB) in partnership with the International Barcode of Life Project (iBOL) and the Department of Environmental affairs (DEA) hosted the 7th International Barcode of Life (iBOL) Conference, from 20 to 24 November 2017.
This was the first time that this event was held on the African continent. The conference introduced LAB-IN-A-BOX, a portable DNA barcoding kit which allows fast species detection for port of entry officials. Director of ACDB, Professor Michelle van der Bank added that port of entry officials on the continent will be receiving training in the use of LAB-IN-A-BOX over time.



NUSTAR AND ASTROPHYSICS

Dr Bonginkosi Kheswa (Applied Physics & Engineering Mathematics) participated in the NUSTAR (Nuclear Structure, Astrophysics and Reactions) conference at Jozef Stefan Institute, Slovenia (23 - 29 September 2017.) He also presented invited lectures at the Advanced Nuclear Reactions and Applications in Astrophysics at Stellenbosch University (9 and 10 November 2017).

PROF STEVEN KARATAGLIDIS AT TOHOKU UNIVERSITY

Prof Steven Karataglidis (Physics) was invited to visit the Tohoku University in Japan at the end of 2017 as Visiting Professor in the framework of the GPPU graduate student programme. During his visit he gave two specialist lectures to a group of talented graduate students.

CHINA AND THE CONVERSATION AFRICA

Prof Hartmut Winkler attended meetings to establish a South Africa-China partnership in optical astronomy in Lijiang and Beijing (November 2017). This led to a collaboration with Chinese partners from the Institute of High Energy Physics in Beijing, which is part of the Chinese Academy of Sciences. This will see joint observational projects and staff interchange. Moreover, Prof Winkler published 7 articles in **The Conversation Africa** in 2017.

INTERNATIONAL PATENT

Prof Marianne Cronje from the Department of Biochemistry and Prof Meijboom from the Department of Chemistry successfully filed their international patent 'Metallodrugs as anticancer agents' in the USA (September 2017) and Canada (August 2017).

In addition, Prof Cronje was invited to serve as an Editorial Board Member for Cell Communication & Signaling (a Nature Springer journal).

EVENTS AND ACTIVITIES BY THE DEPARTMENT OF BIOCHEMISTRY

Prof Liza Bornman represented UJ as a member in her capacity as a Commonwealth Scholarship alumnus in a panel discussion regarding the Role of Science in Promoting Inclusive Development (8 December 2017). She was also successful with her NRF Blue Skies Concept Notes application.
On 25 July 2017, Dr Gerrit Koorsen presented a special lecture on 'Education and Literacy' at the Crown Mines Primary School, addressing about 70 pupils. In the same month, Dr Edwin Madala presented a special lecture on DNA and Molecular Genetics at a Science Awareness Campaign during UJ Winter School. The following month, Dr Edwin Madala gave a talk on Biofuels on Phalaphala FM, Venda (August 2017).
Dr G Tlou successfully established a new research project on Vaccine Development with OVP (Onderstepoort).

31ST PROJECTS DAY, COMMUNITY ENGAGEMENT AND LECTURES

The Academy of Computer Science and Software Engineering hosted a successful 31st Projects Day on 1 November 2017, organized by Mr F Blauw and Mr D Cotterrell.

Mr Jaco du Toit and Dr Dustin van der Haar presented a Cyber Security Awareness Training for Parents at Soweto Science Centre (30 September 2017)., and Prof Ehlers presented an invited lecture at the International Conference on Information Systems (ICIS) in Shanghai (October 2017).
Prof Leung and Dr van der Haar presented papers for ICCIP 2017 in Tokyo, Japan (24 - 26 November 2017). Both won best paper in session awards. Dr van der Haar won another best paper in session award at the ICIET 2018 in Japan.

UJ-ESKOM RESEARCH DAY, CNBC AND BILATERAL PROJECTS

The Department of Applied Chemistry successfully hosted a UJ-Eskom Research Day organised by Dr Soraya Malinga (8 November 2017) and Visiting Professor Ray Suprakas featured on CNBC Africa under the topic "What Nanotechnology can do for healthcare, cosmetics" (29 November 2017).
Dr Richard M. Moutloali was part of the DST delegation to Egypt, where he participated in the bilateral workshop and presented aspects of his bilateral project with the National Research Center in Cairo, Egypt. The presentation was titled "Nanotechnology and Osmosis Membranes for Brackish Water Desalination".