

Science Matters

Science Faculty Newsletter



Message from the Dean



Welcome to this 2015 first semester edition of **Science Matters**. We are already half way through the year and this edition of Science Matters tries to capture some of the activities and high-lights of the first six months of the year. The year started off well with respect to undergraduate enrolments, and we came very close to meeting our 2015 enrolment target of 450 first-time entering students. Together with returning undergraduates we are close to our overall enrolment target of 1450 undergraduate students for 2015. Honours student numbers are slightly up on 2014 (190), and Masters and PhD students look to have increased by some 3.5% over 2014 at a similar date – with new Master's and PhD registrations occurring throughout the year, I am confident that this number will increase such that by the end of the year we will have increased our 2014 PhD (403) and Master's (446) registration by

some 5%, as per our plans. The 160 postdoctoral researchers in the Science Faculty are close on half the total number at UCT which is gratifying, given the important contribution they make to the research and supervision activities in the faculty. Notwithstanding the impact of load-shedding, the teaching semester has gone well, and the Faculty is proud to have graduated 23 PhD and 71 Master's students at the June graduation ceremony.

Over the past six months, our staff and students have continued to excel in a variety of ways – in research, in teaching and in outreach activities. In the pages that follow, some of these accomplishments are highlighted. We are particularly proud of our student achievements, which vicariously reflect on the engagement and commitment our staff.

Research by faculty staff and students continues to flourish, and a vibrant discussion at the DAC Workshop in late May provided valuable ideas on how to take forward, and give life to, the six identified Science Faculty research impact areas that form the basis of our Faculty re-

search strategy. These ideas will be rolled out in the second semester under the guidance of our Faculty Research Committee. The new and exciting Big Data initiative with focus on the needs of the SKA is now well off the ground, with the likely launching of the Inter-University Centre for Data intensive Astrophysics (ICDIA) early in the next semester (with UCT, UWC and NWU as founding members). With the continuing pressure to increase publication outputs, and more importantly improved citation record, it is gratifying to have the 2014 audited figure for our publication count showing a slight improvement on 2014, with 350 subsidy units being recorded – an all-time record output, and 12.5% up on the previous four year average.

I hope that you enjoy reading our 2015 Faculty news captured in the following pages.

Anton le Roex

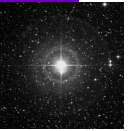
Astronomy Stars



The Department of Astronomy got two new A-rated scientists in the last NRF rating round: Professors Russ Taylor and Patricia Whitelock both received A-ratings and Professor Brian Warner maintained his A-rating. Together with Professor Michael Feast –the department now has four A-rated scientists—quite a stellar group! This highlights the high impact research done in the department.

The picture shows the Astronomy Department at a recent research retreat at Mont Fleur.

Our Science Stars:



Professor Jill Farrant wins EPFL Wish Foundation Award for Women in Science and Humanities



In recognition of exceptional ground-breaking work presented to plant biologists across the globe, **Professor Jill Farrant** has won the Erna Hamburger prize from the EPFL-WISH Foundation. Their citation acknowledges that they have admired her work and found her to be an exceptional role model to biologists and women worldwide in science.

Professor Farrant will receive the award in September in Switzerland.

Inventor Professor Ed Rybicki recognised at annual Innovation Event

UCT professor Ed Rybicki was a top achiever at the annual innovation evening hosted by Research Contracts and Intellectual Property Services (RCIPS) recently to recognise UCT inventors and their achievements. In 1985 Rybicki received the National Research Foundation President's Award and then received an NRF A-rating in 2012, acknowledging his status as a leading international researcher. His research acumen aside, he is also a great innovator.

His accomplishments and contributions to the innovation space were acknowledged at the RCIPS innovation evening, where he became one of the first recipients of the Deputy Vice-Chancellor's Award for Achievement in Innovation. This award is a new addition to the event and is awarded for significant achievement in innovation by a UCT staff member, student or team. Recognition can be for commercialisation of a product through the creation of a spin-off company and the successful licensing of technology, to the promotion and support of innovation.

Professor Edward Rybicki was honoured for his innovative work in the area of biopharming. His research unit helped pioneer the production of human and animal viral vaccine antigens internationally, mainly via the avenue of transient expression in plants. He is an inventor on numerous patents relating to expression of pharmaceutically relevant recombinant proteins in plants and insect cells, and a large percentage of these patents have been licensed and are in the process of being commercialised. Accepting the award, Rybicki commented, "I am humbled and honoured; innovation is something that has not been valued much outwardly at UCT in the past, so for me and my group to be so distinguished by the first such award is very satisfying."



Vice Chancellor's Medal for David Wilson in Geological Sciences

David Wilson, who began his forty-year career at UCT cleaning Jameson Hall and worked his way up to Senior Technical Officer in the Department of Geological Sciences, was hailed for his outstanding contribution to the university at the end of last year, with a Vice-Chancellor's Bronze Medal.

Wilson, who has served as Senior Technical Officer for two decades, did not have the opportunities his colleagues had to forge an academic career, but demonstrated the same passion, respect for detail, accuracy and energy that was shared by the best researchers, said Dr Max Price, Vice-Chancellor.

Beginning as a workshop assistant in Geological Sciences, Wilson's interest led him deeper into the world of analysing rock specimens. Wilson even helped prepare samples of rock that were brought back from the moon by the Apollo 11 mission. Dr Price described Wilson as a world-class producer of thin-sections: the meticulously sliced samples that reveal the crystal structure of rocks when viewed through a microscope – equating the process to 'turning a piece of mountain into a microscope slide'.



David Wilson, left, receives the Vice-Chancellor's Bronze Medal from Dr Max Price.

Recognition for Excellence:



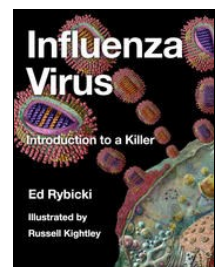
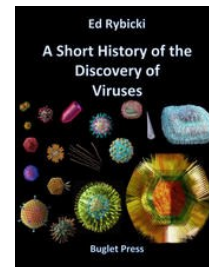
Professor Susan Parnell was recognized as the Emeka Anyaoku Visiting Professorial Fellow by the Institute of Commonwealth Studies at the University of London for 2015/6.

Dr Arjun Amar (pictured right) from the Percy FitzPatrick Institute in the Department of Biological Sciences, received the Claude Leon Merit Award for Early-Career Researchers. He will be using the funds to continue the monitoring of the Black Sparrowhawk population around the Cape Town urban and sub-urban area, which has been monitored for the last 15 years. He has been using data on this population to answer broad ecological questions related to population dynamics and also to explore evolutionary ecology questions related to colour polymorphism, as the species occurs in the area in two discrete morphs (dark and light).



Professor Andy Buffler from the Department of Physics, has been elected a Fellow of the Teaching Advancement at Universities Programme coordinated by the Higher Education Learning and Teaching Association of Southern Africa (HELTASA).

Professor Ed Rybicki from the Department of Molecular and Cell Biology, has recently published two books on viruses: "A Short History of the Discovery of Viruses" and "Influenza Virus: Introduction to a Killer".



Dr Domingo Salazar Garcia from the Department of Archaeology, recently received a Doctoral Thesis prize from the Universitat de València in Spain. This prize (Premio Extraordinario de Doctorado) is awarded by the Universitat de València for the best PhDs defended in each Faculty. The ceremony where he received the award, took place in March this year.

Dr Garcia also received the BBVA Foundation Award to Young Researchers— an award-grant (40,000 EUR) that the BBVA Foundation (Spain) gives to Young Researchers. It was the "I Ayudas a Investigadores, Innovadores and Creadores Culturales".

Left: Dr Garcia receiving the Premio Extraordinario de Doctorado in Spain



UCT Computer Science team wins silver at Intercollegiate Programming Contest (ICPC) World Finals



The UCT team, "I Can't Pronounce Catachtonic" comprising **Yaseen Hamdulay**, **Robert Spencer** and **Sean Wentzel**, together with their coach **Dr Maria Keet**, from the Department of Computer Science, entered the ICPC World finals held in Marrakech, Morocco and came second in the Africa & Middle East region. They were the only team from Sub-Saharan Africa and one of ten teams in the Africa & Middle East Region, out of a total number of 128 teams who participated.

Sean Wentzel won the ICPC Quest and was delighted to bring his first prize back to Cape Town. The win can't be done alone and it is not about the programming itself, but exploring the event, its history, its location and the people organising and participating in it. Sean completed an amazing 110 quests to win the event.

Sean Wentzel, Yaseen Hamdulay, Dr Maria Keet & Robert Spencer in Morocco

Science Winners of the Postgraduate Research Expo:

The Office of Postgraduate Studies at UCT recently organised a Postgraduate and Postdoctoral research expo, where they showcased winning research. Forty postgrads and postdoctoral fellows took part in the expo and networking event. Prizes, sponsored by McKinsey, were awarded in 5 categories, including Africa-specific research, and there was a special peer-judged award, voted for by the expo participants.

In the Science Category, the following were winners:

First Prize: **John Woodland**, a PhD student in the Department of Chemistry, won first prize for his research on “Insights into the mechanism of action of quinolone methanol antimalarials using fluorescent analogues.”

Second Prize: **Jannes Landschoof**, a Master’s student in the Department of Biological Sciences, won second prize for his research on “How many inside? A 3D Micro CT-Scan of Brooding Ophiuriids”.

Third prize: **Camille Olianti**, a Master’s student in the Department of Geological Sciences for her research on “A low $\delta^{18}\text{O}$ hydrothermal breccia from the Koegel Fontein Complex”.

Honourable Mention: **Sunkanmi Olaleye**, a Master’s student in the Department of Computer Science for research on “Xamabile: Comparing mobile text input methods for historical African languages”.

In the category of Africa Specific Research:

First Prize: **James Mutuku**, a PhD student in the Department of Computer Science for his work on “Crowdvoicing for citizen empowerment”.

Second Prize: **Sunkanmi Olaleye**, a Master’s student in the Department of Computer Science, for “Xamabile: Comparing mobile text input methods for historical African languages”.

Honourable Mention: **Noelle Tubbs**, a Master’s student from the Department of Biological Sciences for her work on “Heat stress in African penguins in the face of climate change”.

In the Peer Category (voted for by peers)

Katrine Classens, from the Department of Environmental & Geographical Science, won an award for her work on “The wisdom of using the Arctic in the visual communication of climate change”.



Prize winners at the 2015 Postgraduate Research Week Expo

Most Outstanding Team in Residence Life: Obz Square

Two postgraduate students from the Department of Astronomy, **Avishek Dusoye** and **Sam Legodi**, were on the Obz Square House Committee that won the DSA prize for Most Outstanding Team in Residence Life 2014.

They came into office in March last year, but in just over six months the house committee managed to raise the quality of their living and learning environment. The Obz Square Third Tier Executive Committee not only changed the way the committee gets elected through amendments to its constitution, they are also the driving force behind the process for an Obz Square logo and website (both of which are expected to be launched soon). An Obz Square identity wasn't all they help create: the committee helped foster a sense of community among residents with a number charity and social events, including visits to an old age home, a food drive for those less well-off, a well-attended Heritage Day braai, leadership dinners, aerobic classes and an academic symposium series.



Front row from the left is Lwazi Ncoliwe, Mark Jabangwe, Lizzie Chalira and Avishek Dusoye. Back row from the left is Tafadzwa Mukaro, Reey Springer and Sam Legodi.

HI observations of the nearest starburst galaxy NGC 253 with the SKA precursor KAT-7

The Karoo Array Telescope (KAT-7) was used to study the hydrogen gas in the halo of the nearby galaxy NGC 253. The particularities of KAT-7 allowed the detection of gas that had not been seen previously by other radio telescopes such as the Very Large Array, the largest radio interferometer in the world. This project was a collaboration between researchers at UCT (staff, postdocs & PhD student) and researchers at ASTRON in the Netherlands. This is an exciting project because KAT-7 was built mainly as a learning telescope for engineers, but UCT researchers are fully exploiting its science capabilities too.

Professors Tom Jarrett and Claude Carignan, together with **Dr Ed Elson and Toky Randriamampandry** from the Department of Astronomy are authors of the paper, which is the 3rd paper published on KAT-7 data by UCT researchers .



Wise W1 (blue), W2 (green), W3 (orange) and W4 (red) colour combination image of NGC 253.

Computer Science Team Programming Contest



Thanks to the record-breaking interest in team programming contests, 20 teams of 3-4 students entered the mini contest held by the Computer Science Department at UCT on Thursday May 7. They were tasked with solving as many problems as possible in one hour, using only one PC per team. It was a friendly contest, where students practiced for the upcoming Standard Bank IT Challenge contest, and applied content they recently learned in class, in a fun manner.

The first prize was won by the team “asyncabacus”, consisting of the CS Honours students Jarred de Beer, Leonard Botha, Steven Rybicki, and Nicole Petersen, earning the honour and a 8GB flash drive for each team member. Second prize (and 4GB flash drives) went to the “#!Map Filter Reduce” team, consisting of 2nd-year CS/Maths students **Guy Paterson-Jones, Tashiv Sewpersad and Sinead Urison**, and the third prize (a UCT mug) went to the “Brogrammers”, composed of **Ngoni Choga, Mitch Myburgh, Paul Mwangi, and Ntokozo Zwane**. The difference between 4th and 5th place—“Some Boastful Internet Trolls Code” and “This Was Easier Last Year”—was a mere 5 seconds.

The top 15-20 teams participated in the IT Challenge heats on May 16, and the winning UCT team will represent UCT at the IT Challenge finals in August 2015, competing against the winners of 8 other South African universities.

The mini contest was made possible by the input from Stephan Jamieson, Samuel Chetty, and Maria Keet, and the prizes were sponsored by the Computer Science Department, thanks to previous IT Challenge winners.

STAFF NEWS

WELCOME TO NEW STAFF

Department of Archaeology:

- Dr Jayne Wilkins—Lecturer

Department of Chemistry

- Mr Zaeem Najaar—Administrative Assistant
- Noluthando Ngqanya— Departmental Assistant

Drug Discovery & Development (H3-D)

- Dr Gregory Basarab—Principal Research Officer
- Dr Diego Cabrera—Principal Scientific Officer
- Dr Claire Le Manach—Principal Scientific Officer
- Candice Soares de Melo—Principal Scientific Officer

Department of Computer Science

- Professor Robert Simmonds—Professor
- Dr Brian De Renzi—Senior Lecturer

Department of Environmental & Geographical Science

- Tanya Basadien—Senior Secretary

Department of Mathematics & Applied Mathematics

- Dr Tamar Janelidze-Gray—Lecturer
- Mr Ruan Moolman—Lecturer

Percy Fitzpatrick Institute

- Dr Susan Cunningham—Lecturer

FAREWELL TO STAFF

Department of Biological Sciences:

- Dr Lesego Khomo
- Shaamilah Davids
- Judith Ginindza
- Margaret Koopman

Department of Chemistry

- Dr Banothile Makhubela
- Alice Khoury

Department of Mathematics & Applied Mathematics

- Filip Cools
- Julian Gordon

Department of Oceanography

- Pavs Pillay

Department of Physics

- David Britton

Department of Statistical Sciences

- Katya Mauff

CONGRATULATIONS

Husband and Wife Graduate with PhDs in Chemistry together

Married couple **Ahmed Hammouda** and **Fatin Elmagbari** are graduating with their PhD's in Chemistry in June. Not only have they achieved their PhD's together, but they also produced a baby during their studies! Professor Graham Jackson was the supervisor to both Ahmed and Fatin.

They are both lecturers at Benghazi University, Libya. When they arrived in South Africa, they could not speak English and embarked on 8 months of learning English. Their daughter was only 3 months old and got very lonely, because both parents were so focused on their PhD research, so they decided to have another child. Their son was born with a heart defect and had to have 3 operations, so it was stressful juggling motherhood for Fatin, but her passion for Bioinorganic Chemistry and their great perseverance brought two successfully completed PhD's.



Ahmed with Professor Graham Jackson and Fatin.

Promotions in the Faculty

On 17th February a celebratory dinner was held to congratulate the 104 academic and technical staff members of UCT who were promoted *ad hominem* in 2014, with effect from January 2015. 14 of these were from the Science Faculty and we congratulate them on their outstanding achievement: They are

<u>Department</u>	<u>Title</u>	<u>Name</u>	<u>Promoted to</u>
Astronomy:	Dr	Vanessa Mc Bride	Senior Lecturer
Biological Sciences	Dr	Jacqueline Bishop	Senior Lecturer
Biological Sciences	Dr	Deena Pillay	Senior Lecturer
Physics	Dr	Will Horowitz	Senior Lecturer
Archaeology	Dr	Shadreck Chirikure	Associate Professor
Oceanography	Dr	Isabelle Ansoorge	Associate Professor
Maths & Applied Maths	Dr	Jeffrey Murugan	Associate Professor
Environmental & Geographical Science	Ass. Professor	Maano Ramutsindela	Professor
Physics	Mr	Mark Christians	Senior Technical Officer
Oceanography	Dr	Raymond Roman	Chief Scientific Officer
Chemistry	Ms	Dalielah Jappie	Principal Scientific Officer
Chemistry	Ms	Claire Lawrence-Naidoo	Principal Scientific Officer
Biological Sciences	Ms	Petra Muller	Principal Technical Officer

Wedding Bells in Physics



Judith Zeilinger, a Master's student in Physics recently married Ryan Alcock. Judith is from Austria, where she completed her schooling. She came to South Africa for a gap year as a volunteer and that was where she met Ryan. Ryan is one of the reasons she is still in South Africa! Judith worked for a while and even studied music for a year at UCT before embarking on a Science degree. She is currently doing her Masters in Theoretical Physics, specialising in QCD and her supervisor is Associate Professor Heribert Weigert.

Judith said that planning a wedding while studying was extremely stressful but the wedding day was really special and worth all the effort!

Once her Masters is complete, Judith and Ryan would like to go to Europe for Judith to do her PhD there.

Two postgraduate students in Physics tie the knot....to each other

Charlotte Hillebrand and **Brendan Viljoen**—both Postgraduate students in the Department of Physics recently got married.

Charlotte and Brandon got to know each other in an argument over Lagrangian mechanics at UKZN. They turned out to have a lot more in common than their mutual interest in Physics.

They were married on the seventeenth of January 2015 at Claremont Methodist Church.

Both are currently working towards an MSc in theoretical physics at UCT.

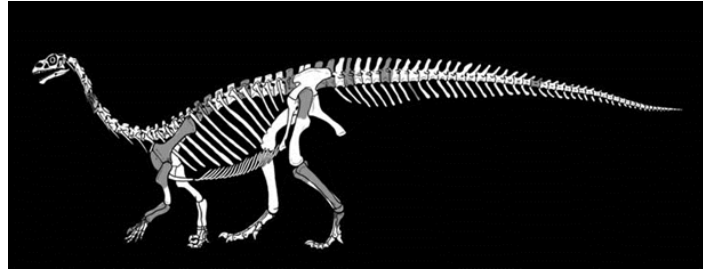
Next year, Brandon intends to venture forth into industry and Charlotte is planning to continue with a PhD.



Research Bytes

New Sesotho-named dinosaur from South Africa

South African and Argentinian palaeontologists have discovered a new early dinosaur from South Africa. The specimen was found in the late 1930s, in the Zastron area of South Africa about 30km from the Lesotho border. Close scrutiny of the fossilized bones of this approximately 200 million year old dinosaur has revealed that it is a completely new dinosaur. One of the most distinctive features is that one of its foot bones, the astragalus, has a “cross” shape, for which the dinosaur is named. Considering the location of the fossil discovery, it was decided that a Sesotho name would be appropriate, and since in Sesotho, “sefapano” means “cross”, the dinosaur was named *Sefapanosaurus*.



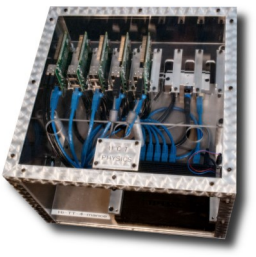
Sefapanosaurus as compared to a soccer player to give an idea of its size! Shaded bones in the *Sefapanosaurus* skeleton shows the fossilized remains in the collections.

Professor Anusuya Chinsamy-Turan from the Department of Biological Science and PhD student, **Emil Krupandan** are part of the team that named the dinosaur. The remains of the *Sefapanosaurus* include limb bones, foot bones, and several vertebrae. It is considered to be a medium-sized sauropodomorph dinosaur i.e. among the early members of the group that gave rise to the later long necked giants of the Mesozoic. Professor Chinsamy-Turan says, “The discovery of *Sefapanosaurus* shows that there were several of these transitional early sauropodomorph dinosaurs roaming around southern Africa about 200 million years ago.”

Argentinian co-principal investigator of the RSA-Argentina collaboration Dr. Diego Pol says, “This and other recent dinosaur discoveries in Argentina and South Africa are revealing that the diversity of herbivorous dinosaurs in our continents was remarkably high back in the Jurassic, about 190 million years ago, when South America, Africa, and other southern hemisphere continents were a single supercontinent known as Gondwana.”

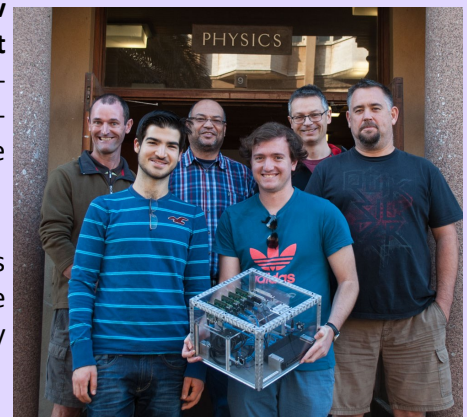
Physics Team builds mini supercomputer from scratch

A team of students and staff from the Physics department has just built a mini supercomputer from scratch. The computer, wittily named H- π -4-mens, is a raspberry pi elements computer. The process of designing, building and programming the computer was an valuable learning experience for those involved and has generated interest from CERN. It is the same as the computers at the High Performance Computing Centre in Mowbray, only less powerful.



Professor Andre Peshier from the Department of Physics wanted to get first year students involved in a project and heard about other universities where students built a cluster computer as a tool. He thought building a “super computer” would be a valuable learning opportunity for students. When returning from a conference, he brought back raspberry boards (similar to those in a cell phone), which he had purchased for €30 a piece. **Trystan Lambert** and **Victor Gueorguiev** were two first year students who were involved, together with **James Dickson**, **Clint Sadler** and **Kerwin Ontong**. Trystan built the parallelized system and set up the configuration, whereas Victor got the software running. Kerwin and Clint did the electronics and came up with the design, and James built the housing structure for the machine.

In terms of the cost of building this computer, Professor Peshier says that it costs less than that of a small computer. The H- π -4-mens computer is a training vehicle and this new invention will hopefully create a tool to provide some fun, creativity and solve physics problems, as well as bringing fresh blood and new techniques and paradigms into the department of Physics.



Back: l to r: Clint Sadler, Kerwin Ontong, Prof Andre Peshier & James Dickson

Front: Victor Gueorguiev & Trystan Lambert

Earliest Evidence of Human Mushroom Consumption detected



El Mirón Cave entrance

The human diet during the Magdalenian phase of Europe's Upper Paleolithic is poorly known. This is particularly a problem regarding food resources that leave little trace such as plant foods. A new study suggests that already Upper Palaeolithic individuals used a variety of plant foods, including mushrooms. Although the Magdalenian in much of north-west Europe is commonly characterised as the period of the 'reindeer hunters' this is unlikely to have been the case in Iberia. Other lines of evidence showed diet included a substantial amounts of meat supplied from Red deer and ibex, but until now it was unclear if foods such as plants were a component of diet.

A study lead by Robert Power, a PhD candidate in the Plant Research Group of the Max-Planck Institute for Evolutionary Anthropology co-supervised by **Dr Domingo C. Salazar-García** from the Department of Archaeology at UCT, has explored diet in the region through dental calculus analysis on Magdalenian individuals found at El Mirón Cave (Cantabria, Spain). Optical and scanning electron microscopy with energy-dispersive X-ray spectroscopy detected a diverse assemblage of microremains from the dental calculus. These microremains from plant, fungal, animal and mineral sources provide some indication of Magdalenian diet. These types of microremains show that the individuals at El Mirón consumed a variety of plants from different environments, as well as other foods, including possibly bolete mushrooms.

Archaeologists know almost nothing about the early use of fungus. Although its use is poorly understood in prehistory, ethnographers have noted that recent hunter-gatherers have often used fungi as food, flavouring and medicine. Mushroom use has been firmly identified from as early as the European Chalcolithic. The Chalcolithic Tyrolean Iceman "Ötzi" carried several types of fungi on his person. This finding at El Mirón Cave is likely the earliest indication of human mushroom use or consumption, which until this point has been unidentified in the Palaeolithic.



Plant fragment recovered in human El Mirón dental calculus

Special issue of *Ostrich* in memory of Philip Hockey

"It is with profound respect and honour that we dedicated Volume 86(1&2) of *Ostrich* to Phil Hockey in recognition of his significant contributions to African ornithology", says Dr Rob Little, Associate Editor.

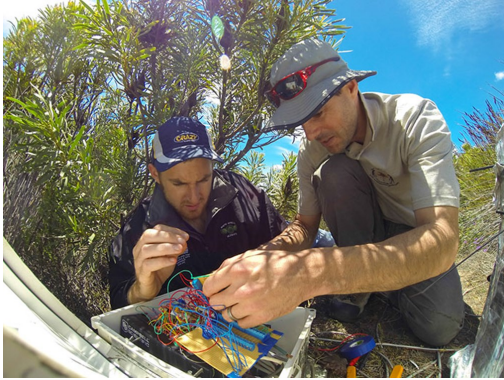
In this special issue

The respect of Phil's contributions to ornithology attracted 20 papers for this special issue, with 12 including Phil as a co-author. There are eight papers on coastal bird ecology, four on avian life history evolution and habitat dynamics, three investigating avian responses to climate change, three on waterbird movements, one on the population metrics of Fynbos birds and a final note on the discovery of a breeding population of Blue Petrels *Halobaena caerulea* on Gough Island. The first five shorebird papers focus on the African Black Oystercatcher, fittingly the cover image for 2015 taken by Jessie Walton, and the species on which Phil led a research programme for more than 25 years. These papers bring this chapter of a long-term single-species study to a close. It has seen the species down-listed from *Near-Threatened* in 1994 to being removed from the Red Data Book of birds of South Africa, Lesotho and Swaziland in 2015.

Three papers on avian responses to climate change deal with behavioural buffers, fine-scale patterns of habitat use, and the impacts on foraging behaviour and body condition. These papers emanate from the research programme which Phil developed with Andrew McKechnie during 2009 and which now has projects in the Kalahari Desert of southern Africa, the Sonoran Desert of North America, and deserts of Western and South Australia. "Hopefully this special issue will also help raise the profile of *Ostrich*, our 'Journal of African Ornithology', and encourage researchers to submit papers of broad ornithological interest to the journal", said Dr Little.



Using Plant Traits to predict the response of Fynbos to drought



Drs Rob Skelton (left) and Adam West attaching probes to fynbos to measure the biological 'pulse' of these plants

Climate change-induced drought is threatening the world's biodiverse hotspots but a new standardizable system to describe drought strategies in plants will help conservationists understand the impact of future drought, says a new paper by Dr Robert Skelton, **Dr Adam West** and Professor Todd Dawson in the *Proceedings of the National Academy of Sciences*.

Much like measuring blood pressure and metabolism in humans to determine how they might react to thirst or hunger, the system measures simple plant traits to get an index for responses to drought-induced starvation and thirst. Understanding how sensitive biodiverse regions are to drought is crucial. But although plant physiologists have hundreds of years of research to draw on, predicting the impacts of drought on plants, particularly those in complex, biodiverse systems, has been difficult.

A key component of the fieldwork involved measuring the "pulse" of the plants. To do that, Dr Robert Skelton, who is now doing postdoctoral studies in plant science at the University of Tasmania in Australia, was up in the mountains before dawn a few days every month to measure the plants' water stress and carbon gain. Part of the project involved building miniature probes and attaching these to plant stems and logging that data, every 15 minutes over two years. Although he found a continuum of drought response strategies in these communities, he also found considerable variation in drought response among the species. "While the three familiar fynbos plant types like restios, ericas and proteas all showed similar classes of response to desiccation or starvation, there were considerable differences among species, showing how important biodiversity might be in protecting ecosystems from change."



Drought-sensitive fynbos.

STUDENT SPOTLIGHT

by Welly Qwabe, PhD Student in the Department of Biological Sciences



I grew up in a small village called Ponta Malongane, in Southern Mozambique and attended school in a small rural town called Kosi Bay in Northern Kwazulu Natal. I studied further at the University of Zululand, where I obtained a first class BSc degree in Biological Sciences and later an Honours degree in Zoology. I then went on to join the University of Cape Town's Marine Research Institute in 2011 to pursue a Master's in Zoology, with support from the Canon Collins Trust, the National Research Foundation and the Carnegie and Andrew Mellon Foundation.

On completion of my Master's degree in 2012, I was awarded a GreenMatter Fellowship to undertake a PhD in Biological Science at UCT. My current research focuses on understanding the interaction between upwelling and ecosystem engineering in structuring benthic assemblages at various spatial and temporal scales in the Langebaan Lagoon. I believe that fundamental ecological research has an important role to play in assisting with policy development and biodiversity conservation. I have also spent time volunteering with an NGO in southern Mozambique, which works on the conservation of sea turtles, and as a keen diver, I have contributed a number of popular articles to a regional diving magazine—SA Divestyle magazine.

I am very passionate about inspiring the next generation of ecologists. While completing my Master's, I joined UCT's Career Guidance Programme to speak to secondary school learners about furthering their education and career choices. During this time, I was also appointed by the faculty of Science to mentor first year students at UCT and I now mentor students who are recruited from disadvantaged schools, assisting with their placement at different universities in South Africa. Through mentorship, I aim to encourage the pursuit of higher education by students from underprivileged families - this is my way of giving back to communities.

Mathematics in Africa Blog site set up.. By Jonathan Shock



In November 2014 during the "AIMS-Imaginary" workshop on mathematics communication in Africa, the idea and first instantiation of a new blogging platform was born. During the conference which included academics and teachers from around 15 countries in Africa, from South Africa to Sudan and from Mozambique to Senegal, there were discussions about many of the problems with language issues surrounding mathematics teaching in South Africa and beyond and about the lack of outreach activity to inspire and educate many young students as to the relevance of mathematics to their lives.

It was decided that an online portal where anybody who wanted to write about mathematics in any African context, in any language, could be a great step in the right direction. And so Mathemafrika.org came into being.

Currently the site is in its infancy, but we have a total of 20 bloggers signed up who are able to write posts whenever they want to about mathematics-related topics at any level. We will soon be putting the framework of the site into more languages and hope to start getting translations of blog posts going at the same time. The development of the site has been funded thanks to the South African Young Academy of Science with the support of **Amanda Weltman** from the Department of Mathematics and Applied Mathematics at UCT.

Eventually we would like to have bloggers from all over Africa writing about topics close to their hearts: be it a school student who has just come across an interesting idea in a maths class for the first time; to a first year varsity student who wants to talk about the shock of moving from matric maths to undergraduate level; to a researcher who wants to write about their paper, or wants to put out a call for collaborators.

We believe that Mathemafrika can be a powerful platform for people to have their voices heard and for young people to be inspired to look further into the beautiful and enormously powerful world of mathematics. For now we hope to see you at www.mathemafrika.org for many mathematical musings!

OUTREACH IN THE FACULTY

Astronomy hosts an Open Day



On Saturday 11 April 2015 the Department of Astronomy held an inaugural Astronomy Open Day. They invited interested learners from Grades 10 - 12 from schools all over Cape Town to visit the department to learn more about Astronomy and what the job of an astronomer actually entails. Staff, postdoctoral researchers and graduate students contributed to various aspects of the day including lectures, activities and demonstrations.

The day's programme included: an introductory lecture on Astronomy; a fun group activity session; a tour of the UCT Astronomy Teaching telescope; an introduction to radio astronomy using a radio telescope in Poland via the internet to do observations; learning to classify galaxies of different types using the citizen science Galaxy Zoo data; discussion of what studying Astronomy involves at UCT and the transferable skills astronomy students pick up in their degrees that can also be applied outside of science in the world of work.

A fun day was had by all and the Department intends to host another Open Day in the third quarter of this year.

UCT Mathematics Competition: by Professor John Webb

The UCT Mathematics Competition began in 1977 as a school-based event organised by local teachers, and in 1980 moved to the UCT campus. This year was its 39th year, and its 36th year at UCT. The 2015 Competition took place on the evening of Thursday 16 April and attracted a record 7688 entries from 169 schools.



Learners queue to register for the competition



Cynthia Sher

The success of the 2015 Competition is thanks to two teams. A small team of teachers and UCT staff compile the papers, while a very large team (over 300 teachers and students) ran the actual event, using 80 lecture venues across the UCT campus. UCT provided infrastructure: venues, traffic control, security and computer support. But somebody who was far more active for months beforehand, on the night, and weeks after, was **Cynthia Sher**, without whom all this would not be possible. She has worked on the Maths Competition since 1989 - that's 27 Competitions. In her first year there were 3630 entries. This year there were 7688. This is Cynthia's last year, and this is the last report prepared under her expert technical guidance. She has been a tower of strength throughout, and will be missed.

The UCT Mathematics Competition is not an isolated event in the school calendar. There is build-up, as schools select and prepare their teams, and there is follow-up, starting with noisy arguments over the problems in the buses going home. This continues in the classroom, with discussion of the interesting bits of maths found in the papers. Once the preliminary results are tabulated, we send out invitations to the top 30 in each grade, and the top three pairs, to come back to UCT to write two follow-up papers. The top students are invited to attend regular meetings of the UCT Mathematics Circle on Monday afternoons. The Maths Circle is a fast-track enrichment programme, providing stimulation for those who find the school curriculum rather limited and to enlist these students in the Interprovincial Mathematics Olympiad, held in September each year.

Last Laugh

