

NOVEMBER 2016



SCIENCE @UJ

NEWSLETTER OF THE
FACULTY OF SCIENCE
UNIVERSITY OF JOHANNESBURG

LEADING SCIENTISTS, INNOVATIVE TECHNOLOGISTS

RETHINK. REINVENT.





A MESSAGE FROM THE DEAN

Thank you to everyone who helped the Faculty succeed this year either by being an outstanding academic, administration, instrumentation or technical staff member. Thank you to those who made an effort to attend and participate in committees, in the Faculty Board, Dean's Committee, graduation and Senate (where applicable). Everyone's contribution is obviously necessary for the success of the Faculty!

Congratulations to all our newly NRF-rated academics, as well as the recent renewals. When the official university holidays start, please make time to get some well-deserved rest. May you all have an enjoyable festive season and a prosperous new year. We will certainly need prosperity, patience and ingenuity for a challenging 2017.



Prof Steven Karataglidis



Prof Catherine Ngila



Prof Basie Von Solms

THREE SCIENCE PROFESSORS APPOINTED AS MEMBERS OF ASSAF

Congratulations to the three Faculty of Science professors who were elected into the prestigious Academy of Science of South Africa (ASSAf). They are, Professors Steven Karataglidis (Physics), Catherine Ngila (Applied Chemistry) and Sebastiaan [Basie] Von Solms (Academy of Computer Science and Software Engineering). This year, ASSAf inaugurated 38 leading scientists as new members, increasing the total membership to over 500.

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CONGRATULATIONS TO OUR 2016 UNDERGRADUATE TOP ACHIEVERS!

First semester overall Top Achievers in 2016

Top Achiever in a Diploma programme

Mr MH Raphala (Analytical Chemistry)

Top Achiever in First Year degree programme

Ms ST Mashiane (Information Technology)

Top Achiever in Second Year degree programme

Ms MLS Reenen (Life and Environmental Science)

Top Achiever in Third Year degree programme

Miss DB Stevenson (Mathematical Science)

73 students were recognised as high flyers in their disciplines when the Faculty of Science held its annual Top Achievers Awards Ceremony in October. They scored an average of above 75% in the first semester of 2016, receiving certificates in recognition of their academic excellence at the function. The programme director, our Vice-Dean of Teaching and Learning, Professor Ina Wagenaar, was joined by Heads of Departments and Faculty Administration in congratulating the students.

R10M NRF PLUS FIVE MILLION RAND UJ INJECTION FOR RESEARCH IN CONDENSED MATTER PHYSICS



Physics' Highly Correlated Matter Research Group

UJ's Physics Department was recently awarded R15m towards purchasing new research equipment for its Highly Correlated Matter Research Group (HCMRG) by the National Research Foundation's (NRF) National Equipment Programme (NEP) together with co-funding from the UJ Research Directorate. The leaders of this group and NEP co-applicants, Prof André Strydom and Dr Buyi Sondezi said they were delighted by the news and this was now the third time that Prof Strydom has been successful at NRF with NEP awards. They acknowledged the Science Faculty Former Executive Dean Prof Kinta Burger, and her successor, Prof Debra Meyer for their stewardship of the Science Faculty and support of the HCMRG in Physics.



Ms Eseoghene Umukoro

L'ORÉAL-UNESCO FOR WOMEN IN SCIENCE FELLOWSHIP FOR UJ PHD STUDENT

Applied Chemistry PhD student Ms Eseoghene Umukoro was awarded a 2016 L'Oréal-UNESCO for Women in Science Fellowship at a ceremony held in Sandton. The fellowships seek to acknowledge and celebrate the achievements of women in science who are on the cutting edge of research in their fields. Umukoro was one of 14 female scientists from across Sub-Saharan Africa to be honoured for their work and impact in the scientific field. This year, about 319 applications from 26 countries were received indicating the competitiveness of the award, the increasing awareness of the fellowship programme and its commitment to advancing women in STEM (Science, Technology, Engineering and Mathematics). Ms Umukoro's doctoral research under the supervision of Prof Omotayo Arotiba and Prof Catherine Ngila is titled *Experimental and computational study of the electrochemical and photo-electrochemical oxidation of organic pollutants at carbon based-semiconductor composite electrodes*.

DISCOVERY HACKATHON HAT TRICK FOR UJ ACSSE STUDENTS

A health and fitness system with innovative functionality to track everyday fitness and health activities of Discovery gym members is what saw students of UJ's Academy of Computer Science and Software Engineering (ACSSE) – Kyle Alexander, Jihyun Byun, Jacques Oosthuizen, Mario da Silva and Shaun Van Wyk (Team Bithealth) – winning this year's Discovery GradHack Hackathon. This is the third consecutive year that students of the Academy win the competition, said Academy Head of Department, Prof Elize Ehlers.



Team Bithealth at the competition



Dr Peter Teske

OCEAN CURRENT STUDY PUBLISHED IN NATURE JOURNAL

Ocean currents are not super highways for animal movement in the sea as they were once thought to be. A new Flinders University study shows that coastal ocean currents in parts of southern Australia not only move animals much less often than expected, but they also trap animals within near-shore regions, said UJ scientist, Dr Peter Teske, in the Department of Zoology, formerly a marine scientist at Flinders University, and one of the authors of the study. The study "Oceanography promotes self-recruitment in a planktonic larval disperser" was published in the Nature journal Scientific Reports and was funded by a Discovery Grant from the Australian Research Council. The findings have important implications for the design of marine parks and for fisheries management.

EXCELLENCE AWARDS CONFERRED AT FACULTY YEAR-END FUNCTION

The Faculty of Science held its 2016 year-end function where academic staff were applauded for their outstanding contributions in key focus areas of the Faculty: Research, Teaching and Learning, as well as Community Engagement.

RESEARCH AWARDS:



Prof André Strydom won the award for the Best Research Professor in the Faculty for 2015, based on his exceptional publications output, all in high quality journals.



An award in the Associate Professor/Professor category went to chemistry professor, Reinout Meijboom.



It was Prof Jayne Rogerson of the Department of Geography, Environmental Management and Energy Studies who took the Senior Lecturer / Lecturer Award. She was promoted to professorship in October 2016.

TEACHING AND LEARNING:



This year's Teaching & Learning Excellence Award went to Academy of Computer Science & Software Engineering Senior Lecturer, Dr Wai Szi Leung. The runner-up was Mrs Chantel Duncan, a lecturer of Pure Mathematics.



Dr Buyi Sondezi received the Faculty Community Engagement Award, based on her outreach activities and events hosted to promote Physics to the youth.

JUNIOR CAPTAIN SCOTT MEDAL FOR BEST DISSERTATION



Lindi Steyn congratulated by Prof Wessel Pienaar, the Chair of the Society

The Junior Captain Scott Medal for best Master of Science dissertation submitted at a South African university, awarded by the **Suid-Afrikaanse Akademie vir Wetenskap en Kuns**, went to UJ Biodiversity and Conservation PhD candidate, Lindi Steyn. Supervised by NRF A-rated scientist, Professor John Maina, Steyn's dissertation was titled: Comparative determination of the numbers of the House Sparrow, *Passer domesticus*, the Cape Glossy Starling, *Lamprolornis nitens*, the Cape Turtle Dove, *Streptopelia capicola* and the Laughing Dove, *Streptopelia senegalensis* in the Johannesburg and Vaalwater area, with study into the possible causes of expected declines. Steyn said she was humbled and excited by receiving the medal as this came very unexpectedly. Her interest in ornithology and animal conservation, especially birds, continues to grow. She enjoys watching, travel, camping, and reading in her spare time.

ACSSE CELEBRATES 30TH PROJECTS DAY

The Academy of Computer Science and Software Engineering (ACSSE) celebrated its 30th Projects Day which was a resounding success. Attended by staff, students, alumni and Friends of the Academy, including sponsors and captains of industry, over 50 projects were exhibited by the Academy's second-year, third-year and Honours students, celebrating creativity and innovation in information technology as displayed at Auckland Park Kingsway campus' D-Ring Walkway. The evening was capped with the Academy's annual awards ceremony in recognition of the standard of excellence presented in the projects as well as outstanding contribution to the annual event by staff and the Academy's stakeholders.



Prize-winners at Projects Day 2016

25TH SUCCESSFUL BOTANY AND PLANT BIOTECHNOLOGY POSTGRADUATE SYMPOSIUM



Ryan Orton



Dorcas Lekganyane



Estherna Pretorius

The Department of Botany and Plant Biotechnology held its 25th Annual Symposium at the Resolution Circle this November. Attended by the Executive Dean Faculty of Science, Prof Debra Meyer, symposium guest speaker, Prof Alvaro Viljoen, stressed the significance of capitalising on South Africa's local biodiversity. The country's resources continue to attract international pharmaceutical companies, he said, so why should we not focus on boosting our own bio-economy? The Best Honours Talk and Honours Poster was delivered by Ryan Orton, Dorcas Lekganyane scooped the award for Best Masters Talk and Estherna Pretorius received the award for Best PhD Talk. They were congratulated by the Head of Department, Prof Charles Whitehead at the awards ceremony of the symposium.



Above: Gershon Amenuvo
(Best Research Paper)



Right:
Cresten Moodley
(Best Poster)

CHEMISTRY RESEARCH DAY, A SUCCESS

The Department of Chemistry held a successful Research Day in October which was attended by Ms Edith Shikumo – the Young Scientist Liaison Officer at the Academy of Science of South Africa (ASSAf) and Secretariat of the South African Young Academy of Science (SAYAS) – who motivated current students when she spoke about the Lindau Nobel Laureates Meeting and opportunities for young Scientists at ASSAf/SAYAS. The Department's research group leaders presented an overview of current and future research projects and Gershon Amenuvor (PhD student) received the award for the Best Research Paper, entitled: "**Efficient Solvent-Free Hydrogenation of Levulinic Acid to γ -Valerolactone by Pyrazolylphosphite and Pyrazolylphosphinite Ruthenium(II) Complexes**". Cresten Moodley (MSc student) received the award for the Best Poster, entitled: "**The Synthesis of Lanthanide-Cupferon Type Complexes as Spectral Converters for Solar Cells**". The prizes were sponsored by Separations and Chromspec.

SCIENCE ORANGE CARPET STUDENTS WELCOMED TO UJ



The Faculty of Science attracted some of the country's brightest mathematics and science high school learners to UJ's Orange Carpet Cocktail event. Informed about a host of career options they can pursue within the Faculty and encouraged to come study amongst the best at UJ, the learners were welcomed by the Executive Dean, Prof Debra Meyer; Vice-Dean for Teaching and Learning, Prof Ina Wagenaar; Faculty Marketing and Faculty Administration. The Faculty said it was serious about rewarding excellence in mathematics and science, wishing the learners well for their Grade 12 final examinations.



Prof Elmarie Kritzing (Unisa), Dr Maria Bada (University of Oxford) and Prof Basie von Solms before the talk.

CYBER SECURITY “A PRIORITY” FOR OXFORD AND UJ

The Centre for Cyber Security at UJ’s Academy of Computer Science and Software Engineering recently hosted Dr Maria Bada, a senior Researcher at the Global Cyber Security Capacity Centre (GCSCC) of the University of Oxford who delivered a stimulating interdisciplinary talk entitled: The Psychological and Social consequences of Cyber Attacks. Dr Bada said as cyberspace has grown in prominence, unfortunately so too has the number and variety of cyber-attacks. “These attacks range from hacking and denial-of-services, to malware and spyware attacks, and can affect everyone/everything from the public to the critical national infrastructure of a country”. Her talk followed the Centre’s visit to Oxford University where, at the Early Career Cyber Researchers’ Symposium of Cyber Oxford, Prof Basie von Solms delivered a keynote presentation, along with UJ presentations by Mr Jaco du Toit and Mr Frans Blauw. The Academy’s Senior Lecturer, Dr Grace Leung, won an award for the Best Presentation: Protecting Cybersecurity Machine Learning. Earlier this year, Dr Dustin van der Haar and Mr Jaco Du Toit of the Academy also headed a successful campaign which raised cyber security awareness amongst parents of the Soweto Science Centre students.

35 SOUTH AFRICAN MINERAL SPECIES IDENTIFIED IN NEW BOOK

The Bushveld Complex is world famous for its spectacular geology and platinum-chromium deposits. It covers an area of approximately 65 000 km² and is therefore the largest layered complex in the world. It is equally well-known for its diverse platinum-group mineralogy. Apart from these minerals, the Bushveld Complex is a source of secondary mineralization as well. A new book, “Microminerals of the Bushveld Complex”, published by the Council for Geoscience and co-authored by Prof Bruce Cairncross from the Department of Geology at UJ, for the first time documents over 170 of these minerals and provides a host of other information as well. One major contribution of the research that culminated in this book is the quantitative identification of 35 mineral species identified for the first time from South Africa.



Prof Bruce Cairncross and his co-authors

HONOURS AWARD AT SOCIETY OF SOUTH AFRICAN GEOGRAPHERS CONFERENCE



Shayna-Ann Cuthbertson and Arno Booyzen at the student conference



James Gregory receiving a Bronze Medal at the conference.

The Society of South African Geographers (SSAG) celebrated a century of geography teaching and learning at tertiary level in the country at the 10th Biennial Conference which was held the Stellenbosch University, where James Gregory of UJ's Geography, Environmental Management & Energy Studies Department was awarded a Bronze Medal by the President of the conference for his Masters dissertation entitled "Creative Industries in Johannesburg: Geography, Operational Characteristics and Linkages to Urban Regeneration". Arno Booyzen and Shayna-Ann Cuthbertson presented their Honours research at the student leg of the conference where Booyzen scooped the award for Best Honours presentation in the field of GIS/ Remote Sensing for his study entitled: "Estimation of canopy height in a complex vegetation environment using Sentinel-1 SAR".

DNA BARCODING ADVANCED BY NEW LIFESCANNER APP

UJ's African Centre for DNA Barcoding (ACDB) in collaboration with the University of Guelph's Biodiversity Institute of Ontario, Canada successfully introduced a new smartphone application known as LifeScanner to fellow staff, students and colleagues. The app is designed to help users discover the diversity of living organisms around them, aiding them in contributing to a global knowledge-base on biological diversity. Users of this app are able to learn about the species they encounter - from the food they eat, to bugs in the garden. ACDB partnered with local government officials towards combating wildlife crime, offering a LifeScanner App Training Course which was attended by colleagues from the Department of Environmental Affairs at the Kingsway campus. ACDB also hosted 24 Sri Lankan Environmental Officials as well the Deputy Director-General for Environmental Programmes, Dr Guy Preston, for a workshop aimed at showcasing the ongoing DNA Barcoding initiatives in South Africa as well the future application of the LifeScanner (<http://lifescanner.net/>). The app is a significant step towards clamping down on wildlife crime, especially in the South African context.





Prof Bettine van Vuuren

RAISING THE PROFILE OF FEMALE ANTARCTIC RESEARCHERS

Prof Bettine van Vuuren believes in breaking through the 'Ice' Ceiling by raising the profile of female Antarctic researchers. She attended the Scientific Committee on Antarctic Research (SCAR) Open Science Conference in Malaysia and was nominated by the committee to be visible on its Wiki page to honour woman in Antarctic research. Prof van Vuuren said Antarctica and the Southern Ocean islands are exceptional to study biodiversity and the impact that climate change has on species, as well as the earth's history and geological processes. "South Africa also makes a major contribution to space and physical sciences. South Africa, as one of the original signatories to the Antarctic Treaty, continues to make a notable contribution to Antarctic science and conservation on various fronts. We have a footprint in all of the major disciplines (Biology, Geology and Physical Sciences), with UJ representatives in both Biology and Geology."

APPLIED CHEMISTRY AT ICPAC IN MAURITIUS

Seven presentations were delivered by UJ academics and students at the International Conference on Pure and Applied Chemistry (ICPAC 2016) held in Mauritius, themed "Emerging Trends in Chemical Sciences". The conference featured a wide variety of keynote, plenary, invited and contributed lectures, as well as poster sessions in response to an increase in the demand of energy, food and water described as a global crisis

by Professor Ponnadurai Ramasami who chaired the Conference Organising Committee. The UJ academics were Drs Bezo Mabuba, Soraya Malinga, Philiswa Nomgongo, Derek Ndinteh and Wendy Maxakato. Masters students, Ms Khathu Nedzivhe-Mqehe (supervised by Dr Mabuba and Dr Nomgongo) and Ms Livhuwani Nemandava (Dr Dinteh) won the Best Poster prizes for their presentations.



Applied Chemistry represented in Mauritius



SA's Dirty Laundry Project

BIOCHEMISTRY LADIES HELP AIR SA'S DIRTY LAUNDRY

Dr Lizelle Ann Piater received overwhelming support from the ladies in the Biochemistry department in request for panty donations for the upcoming 16 Days of Activism art installation titled SA's Dirty Laundry. Working in close collaboration with Soma Art + Space and lecturer/journalist, Nondumiso Msimanga, the project is geared at creating awareness around the issue of rape in South Africa, and aims to hang a washing line of 1.2 kilometres, displaying 3600 pairs of panties in the streets of the Maboneng Precinct in Johannesburg. According to the project, up to 3600 women could be raped in the country based on a 2013 Medical Research Council survey; the Institute for Security Studies claims that only one in 13 rape cases are reported to police, with fewer than 30 prosecuted and only 10 convicted.



Winners announced at the conference in dublin

A doctoral student at UJ's Department of Biotechnology and Food Technology, Oluwafemi Adebo, won the 2nd prize for his Masters research at the 2016 International Union of Food Science and Technology (IUFOST) Food Safety Without Borders Graduate Student competition in Dublin, Ireland, in August. Co-supervised by Dr Patrick Njobeh and Dr Vuyo Mavumengwana of UJ, the

INTERNATIONAL UNION OF FOOD SCIENCE AND TECHNOLOGY AWARD FOR UJ STUDENT

study found that cultures and lysates of a bacteria strain (*Pontibacter* sp.), isolated from an ultra-deep South African Gold mine aquifer, can effectively degrade aflatoxin B1 (AFB1) and render it less toxic. "This mycotoxin (poison from fungi) is highly toxic in nature and the most naturally occurring potent carcinogen, known to be a huge food safety issue in developing countries most notably in Africa. The ever-increasing proliferation of food and feed commodities by AFB1 necessitates an effective control approach to mitigate its occurrence and toxicity thereafter," Dr Njobeh explained. Three research articles from the study have since been published in top, high impact factor journals in food science and technology including: *Critical Reviews in Food Science and Nutrition*, *International Journal of Food Microbiology and Food Control*.

SOWETO SCIENCE CENTRE RECEIVES LABORATORY EQUIPMENT DONATION



Laboratory equipment donated to the Centre

The Soweto Science Centre received a donation of laboratory equipment worth R21 000 from laboratory instrument supplier, Chembiz, to boost teaching and learning at the centre.



Primary school learners attending Junior Scientist Workshop

ZOOLOGY DEPARTMENT INSPIRES JUNIOR SCIENTISTS

UJ's Zoology Department continues to reveal the wonderful world of science to talented young minds who attend its annual Junior Scientist Workshop held successfully in Auckland Park Kingsway campus. The workshop attracted a host of learners from in and around Gauteng this year, exposing them to a university environment and an opportunity to conduct scientific experiments in UJ research laboratories. This unique experience does not correspond with school syllabus and the workshop is divided into three exciting categories for the learners to choose from.



Botany students at the bag donation hand-over

PPS BAG DONATION ADDS THRILL TO BOTANY EXCURSION

Students in the third-year Botany and Plant Biotechnology class were thrilled to receive a donation of bags from financial services providers, PPS, ahead of their much-anticipated excursion to Cape Town in September. The trip gave students a "hands-on" and practical approach to Botany and its applications in the real world as the department travelled to Kirstenbosch Botanical Gardens, Compton Herbarium, Mooiplaas Vineyard, a herbal pharmaceutical production plant and Worsster Botanical Gardens in the Mother City. "The trip is aimed to provide students with a rounded view of the discipline and that it is far beyond lab work," said Organising Committee Member and UJ Botany Masters student, Ryan Rattay. PPS Graduate Marketing Specialist, Rebecca Seabela said they were proud to donate bags to the students. "We're always trying to find ways to encourage third-year students to study further as job markets are getting tougher to graduates to get into."



Dieter Rosslee and the team

ROWING AT THE RIO 2016 PARALYMPICS

UJ BSC Physical Sciences student, Dieter Rosslee (21) from Alberton, was thrilled to be part of the South African Paralympics Rowing team which competed in Rio de Janeiro, Brazil. Rosslee lost his right leg in the year 2000 due to a lawnmower accident and his family has since been his greatest support. "In 2013 I was told by my coach, Marco Galeone (para rowing national coach) that I will be in the 4+ that would go on and compete at the World Championship in Korea that year. Just the year before I would never have thought that I would be competing on an international level," he said. The team has won a number of medals at International competitions over the years, one of which was a Bronze Medal at the World Championship in 2013. In 2015, Rosslee received an Age Group Sportsman of the Year Award at the UJ Sports Awards. His team has also won the Gauteng Team of the Year with Disabilities Award for two consecutive years.

BEST POSTER PAPER AT INTERNATIONAL CONFERENCE



Marinus Boon

Mr Marinus Boon won an award for the at the best Poster Paper presented at this year's International Society for Photogrammetry and Remote Sensing (ISPRS) Conference in Prague. "This is a truly large conference and Marinus has done the Departments of Zoology and Geography at the University of Johannesburg proud with his achievement," said Zoology HoD, Prof Annemarie Avenant-Oldewage. His paper, "Wetland assessment using Unmanned Aerial Vehicle (UAV) Photogrammetry", was co-supervised by Drs Richard Greenfield (Zoology) and Solomon Tesfamichael (Geography).

SOCIAL MEDIA COMPETITION WINNERS

Faculty of Science ran a successful two-week social media competition which promoted its A-rated scientists to internal and external stakeholders on Facebook and Twitter. The official Faculty Facebook page was launched at the beginning of the second semester where staff and students were invited to visit our website (<https://www.uj.ac.za/faculties/science>), find out the names of three NRF "A-Rated" researchers and post their titles, names and surnames on our Facebook timeline followed by the hashtags: #nrfa-rated and #science@uj. Competition entrees were entered a lucky draw for three hamper giveaways courtesy of the Office of Executive Dean of the Faculty of Science. The winners were students: Khanya Shaun Banda (BSc Computer Science and Informatics), Obakeng Patrick Keabadile (BSPH05 Geology and Chemistry), and Mc Arthur Butho Jamela (BSc Information Technology).



Competition winners congratulated by Faculty of Science Head of Administration, Mrs Naomi Strydom.

It was with deep regret and sadness that the University community was advised in October of the passing of the Faculty of Science Former Dean, Prof Guillaume De Swardt who joined Rand Afrikaans University in the early 70s and was Dean of Science for 11 years. We also learned of the tragic passing of our student, Mr Elizo Baloyi, who was fatally shot. University Management met with the Baloyi family to express their sincere condolences regarding this tragic event and organised PsyCaD for counselling to students who witnessed the incident. The services of PsyCaD were also offered to the family.