

SEPTEMBER 2010



Faculty of Science NEWSLETTER

The Faculty at the cutting edge of research

The Faculty constantly produces exceptional research contributions. Refined and relevant research is integrated into research projects, which are of benefit to the industry, the community and the broader South African context.

The Department of Chemical Technology is doing research on the development of nanomaterials that are capable of removing pollutants from water. Research undertaken by our Department of Zoology includes pollution monitoring in aquatic environments and the sustainable utilisation and conservation of freshwater fish species.

Staff in the Department of Physics is playing a part in the ground-breaking research on The Large Hadron Collider. Moreover, the Department of Physics currently operates the only laboratory in Africa where the physical properties of matter can be studied in experimental temperatures below 2 degrees Kelvin and down to within 0.34 Kelvin from the absolute zero of temperature; and in magnetic fields up to close a million times the magnetic field of the earth.

The Faculty is also internationally renowned for its breakthrough in solar energy research, which opens new possibilities for affordable electricity from the sun.

Another example of the Faculty's social responsiveness is *The Enerkey Sustainable Mega-Cities* project which is a collaborative initiative between, amongst others, UJ and the University of Stuttgart. In collaboration with our German partners, the Faculty addresses energy related technical, economic, ecological and social challenges with the aim of uplifting the urban region of greater Johannesburg. Our Department of Botany and Plant Biotechnology played a key role in the ground-breaking discovery of a 'barcode' gene. This gene provides scientists with innovative ways to easily identify different plants by analysing the DNA of the species. Further, this Department is developing an extensive global database of DNA information from the majority of tree species on earth and is also delivering excellent research results in plant classification and the use of medicinal plants.

IN THIS ISSUE RESEARCH FOCUS AREAS WITHIN THE FACULTY | MILESTONE IN PHYSICS RESEARCH | AWARD FOR PHYSICS | STUDY SHOWS TIGERFISH BECOME TWICE AS OLD | CATCH AND RELEASE FISHING | SCHOLARSHIPS OF CANSA | FIRST YEAR EXPERIENCE | SET SUCCESS STORY FROM GEOLOGY | COLLOQUIUM OF AFRICAN GEOLOGY | AU REGIONAL SCIENTIFIC AWARD FOR WOMEN | PUBLIC LECTURES | ACHIEVEMENTS BY STAFF AND STUDENTS | NEW BOOKS



Research Focus Areas within the Faculty

Academy for Information Technology

One of the Academy's areas of research is that of Information Security. Research projects in this area cover the whole spectrum of Information Security – from the more technical side to the management and governance side.

Another area of research is that of Agents Architectures and Agent Applications. Research projects in this area focus on the component-based embedding of Agent-enhancing characteristics in Agents and Multi-Agent Systems (MAS).

A third area of research is that of Computer Graphics. Research projects in this area focus on modelling and visualization, but also include aspects of computational geometry and other topics.

Applied Mathematics

Research in the Department comprises projects in quantum calculations; non-linear dynamics; deterministic chaos; fractals; wavelets; cellular automata;

neural networks; genetic algorithms; numeric analysis; symmetry solutions of differential equations; computer algebra and software and hardware development.

Biochemistry

Research activities in the Biochemistry division focus on host : pathogen interactions and special emphasis is placed on defence mechanisms in the host and factors that determine susceptibility. This research is conducted in host : pathogen models of both plant and animal systems, and provides students with a unique opportunity to obtain biochemical training in an environment in which both plant and biomedical biochemistry is practised. This lateral approach to host : pathogen interactions is carried out biochemically, molecular biologically, genetically or cytobiologically.

Another focus is the interaction of stress responses and defense responses, with emphasis on programmed cell death in two different model systems. When an organism is subjected to a physiological or environmental stress, a set of highly conserved proteins, known as heat shock proteins, are expressed, and

function to assist with protection against the stress condition. However, if the cell cannot recover and is damaged beyond repair, it is then programmed to undergo cell death, a process known as apoptosis. The research explores the mechanisms how heat shock proteins function in the adaptive responses to stress, including programmed cell death, in normal and mutated plant cells or malignant/cancerous cells.

The genetics of host susceptibility to human pathogens are also studied and here the investigations focus on connection between the promoter structure of the vitamin D receptor gene, epigenetics and susceptibility towards tuberculosis. Another focus is the interaction of histone proteins with DNA and how post-translational modifications can affect gene transcription.

Botany and Plantbiotechnology

Plant Growth and Development

The main thrust of research in this field is in the areas of plant biotechnology and postharvest physiology and technology of fresh fruit, vegetables and cut flowers.



Taxonomy, Medicinal Plants and Ethno Botany

The Department is widely known as a centre of excellence in the field of African medicinal plants, ethno botany and the classification of African plants. One of the main aims of their taxonomic endeavour is to investigate the taxonomic, genetic, chemical and geographical variations in various commercially important indigenous plants, especially those that are potentially useful to the pharmaceutical industry.

Regional patterns of biodiversity and conservation in South Africa: The flora of the Kruger National Park

A thorough understanding of biodiversity patterns and processes is also required for efficient conservation. Indeed, one of the biggest challenges for conservation biology is to provide conservation planners with ways to prioritise effort. Much attention has been focused on species richness and endemism; however, the conservation of evolutionary process is now acknowledged as a priority in the face of rapid global change. With this research, a synthetic approach is taken towards explaining the evolution of biodiversity within one of the world's most renowned protected areas, the Kruger

National Park. The scientific goal is to understand how evolutionary history and ecology have shaped biodiversity in the region, and to use this new knowledge to help design science-based conservation actions.

Chemistry

Research in the chemical sciences focuses on three areas, namely synthetic methodologies, speciation analysis and water treatment, and the determination of molecular structure.

Synthetic Organic Chemistry

The research programme in synthetic organic chemistry focuses on synthetic methodologies of industrial and pharmaceutical interest.

The Catalysis Research Centre

Catalysis is a means of facilitating chemical reactions that are otherwise difficult or uneconomical to perform. The catalyst may be in the same phase/medium as the substrate (homogeneous catalysis) or in a different phase (heterogeneous catalysis). There is a global need for improved catalyst systems in terms of catalyst performance, longevity and recyclability in all areas of endeavour relating to the manufacture of chemicals. Accordingly, it is a focus of this research centre to investigate

catalysts with improved performance characteristics as measured against selected benchmark systems.

Water chemistry, element and species analysis

This research programme focuses on water chemistry and the analytical chemistry of chemical species of the same element in different physico-chemical forms, eg elements in different oxidation states, state of complexation, and adsorbed species.

Crystal and Structural Chemistry

This program is concerned with the phase chemistry of industrially important materials, with the focus on the mineral and wax industries. The relationships between structure and properties of the crystalline forms of these materials are studied by the determination and analysis of their three-dimensional structures. The use of supramolecular techniques for the preparation of unique compounds is stressed.

Chemical Technology

The research in the Department is mainly focused on four research areas: nanomaterials research which is part of the Center of Excellence for Strong Materials established by the Department of Science and

Technology, water treatment research which is part of the UJ water and health research, a NRF recognized research niche area, natural products and phosphorus chemistry. The Water Research Group in the Department has been recognized by the Department of Science and Technology as a Nanotechnology Innovation Centre (Water research platform).

Nanotechnology

UJ's involvement in nanotechnology research dates back six years, spanning four key thrusts – the development of novel carbon-based nanomaterials, their modification to act as supports for other chemicals (such as catalysts), the development of “nanosponges” for the purification of water, and developing an understanding of nano-scale magnetic material properties. Through these research efforts the UJ has gained national recognition for a sound research programme in this domain, and is a formal partner in the NRF/DST Centre of Excellence for Strong Materials (centred at Wits University) and the DST/Mintek Nanotechnology Innovation Centre. The programme has also recently been formally approved as a Developing Research Niche Area by the NRF.





Nanomaterials

This research group focuses on the synthesis, functionalisation, characterization and applications of carbon-based nanomaterials. The team has just been granted an NRF Research Niche Area on Carbon Nanomaterials Science and Engineering at a developing level of activity.

Water treatment research

There are two main thrusts in the water research field. One focuses on nanoporous polymers (alias nanosponges) for use in water purification. Other research focuses on water quality and the effects on industrial and domestic usage.

Natural products

This research group focuses on identifying and sourcing indigenous Southern African medicinal plants.

Phosphorus chemistry

This area focuses on the synthesis of phosphorus derivatives and their application as organic synthesis tools, bio-medical agents, and material precursors.

Food Technology

Various projects are conducted in collaboration with the private sector on mycotoxins in milk and maize and within the field of brewing and beverage production.



Geography, Environmental Management & Energy Studies

Sustainable Energy and Geo-Informatics (consisting of Geographic Information Systems (GIS) and Remote Sensing) are the main research areas in the Department. A flagship project in the Department is ENERKEY.

Enerkey

Enerkey Sustainable Mega-Cities Project is a collaborative initiative between UJ, Tshwane, Ekurhuleni and Johannesburg, the University of Stuttgart and the Metropolitan Council of Stuttgart, Germany.

Geology

Projects are undertaken in cooperation with various institutions and universities worldwide.

Centre in Economic Geometallurgy (integrated with the Paleoproterozoic Mineralization (PPM) Research Group)

The Paleoproterozoic Mineralization (PPM) Research Group in economic geology and geometallurgy already enjoys national recognition and international exposure, with the UJ's first NRF Research Chair awarded to the group's leader.

Mathematics

Graph Theory

One primary activity is modeling, a process involving formulating a problem in such a way that it can be attacked by techniques in Graph Theory.

Functional Analysis

Research in the Department specializes in the more abstract setting, where we employ the latest techniques to obtain results connecting the algebraic and spectral structure of elements in the particular Space.

Logic

Research in this area focuses mainly on modal and algebraic logic.

Physics

Four main directions of Physics research are pursued

Magnetism and ultra-low-temperature Physics

This group focuses on magnetic effects in the elasticity, thermal expansion and electrical transport properties of chromium and chromium alloys.

Photovoltaics

The structural, optical and electrical properties of the thin films are investigated as function of the growth parameters in order to produce materials for the fabrication of high efficiency solar cell devices. Besides fundamental material science, innovative technologies are developed in order to produce cell structures on flexible polymer and metal substrates.

Astrophysics & Atmospheric Physics

A variety of topics are researched: (i) the theory of physical processes in neutron stars, (ii) time series analysis of astronomical data, (iii) the spectral characteristics, variations and luminosity of active galactic nuclei, (iv) the attenuation of

solar and stellar radiation in the atmosphere and (v) the optical characteristics of aerosols and their impact on the global radiation balance.

Statistics

The main fields in which research is undertaken in the Department are Financial Statistics and Industrial Statistics. The applications are primarily in finance and in industrial quality control.

Zoology

Aquatic ecotoxicology

Over the last 20 years a group of scientists in the UJ Zoology Department have developed a branch of aquatic research into the field of freshwater and estuarine eco-toxicology.

A specific strength of this research programme is its external applied and consulting research activities that ensure constant feedback on national research priorities into the programme.

Other research areas:

Pollution:

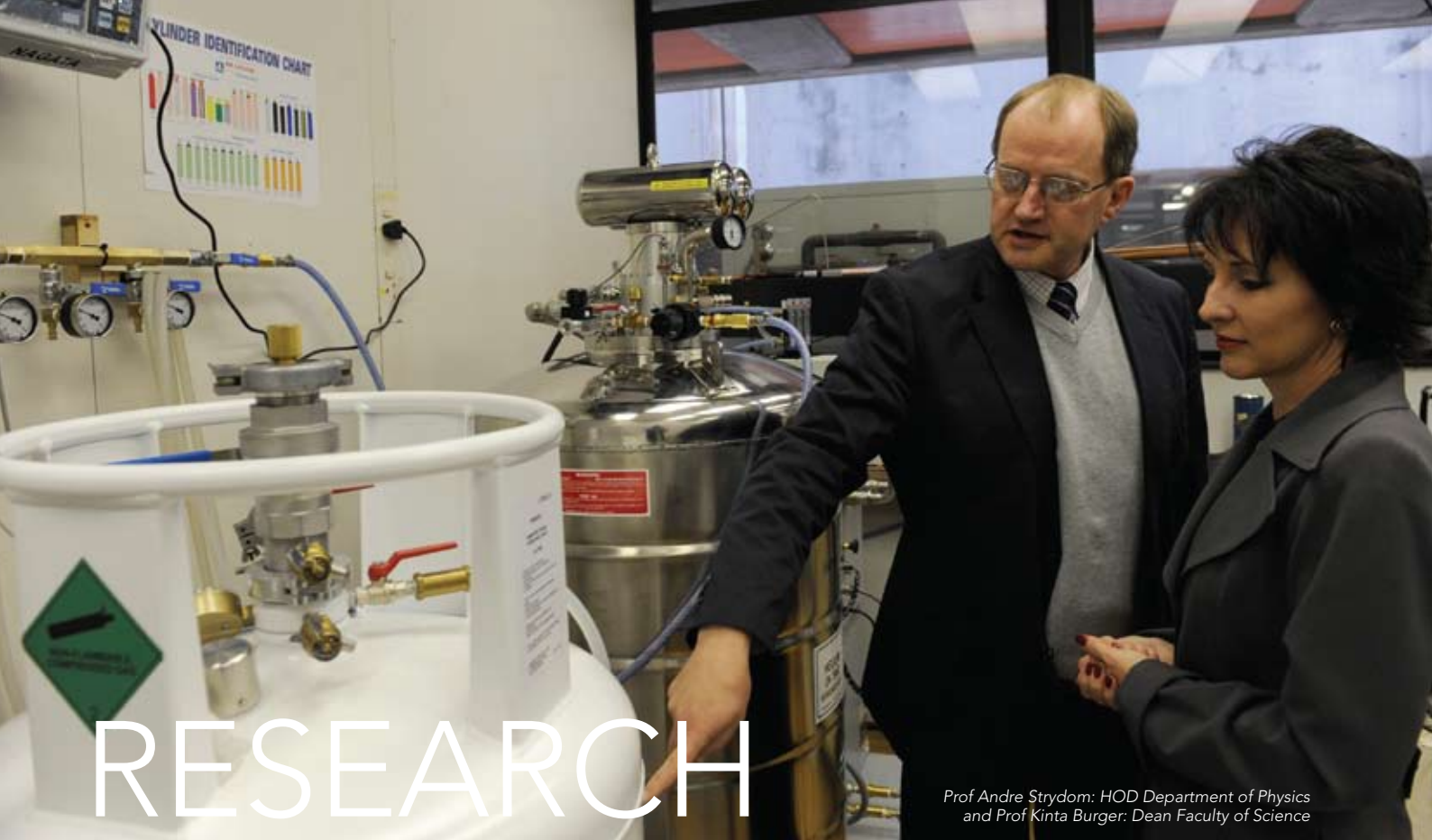
Physiological effects (Biomarkers)
Fish health index (Including Parasitology)
Effects on reproductive Physiology
Histopathological effects
Biological control of water plants
Aquatic integrity

Population Genetics:

Molecular Taxonomy

Biosystematics :

Comparative Morphology



*Prof Andre Strydom: HOD Department of Physics
and Prof Kinta Burger: Dean Faculty of Science*

RESEARCH

RECYCLING HELIUM

Plans for recycling helium as part of the cryogenics operations in Physics came to fruition, and in the process they have reached another milestone in Physics research on the Continent.

Helium is an increasingly scarce commodity. The second lightest element in nature, it has found particularly useful application as a gas with which very low temperatures can be reached in a laboratory through liquefaction of the gas to its condensation point at about -269°C . Refrigeration applications of helium in its liquid state include providing low-temperature specimen and measurement conditions in fundamental Physics, Chemistry, and Materials research, enabling the operation of superconducting magnets for research involving magnetic fields as well as for sophisticated medical diagnostic procedures, and providing operating conditions for particle detectors.

Having recently become the largest single consumer of liquid helium in South Africa for research at very low temperatures and high magnetic fields, the group of Prof Andre Strydom ventured into the unknown with this research commodity and

started looking for sources of liquid helium other than having to import it at considerable cost. Thus they embarked on a road towards manufacturing their own liquid helium by liquefying gas-phase helium.

Persistence finally paid off they reached the critical condensation point for turning helium gas into the precious liquid which they use as a cryogenic fuel for their experimental stations and superconducting magnets. But it took another 24 hours until they became the first laboratory on the continent to collect liquid helium by the pulse-tube method of liquefaction and, in fact, the only installation in Africa to produce liquid helium.

Work is now in progress to saddle up the first two cryogenic stations in Physics in tandem with the liquefaction plant in order to recycle our helium on the road to self-sufficiency. As more helium-based research stations come in operation in the rapidly growing experimental research environment of Physics at UJ, the recycling of liquid helium is destined to turn our cutting-edge research into a sustainable cryogenics operation.

But this success story continues ...

Just a few weeks ago Prof Strydom implemented the first test

phase of recovery of helium gas to the liquefier, from where the previously tested liquefaction was supposed to take place.

One of the existing two low-temperature measurement stations in his lab was brought online into the helium pressure circuit...and the results were a big success. The feed from ultra-high purity and expensive purchased helium gas from local high-purity gas suppliers dropped by about 20%, meaning that gas boiling off from the low-T station was being liquefied.

Soon thereafter, implementation of the second low-T station (SQUID magnetometer) was pursued. Another smooth and painless incorporation followed. The two low-temperature systems have been running on the recovery line ever since.

The result?

Our liquefaction and recycling efforts are henceforth saving the University Research Committee and other funders of the Low-temperature Research Laboratory of the order of R 1500 per day, 7 days of the week, 52 weeks of the year while at the same time nursing one of the scarce cryogenic commodities of planet earth. Truly an advance in making research more affordable and sustainable.

Milestone in Physics Research on the Continent

Award for Physics from National Equipment Programme of NRF

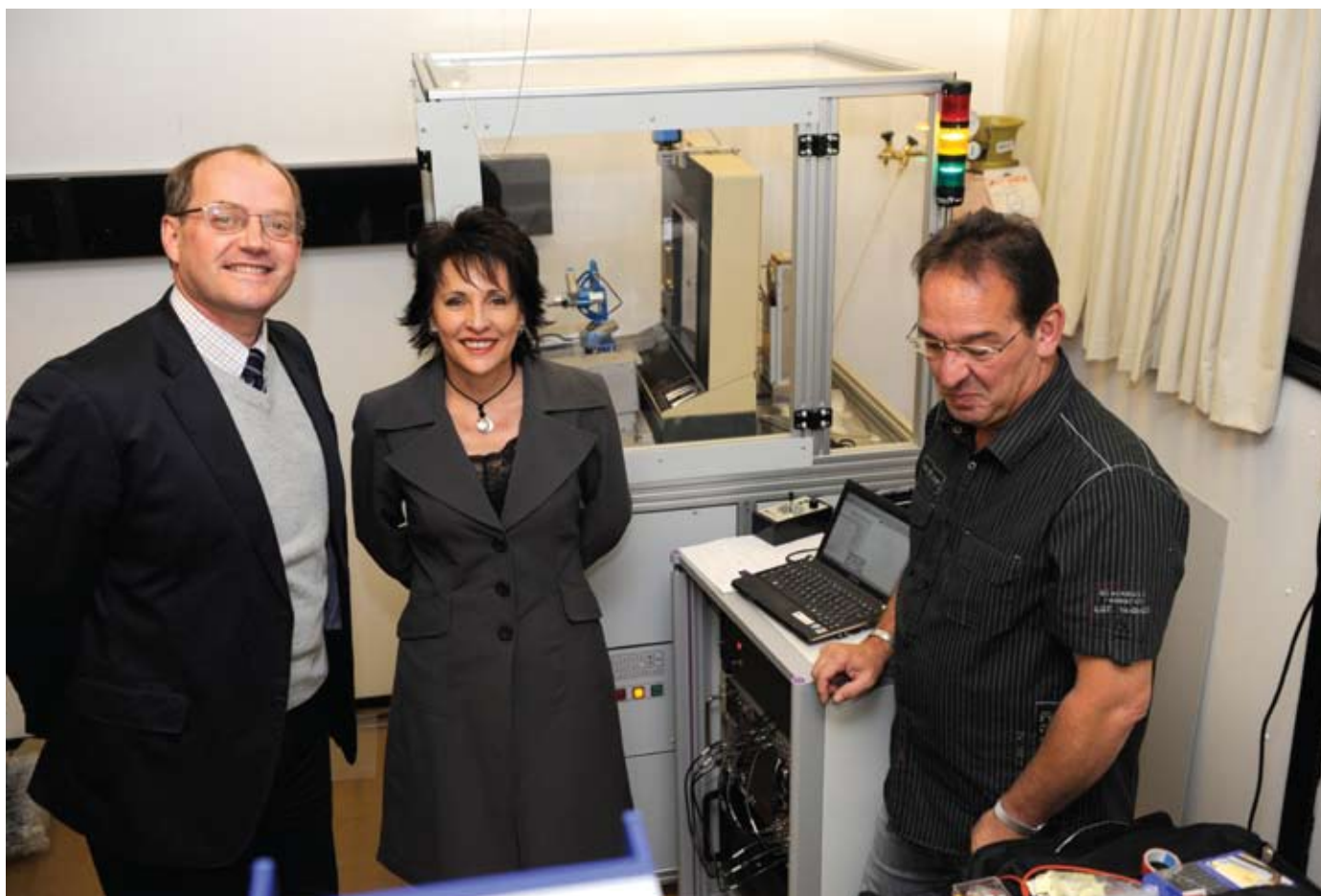
In the 2010 award nomination under the Research Infrastructure Support Programme of the SA National Research Foundation (NRF), a grant amounting to R 2.1 million rand was awarded to Prof AM Strydom of the Department of Physics, Faculty of Science for a Single-Crystal Alignment Facility. The award comprises the amount of R 600 000 co-invested by the University Research Committee of UJ.

A fiercely competitive programme at the NRF, the research equipment grants at the NRF are understandably very highly sought after for their instantaneous injection of large capital into the building up of research facilities in the experimental sciences that are otherwise very difficult indeed to fund under ordinary running expenses and other grant awards.

This will be the only crystal orientation facility of its kind on the continent. Cutting-edge technology of X-ray sensing elements, high-speed radiation detection and extraordinary image resolution are coupled with high-end digitizing software in this new generation of X-ray scattering hardware to produce real-time crystal orientation and imaging. Directing a well-focused X-ray beam onto a single crystal, the highest form of atomic order in the solid state world around us, permits a glimpse into the atomic world in much the same way that an X-ray photograph allows us to peer at the bones deep within the human body. Condensed matter Physicists need to know the way in which atoms are packed in a single crystal in order to measure physical properties that can be completely different along various directions along

such a crystal. In extreme cases a single crystal might be a good electrical conductor in one direction, and a near-insulator in other directions. In certain examples the single-crystal state of a chemical element might have an appearance worlds apart from the non-single crystal state: compare common graphite in a pencil, a polycrystalline state of the element carbon, with diamond, which is nothing but a single crystal state of the very same element, carbon. Research that attempts to explain such phenomena require well-oriented single crystal sample material.

This prestigious new crystal orientation facility is a much needed tool in Condensed Matter and the related branches of Physics and Materials research, and will put Physics at UJ back at the forefront of single-crystal research capability.



Prof Andre Strydom: HOD Department of Physics, Prof Kinta Burger: Dean Faculty of Science and Dr Andreas Erb from Germany.



Results from a study by Ruan Gerber, a MSc student supervised by Prof Nico Smit in the Centre for Aquatic Research (CAR) at the University of Johannesburg's Department of Zoology, Faculty of Science, is shattering all beliefs around southern Africa's tigerfish – showing that they can live for up to 20 years – twice the age once thought.

Millions of people in Africa depend on the livelihoods derived from inland fish, either as a source of food or a means of income. This is especially so for the communities living around the Okavango Delta in Botswana.

One of the most well known species of predatory fish found in the Okavango Delta is the tigerfish (*Hydrocynus vittatus*). Famous for its ferociousness and fighting spirit, the tigerfish is highly sought after by sport fishermen, and tigerfishing forms an important component of the large commercial and recreational fishery in the region. Yet, despite its popularity, relatively little is known about the ecology of this species, especially its age structure, something the CAR hoped to rectify through its three-year study undertaken with the support of AIRES-SUD – a programme of the French Ministry of Foreign and European Affairs.

Gerber and Smit's study, which explored the age structure, growth rate and size at maturity of tigerfish in the Okavango Delta, was the first of its kind to

be performed on this particular species. These researchers not only looked at determining the age of fish, but also investigated the techniques best suited to determining this in this specific species. One of the CAR's researchers, Prof Nico Smit, explained that any errors in the age-based assessment of the growth and mortality rates of a species could lead to errors in the management of the fishery. There are many examples in which incorrect age determination has led to overexploitation of the fish species.

Exploring techniques

The CAR researchers caught more than 200 tigerfish along 20 km of the main river channel in the Okavango Panhandle, south of Shakawe. The fish were caught using standard recreational angling gear. The live fish were transported to a field laboratory where, among others, the researchers recorded the weight and total length (the length from the tip of the snout to the tip of the longer lobe of the caudal fin).

Previous age and growth estimates of tigerfish in Africa were based on scales and no age or growth analyses had been done on this species in the Okavango Delta prior to the CAR study. The Centre's researchers collected relative age data from scales, as well as whole otoliths and sectioned otoliths and indices of bias and precision were used to select the most

appropriate method. Relative age data collected using this method were then used to provide information on growth rates as well as size and relative age at sexual maturity of both sexes.

Using sectioned otoliths proved to be the most appropriate method for ageing tigerfish. Otoliths, small white structures found in the head of most fish, provide a sense of balance to fish in much the same way that the inner ear provides balance in humans. They are used extensively in studies to understand the life of fish. This is because otoliths have growth rings (annuli) not unlike those of a tree which record the age and growth of a fish.

Interesting findings

One of the most significant findings of the study was the maximum lifespan of the fish – 20 years. This is twice the age previously thought and makes tigerfish relatively long-lived compared to other African fish species. Smallmouth yellowfish (*Labeobarbus aeneus*) and longfin tilapia (*Oreochromis machrochir*), for example, only live about half as long.

The researchers also found that male tigerfish, who grow to be much smaller than the females, tend to live longer (up to 20 years compared to 16 years for females). While just about as many male as female tigerfish are caught, the males seldom exceeded 2 kg and 600 mm in length, while females easily grew

Study shows Tigerfish become twice as old as we thought



The research team members (Prof Nico Smit, Dr Wynand Vlok, Dr Jan Roos, Prof Victor Wepener and Prof Johan van Vuren) on their way to a good fishing spot.

up to 7 kg and 960 mm. This is important from a conservation point of view as it means that the large trophy fish – especially sought after by game fishermen – are mature females, which could affect the sustainability of the fish population in the long term.

The study indicated that both sexes of tigerfish grow rapidly during their first four years of life at a rate of 120-160 mm a year. This initially rapid growth rate is attributed to the fact that juvenile fish need to reach a size large enough to avoid predation

especially from the large African pike (*Hepsetus oideus*) and the larger of their own species which also feed on young fish.

The fish (both male and female) reach maturity at four years of age. Thereafter males may only grow another 60 to 100 mm in length during their next 15 years of life, whereas females may grow another 130 mm to 150 mm in the same period. Females tend to double their mass from 590 mm (2 kg) to 710 mm (4 kg).

It is hoped that these findings will go a long way towards

developing a comprehensive fisheries management plan for sustainable tigerfishing in the Okavango Delta.

The results from this study was published in the African Journal of Aquatic Science with reference: Gerber R, Smit NJ, Pieterse GM and Durholtz D (2009) Age estimation, growth rate and size at sexual maturity of tiger-fish *Hydrocynus vittatus* from the Okavango Delta, Botswana. *African Journal of Aquatic Science* 34: 239–247.



Ruan Gerber (left) and Prof Nico Smit (right) with tigerfish they caught as part of this study in the Okavango Delta, Botswana. Ruan's fish was a 12 year old 3.5kg female and Prof Smit's a 16 year old 6.25 female.

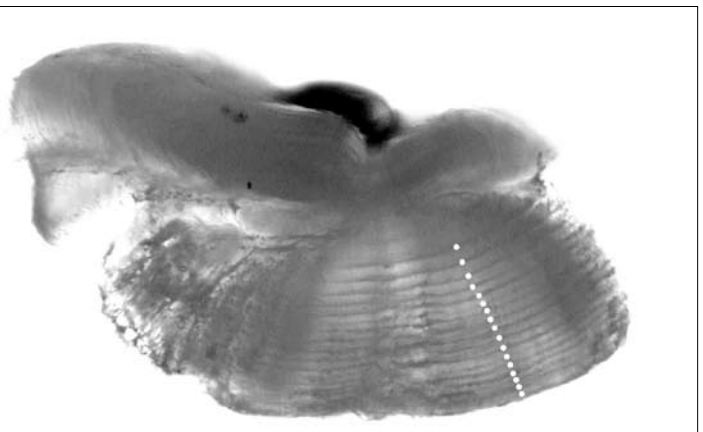


Photo of a sliced lapillus otolith with the dots indicating the different growth zones. When calculated the growth zones of this specific tigerfish gives it a relative age of 17 years.

Is catch and release angling placing undue stress on the Okavango Delta's tigerfish population? A team from the Centre of Aquatic Research (CAR), Department of Zoology at the University of Johannesburg spent some time in this African oasis to find out.

To many anglers, the tigerfish (*Hydrocynus vittatus*) is the epitome of Africa's freshwater game fish species. This highly-prized game fish is known for its ferociousness and its fighting spirit.

Considered one of the most important predatory fishes in Africa, tigerfish are abundant in areas throughout the continent. However, in recent years its numbers have declined in many rivers due to water abstraction, pollution, obstructions such as dams and weirs and fishing pressure, notes Prof Nico Smit, who heads up the CAR. "This has been recognised specifically in South Africa. The tigerfish is now included on the protected species list, together with such marine icons such as the great white shark and the coelacanth, which was once thought to be extinct."

Despite its high profile as a protected ecologically and economically important species, little is known about the biology of the tigerfish, especially in areas such as the Okavango Delta. To date, the majority of research on tigerfish has been on populations from the Zambezi and Olifants River systems.

Popular spot for anglers

The Okavango Delta, specifically the Panhandle region with deeper, faster-flowing water, is one of the most popular areas in Africa for anglers to catch tigerfish. Recreational anglers specifically favour the Panhandle region, as the many tourist lodges and camps dotted around the

area testify. This brings valuable income to the region.

As in other areas in the world, 'catch and release' angling is being actively promoted by recreational angling fraternities in the Okavango Delta to conserve the fish population. While some anglers keep a portion of the tigerfish captured (up to five a day are permitted) many fish are released again shortly after capture.

As Prof Smit points out, while the catch and release strategy is aimed at conserving fish species, its ultimate success depends on ensuring high release survival rates by minimising injury and mortality. Globally, the debate is raging among fishing circles whether catch and release fishing is, in fact, the best approach, specifically in light of the current lack of knowledge regarding the sub-lethal effects and post-release mortalities this approach may have on individual fish species.

The most physically demanding form of exercise stress in fish is capture by angling.

"The specific cause of mortality in fish following exhaustive exercise is unknown, although some studies point to the generation of muscle lactic acid which may produce intracellular acid-based disturbances," reports Prof Smit.

Growing Africa's body of knowledge

Knowledge on the impacts of catch and release is most notably absent for African fish species, something the CAR aims to rectify. During a two-month stint a CAR research team consisting out of Prof Nico Smit, Dr Glyn Howatson and Dr Richard Greenfield studied 66 tigerfish caught and released along a 10 km stretch of the main channel in the Okavango panhandle, south of Shakawe, in Botswana.

All fish were captured from a boat using standard recreational fishing gear. Following capture

the fish were anaesthetised for two minutes, blood samples taken, weighed, and measured before being revived and released. For each fish caught the times to land fish and handling procedure (hook removal) were also recorded. The landing and handling times were combined to determine a total angling time. The project team also measured the water temperature daily throughout the collection area.

The level of lactate (a known stress biomarker) was measured for each fish to determine the physiological effect of angling time, fish size and water

Catch and release fishing in the Okavango under the spotlight



Prof Smit and a 6.8kg tigerfish caught during the study in the Okavango Delta

temperature (influenced by the time of year). To serve as controls, 15 randomly selected fish were kept for 72 hours to see what lactate levels would be in unstressed fish (normal conditions).

As could be expected the team found a significant correspondence between the size



of the fish and landing time. What is interesting is that in tigerfish, females are generally found to be heavier than males. The longer a fish took to land, the more stress it seemed to experience (as could be detected from higher lactate levels). The size of the fish did not seem to influence the stress it experienced.

A large degree of metabolic stress was evident in the fish even following angling durations of less than a minute. "The tigerfish blood lactate levels were significantly elevated less than one minute after hooking when compared to the control fish," notes Prof Smit. "This indicates that there is an acute metabolic response that is likely a result of increased muscular work following hooking."

"Since larger fish take longer to land, female tigerfish, which grow the largest – more than 2 kg – are likely to be subjected to greater physiological stress from rod-and-line angling than males," notes Prof Smit. "Since other studies have shown that angling stress may affect spawning behaviour, this certainly requires further investigation, especially since the largest angling intensity in the Okavango Delta ripening of male and female tigerfish."

Water temperature plays an important role in physiological responses to angling. Higher temperatures result in significantly greater responses

to physiological variables such as lactate and cortisol (another stress biomarker) in trout, which may have a detrimental effect on the prognosis of the fish. During this investigation, which took place during spring the water temperature in the Okavango Delta ranged between 22°C and 24°C. In general water temperatures in the delta can vary between 17°C (in winter) and 35°C in the summer months. If the response in tigerfish is similar to trout and salmon, then one might expect far greater levels of blood lactate during the summer months.

According to Prof Smit, this study provides a valuable foundation on which to build future research on the effects of catch and release on African fish species. "Data from this investigation, plus proposed future research, should be used to make sound, evidence-based recreational fisheries management decisions to provide sustainable utilisation of this popular angling species."

A paper reporting the results of this study has been published in the December 2009 issue of the *African Journal of Aquatic Science* with reference: Smit, NJ, Howatson, G & Greenfield, R 2009. Blood lactate levels as biomarker for angling-induced stress in tigerfish *Hydrocynus vittatus* from the Okavango Delta, Botswana. *African Journal of Aquatic Science* 34: 255-259.

FACULTY NEWS

Scholarships of CANSA

The cancer association of South Africa (CANSA) in partnership with UJ, have made available three master's and two doctoral scholarships for students registered at UJ for study in 2010. These scholarships have values of R20,000 for master's and R30,000 for doctoral studies. Areas of study to which these scholarships were applicable include

carcinogens in the environment, health sciences, animal studies and zoology, socio-psychological issues, business management in non-profit organisations, and marketing and communication in non-profit organisations. Of these five scholarships made available, three were awarded to students in the Department of Biochemistry, one was awarded

to a student in the Department of Zoology, and one was awarded to a student in the Department of Educational Psychology.

Congratulations to the following students:

Ms NB Skerman – Master's degree (Biochemistry)

Ms C Orsmond – Master's degree (Biochemistry)

Mr G Müller – Master's degree (Zoology)

Mrs E van der Merwe – Doctoral degree (Biochemistry)

Ms E van Zijl – Doctoral degree (Educational Psychology)

An official award ceremony was hosted at the Cansa National Office.



The Faculty of Science at UJ highly values success of its students and believes that the key for opening doors into success is to invest efforts and time in initiating strong bonds with the first year students at point of entrance into the Faculty. On day one of entrance into the Faculty, intense orientation programme is conducted to intensively inform students of the faculty (Faculty of Science) they have become part of.

We interact with students as persons first before we can

interact with them as scholars of the discipline. One of the main points of focus with our orientation is that the first year student goes through the early days and transition process into the university environment and processes thereof with ease. In team work with the other UJ bodies and systems, we make it a point that the students feel welcome and that they are briefed about the environment and processes they will engage in from day one of their existence at the UJ.

FIRST YEAR EXPERIENCE IN THE FACULTY OF SCIENCE

As an integral part of the orientation programme, we inform the students about the programmes of study prior to registration so they could be in a good position to make better informed decisions in choosing their respective programmes of study. We make it our responsibility that the students are familiarised with the context of learning and teaching in Science at the UJ. We take tours around the campus and in particular to the departmental homes and labs. Students get to initiate social contact with their respective

programme managers.

Throughout the entire first year of study we remain in contact with the students, monitoring their progress, acknowledging their achievements and improvements, encouraging them and advising them about the relevant academic support structures available for them in Faculty of Science and at the UJ as a whole.

We try our best to structure the strong and relevant systems in place to assist increase the chances of success of the individual students.



Ashley Gumsley

SET Success story from Geology @ UJ

Ashley Gumsley is one of the success stories of the SET program. Ashley is a MSc Geology post-graduate student in the UJ Geology Department, and a member of the PPM Research Group. He is being co-supervised by M Knoper, Dr HM Rajesh, and Dr M de Kock. Ashley started his BSc in Geology and Chemistry in 2004, after completing the BSc Bridging Course in 2003. In 2008, Ashley completed his BSc Hons Geology degree cum laude. He started work on his MSc dissertation in 2009 with the title *Establishing a 'bar code' for the southeastern Kaapvaal Craton in northern KwaZulu-Natal, South Africa*.

Ashley will be very busy over the next several months. In January he was voted Chairman of the SAS-SEG (South African Student Chapter for the Society of Economic Geologists), whose membership largely consists of geology students from both UJ and Wits. More recently, Ashley was selected by the Society of Economic Geologists (SEG) to attend the annual 2010 SEG Foundation Student-Dedicated Field Course, taking place across the western United States. The course will emphasize the geology and ore deposits of the Tintic Mining District, the Bingham Canyon Cu-Mo-Au mine, both in Utah, and the Henderson Mo mine in Colorado, together with the stratigraphy and geochemistry of Colorado Plateau uranium-

vanadium-copper deposits. The geologic setting, alteration and mineralization in each of the areas being visited will be reviewed. After the field course, Ashley will be a delegate at the SEG conference in Colorado, where he will be presenting a poster on *Re-evaluating the provenance of gold in the Witwatersrand Basin, South Africa*, using shale geochemistry. Soon thereafter in Denver, he will attend the annual meeting of the Geological Society of America where he will give a presentation entitled *Episodic mafic magmatism during the Mesoarchean to Paleoproterozoic on the Kaapvaal Craton: Implications for cratonic reconstructions*. Finally, Ashley will travel to Sweden, where he will carry out U-Pb age dating on baddelyite (ZrO₂) before wrapping up his busy schedule and arriving back in Johannesburg by January 2011.

Ashley is a success story because he has an inquisitive mind and good interpretative abilities. An intelligent and hardworking student, Ashley has a natural inclination for research. This inclination stems from his curious bent of mind and a nature for questioning. He has the ability to voice his ideas clearly, which greatly enhances his expressiveness when approached by fellow students. His extreme interest, persistent attitude and intellectual curiosity drive him to get deeply involved in his research and excel in it.

COLLOQUIUM OF AFRICAN GEOLOGY FIRST TIME IN SA

23rd *Colloquium of African Geology (CAG23)* will be held for the first time in South Africa, at the University of Johannesburg from 8 – 11 January 2011. The *Colloquium of African Geology (CAG)* is a major biennial meeting organized under the auspices of the Geological Society of Africa (GSAf). The theme for the CAG23 is *Together in Africa for a Leading Role in Geosciences*.

The CAG23 will be organized by the University of Johannesburg in cooperation with the University of the Witwatersrand, the Geological Society of South Africa (GSSA), the Mineralogical Association of South Africa (MINSA, a division of the GSSA) and the Nuclear Energy Corporation of South Africa (NECSA) under the auspices of the Geological Society of Africa (GSAf). The event will take place at the Auckland Park Campus of the University of Johannesburg, while the opening ceremony will take place on the Soweto Campus located in the core of Soweto city.

Further information can be found at www.cag23.co.za or by contacting:

Dr Hassina Mouri
Chair CAG23-SA2011
Department of Geology, University of Johannesburg
cag23@uj.ac.za
Tel: 27 11 559 4706





Dr Hassina Mouri from the Department of Geology has been awarded the African Union Regional Scientific Award for Women Scientist 2010. The award ceremony is on 9th of September 2010, and it will be held in Addis Ababa, Ethiopia

Dr Hassina Mouri has an internationally recognised educational background. She studied and worked in different institutions on three continents (Africa, Europe and America). She graduated in 1990 from the University of Algiers (cum Laude). As an outstanding student of the year, she was awarded a fellowship to continue her studies in France (Paris 7) where she obtained her Master in June 1991 then a PhD degrees (cum Laude) in January 1995. Soon after that she was recruited as a research associate by the University of Helsinki and the Geological Survey of Finland (1995-1999). After spending another year as a research associate at the University of Minnesota, she

joined the University of Pretoria in October 2000. In August 2008 she joined the Department of Geology of the University of Johannesburg.

Her research work focuses on the Archaean (3.8 to 2.5 billion years ago) crustal evolution using different instrumental techniques and disciplines (essentially mineralogy, petrology, radiogenic isotope geology). Dr Mouri's core interest focuses on Ultra-high temperature granulites rare rocks that record still unexplained events when regions of the Earth's crust reached temperatures approaching, even excess 1000°C. These rocks preserve in their textures and minerals, "snapshots" of the Earth's past geological history, which are necessary to understand how mountain belts form and how the Earth's crust evolved during early times.

Dr Mouri's work was presented at several international conferences and published in several

international journals. Dr Mouri has been invited to co-organise and chair scientific sessions at a number of International Conferences. In November 2008, she was elected Secretary General of the Geological Society of Africa and Chair of the organising committee of the 23rd Colloquium of African Geology, to be held for the first time in South Africa (University of Johannesburg) in January 2011.

She is the recipient of a number of recognitions that include an award for the best presentation at an IGCP meeting in Australia in 1993; a one month research grant at the University of Pavia -Italy 2007 and was invited in February 2008 as studio guest for the Women in Science television program of the South African national broadcaster (SABC). Dr Mouri has proven that, although geology is a "male-dominated field", females can gain knowledge and skills in this field and perform as well.



African Union Regional Scientific Award for Women Scientists 2010

PUBLIC LECTURES

A large number of staff was involved in public presentations and discussions – ranging from radio and TV interviews to participation in scientific quizzes. Various popular and other public presentations were given. The main public lectures presented in 2010:

- Dr Derek Fish on *Good Vibrations, the sound of science*: 13 April 2010
- Prof Fanus Viljoen on *Diamonds – origin, exploration, mining, beneficiation*: 4 Mei 2010
- Dr Marijke Coetzee on *The Future of Social Networking: Problems with current online social networking applications, Decentralisation, The Semantic Web, Mobility, Ad hoc networking, Trust*: 3 June 2010
- Prof Liza Bornman on *HIV/AIDS. Why sub-Saharan Africa? A genetic perspective*: 29 July 2010
- Dr D T Dekadjevi on *A Rough Guide to Nanoscience and Nanomagnetism*: 12 Augustus 2010
- Dr Eddie O'Connor on *SA Electricity Crisis*: 19 Augustus 2010
- Prof Hartmut Winkler on *A Great Atmosphere: The Physics of Rainbows, Lightning and Other Atmospheric Light Phenomena*: 9 September 2010
- Ms Harriet E Pearson: *Security and privacy on a smarter planet*: 17 September 2010
- Prof Rui Krause on *Nanomaterials*: 12 October 2010



The National Research Foundation (NRF) prestigious President's Award was bestowed upon Prof Nic Beukes from the Department of Geology. The aim of the President's Award is to celebrate excellence in research as well as to highlight those researchers that are considered world leaders in their fields by their peers.

Prof Beukes is primarily a field geologist, specializing in sedimentology and stratigraphy, with emphasis on understanding the origin of iron and manganese ore deposits and the nature of surface environments on early earth, which includes the history of atmospheric oxygen and climate changes in the middle Archean to early Paleoproterozoic.

He has worked extensively on iron and manganese formations all over the world and also studied the genetic and sequence stratigraphy of silici-clastic strata of the Witwatersrand and Pongola basins, depofacies in early Precambrian carbonate platform successions, early Precambrian laterite profiles and paleosols and the nature of post-Gondwana land surfaces and associates soil profiles.

Prof Beukes is a recipient of the Draper Medal, the highest award from the Geological Society of South Africa, in 2002 for scientific contributions in geology and serves on various National and International Geological Research Committees. He was fundamental in recognising that the early Proterozoic sequences contained a set of glacial deposits. Succeeding paleomagnetic studies indicated not only cold climates but maybe another snowball earth time. These findings have made major impact on the thinking about early climate changes.

Prof Beukes has supervised many MSc and PhD students, authored or co-authored more than 140 full length research papers in International and National Journals, published about 170 Scientific Research Abstracts and 98 Confidential Research Reports.

Prof Beukes is regarded by his international counterparts as in the top 1 or 2 percent of all earth scientists.

NRF Presidential Award



OUTSTANDING PERFORMANCE IN THE DEPARTMENTS

Achievements by staff and students

ACADEMY FOR INFORMATION TECHNOLOGY

- The committee for the 2010 IFIP TC-11 Kristian Beckman Award has awarded the Kristian Beckman Award to Prof Basie von Solms from the Academy for Information Technology, Faculty of Science. The 2010 IFIP TC-11 Kristian Beckman Award was awarded to Prof Von Solms to honour him for his never tiring work towards broadening the meaning of Information Security in various aspects, eg by adding management aspects to the academic perception of information security and by creating the field of Security Governance. It is also to honour his work as Chair of TC-11, where he strongly demonstrated the importance of information security within IFIP and the whole field of information processing, and his various achievements in the area of IT Security Education on all levels. The Kristian Beckman Award was established in 1992 by IFIP Technical Committee 11 to commemorate the first chair of the committee, Kristian Beckman from Sweden, who was also responsible for promoting the founding of TC-11 in 1983. This award is granted annually to a successful nominee and is presented at the annual IFIP Security Conference that is organised under the auspices of TC-11.

The objective of the award is to publicly recognise an individual, not a group or organisation, who has significantly contributed to the development of information security, especially achievements with an international perspective.

- Mr EK Ekron, an Honours student under the mentorship of Prof Elize Ehlers, won first place in Software Design at the Microsoft Imagine Cup South Africa. Mr Ekron and Mr Bijker attended the Microsoft Imagine Cup 2010 in Poland in July. The event was attended by 400 finalist out of an initial 300 000 students from all over the globe. The Microsoft Imagine Cup South Africa 09 competition is a platform on which 40 teams from universities throughout South Africa are pitted against each other to gain recognition in a number of categories. In addition, third year project team Creativity Captured, consisting of students Mr M Heydenrych, Miss SN Usher and Mr JA Venter, were given the special award of having shown the most professional potential amongst all entries.
- Mr DA Coulter was awarded the Best Paper award at the International Workshop on Agent-based Collaboration, Coordination and Decision Support.
- Dr Marijke Coetzee from the Academy for Information Technology served as co-chair of the 9th annual Information Security for South Africa conference - ISSA2010 - at the Sandton Convention

Centre. It was jointly hosted with UNISA and the University of Pretoria. From 2010 ISSA is co-sponsored by the IEEE Systems, Man and Cybernetics Society (SMCS) Chapter, a chapter of the IEEE South Africa Section.

DEPARTMENT OF BIOCHEMISTRY

- Mr M George was awarded the prize for the best poster presentation at the Southern and Eastern African Network of Analytical Chemists International Conference.
- The Department of Biochemistry recently hosted their annual Prize Giving Awards Ceremony to recognize their top achievers of 2009. They were Ms Siobhan Jenkins (best 2nd year), Mr Cameron Meyer (best 3rd year), Mr Dewaldt Engelbrecht (best Hons student) and Ms Melissa Vetten (best MSc student).
- The South African Society of Biochemistry and Molecular Biology (SASBMB) recently awarded Nicola Skerman, a Master's student in the Department of Biochemistry at the University of Johannesburg (UJ), the SASBMB Best Honours Student Award for 2008.
- The first Inaugural Cell Death Symposium on Cell Death in Diseases will be held from 10 January – 12 January 2011 at the Two Oceans Aquarium, V&A Waterfront, Cape Town, South Africa. Speakers participating are Richard Lockshin, St John's University, NY; Zakeri, Queens College,

NY; Ray Birge, New Jersey Medical School, NJ and Christian Widmann, University of Lausanne, Switzerland. The Symposium is organized by Dr Marianne Cronje from the Department of Biochemistry, UJ and Dr Lester Davids from UCT.

- Fidele Tugizimana, a BSc Hons student in the Department, has won an award for the 2nd best presentation at a Chromatography Society of South Africa (ChromSA) Gauteng Branch student symposium, held at the University of the Witwatersrand. His presentation was entitled *Application of Chromatography in Metabolite Profiling of Defence-related Secondary Metabolites in Tobacco Cells*, showcasing part of the project he is embarking on with Mr MJ George under the guidance of Prof IA Dubery.

DEPARTMENT OF BOTANY AND PLANT BIOTECHNOLOGY

- Prof Ben-Erik van Wyk received the UJ Vice-Chancellor's Prestigious Award for the Most Outstanding Researcher of the year. He also received the Faculty of Science award for the Top Senior Researcher of 2009.

The main research contributions of Prof Van Wyk are in two focus areas, namely (1) the naming and classification of plants and (2)



Prof Basie von Solms, Academy for Information Technology



(From left to right: Prof Kinta Burger (Dean of the Faculty of Science), Melissa Vetten, Dewaldt Engelbrecht, Cameron Meyer, Siobhan Jenkins and Prof Ian Dubery (HOD of Biochemistry).



Left to Right: Fidele Tugizimana (2nd Prize winner), Julien Makiese (1st Prize), and ChromSA judges Ms Hannalien Meyer from SABS and Prof Ergmont Rohwer from UP.

OUTSTANDING PERFORMANCE IN THE DEPARTMENTS

Achievements by staff and students

Ethnobotany is the study of plant uses by local people. In this context, the plants used in traditional medicine are of particular interest. The research work on medicinal and poisonous plants done at UJ is of considerable local and international interest. The multidisciplinary approach to botany, which includes studies of the chemistry of the plants, has led to numerous important publications and books on medicinal, poisonous and other useful plants. This work also has important practical value in the development of new medicinal crops and new products. The research results generated at UJ are nowadays routinely used by pharmaceutical companies in their quality control procedures and also in poison centres and forensic laboratories to determine the causes of human (and animal) deaths resulting from accidental or criminal poisoning. The results of many years of research are summarised in books such as *Poisonous Plants of South Africa* (2002) and *Medicinal Plants of South Africa* (revised edition 2009).

- Marianne le Roux, a PhD student of Prof Ben-Erik van Wyk, received the *Hannes van Staden Prize* for the best oral presentation by a PhD student as well as the prestigious *Best Young Scientist Award* for the best oral paper by a young botanist during the recent 36th Annual South African

Association of Botanists (SAAB) Conference.

- An exciting scientific breakthrough in the barcoding of plants was achieved by colleagues in the Department of Botany and Plantbiotechnology under leadership of Prof Dr M van der Bank. Moreover, together with the South African National Biodiversity Institute (Pretoria), the Department is playing a major role in the Tree-BOL (Barcode of Life) initiative that aims to create a reference database of trees by establishing DNA barcodes of all tree species in the world. UJ is the representative of Africa in this ambitious project.
- Dr Eduard Venter attended the South African Genetics Society Congress in Bloemfontein and was re-elected as treasurer of the SAGV, South African Genetics Society, SAGS. He also organized the ACGT Regional Plant Biotech Forum held at UJ. He attended a workshop on Agric-Biotech where the roles and responsibilities of various institutions in the biotechnology innovation system were investigated and a workshop hosted by Biogazelle on quantitative polymerase chain reaction (qPCR) data analysis.

DEPARTMENT OF CHEMISTRY

- Carina Alicia Renison was awarded the James Moirs Medal of the South African

Chemical Institute. The Medal is awarded to the best BSc Honours student in chemistry achieving a minimum aggregate final mark of 75% at each University, and the best BTech student with the same minimum aggregate in chemistry at each Technikon or University of Technology.

DEPARTMENT OF CHEMICAL TECHNOLOGY

- The Acharya Vinova International (AVI) award was bestowed on Dr AK Mishra for outstanding international research work in science and technology, applied or fundamental, in Biological, Chemical, Earth, Atmosphere, Ocean and Planetary, Engineering, Mathematical, Medical and Physical Sciences.
- Four postgraduate students from the Department of Chemical Technology left South Africa to attend lectures at Delft University of Technology (TU Delft), Netherlands, for a period of three months. The students (Mr Thabo Nkambule (PhD), Mr Machawe Motsa (MSc), Mr Derrick Dlamini (MSc) and Mr Gcina Vilakati (MSc)) form part of the seven students selected country wide for this round of the SAVUSA (South Africa – Vrije Universiteit Amsterdam – Strategic Alliances) initiative. SAVUSA was established in 2002 and seeks to contribute to the academic climate in both South Africa and the Netherlands by offering South African PhD and Master's students the opportunity to carry out part of their studies in the Netherlands while developing academic projects with a strong societal component around relevant themes such as diversity and water management. These themes fall under the SKILL programme and the four students will register for three courses which are offered at the Master's level in Civil Engineering at TU Delft. The courses are Integrated Water Management,

Fundamentals of Drinking Water and Wastewater Treatment, and Public Hygiene and Epidemiology. The Netherlands government will cover the full cost of this exchange programme which includes air fares, accommodation, tuition costs, visa fees and the monthly stipends.

DEPARTMENT OF GEOLOGY

- Dr MO de Kock received the UJ Vice-Chancellor's Prestigious Award for the Most Promising Junior Researcher of the year 2009. Dr De Kock specializes in paleomagnetism. Paleomagnetic studies are used to trace the "paths of drift of continents" through time, to reconstruct the nature and components of ancient continents fragmented by plate tectonics and to indirectly date rock successions. He is generally interested in the formation and break-up of Supercontinents through Earth history. He is particularly interested in how the supercontinent cycle influenced life on earth, the atmosphere and the oceans and how supercontinent formation and breakup is related to the origin of large mineral deposits. His interest has taken him to the 2.7 billion year continental reconstructions of Vaalbara, a juxtaposition of ancient continental building blocks that sit today far removed from each other in South Africa and Australia. He received several awards for his work on the Permian-Triassic mass extinction event (the extinction of mammal-like reptiles 250 million years ago, which was much more catastrophic than the extinction of the dinosaurs 65 million years ago); among them are the Corstophine Medal of the Geological Society of South Africa and the S2A3 Bronze Medal of the South African Association for the Advancement of Science



Gcina Vilakati; Prof Rui Krause; Thabo Nkambule; Prof Bhiekie Mamba; Derrick Dlamini; Machawe Motsa; Dr Ajay Mishra; Dr Shivani Mishra of the Department of Chemical Technology

OUTSTANDING PERFORMANCE IN THE DEPARTMENTS

Achievements by staff and students



Each year the Department of Geology gives prizes to the best 1st, 2nd, 3rd year and Honours students. From left to right: Mrs Christelle van der Merwe (best first year geology student – 86% average); Mr Ashley Gumsley (best geology honours student – 80% average); Ms Laura Bowden (best second year geology student – 76% average); Mr Mathew Barnard (best third year geology student – 81% average); Mr Donovan Pretorius (best geology honours student – 81% joint award with Mr Gumsley). Mr Barnard also won the Rand Pioneers Yule Crosby Memorial prize for the best third year student in geology.

Current Research of Dr De Kock is:

Completing the Plate Tectonic revolution;
Paleomagnetism and high-precision geochronology of Bushveld Complex related intrusions;
Establishing a 'bar code' for the southeastern terrane of the Kaapvaal Craton in northern KwaZulu-Natal, South Africa;
Oxidation of the deep ocean and greenhouse conditions preceding the assembly of Rodinia.

- Mr Bertus Smith, Lecturer in the Department, was awarded the John Handley Medal and the Corstorphine Medal by the Geological Society of South Africa for the most meritorious Master of Science thesis in Geology at any university in South Africa.
- Professor Bruce Cairncross was presented with the Geological Society of South Africa's Presidential Award for his services rendered towards preserving and maintaining the Johannesburg Geological Museum collection and services towards documenting

and preserving South African mineral heritage in general.

DEPARTMENT OF PHYSICS

- Prof H Winkler received the UJ Vice-Chancellor's Prestigious Teaching Excellence Award for 2009.

Prof Winkler's philosophy is determined by the following four motifs: subject enthusiasm, personal interaction, hyper-organisation and work ethic.

1. Generating subject excitement, enthusiasm and enjoyment: Throughout his teaching he tries to focus on simplification, the broader picture, and how the otherwise abstract topics affect everyday life. Even in his massive first-year classes he encourages debate, and has introduced topics into the syllabus purely for the purpose of highlighting the most fascinating aspects of the subject.
2. The personal touch: He makes a point of trying to get to know the names of his students. He finds that students repay the interest

that one shows in them by displaying more interest and better commitment in his courses.

He also believes in personally approaching those students that are not pulling their weight and reprimanding them, while praising top performers. He takes extraordinary steps in recognising good efforts where it is due.

3. Hyper-organisation: He believes that with classes as large as 500 students, it is critical that the course organisation has to be perfect. Students must know that the lecturer has the course under complete control.
4. Getting students to work: In a subject such as Physics, the only way to assimilate the course work is to apply theory in practice by working through countless examples. The best lecturing and study aids will prove useless if the student does not practice problems on their own.
- Prof S Connell was elected as the President of the South African Institute of Physics.

- Prof Simon Connell and Ms Claire Lee from the Department of Physics attended the First African School of Physics in Stellenbosch. They are on the local organising committee and have been involved in this school since July 2008. The inaugural African School of Fundamental Physics and its Applications (ASP2010) has attracted the world's top teachers and researchers in High Energy Physics and the spin-off applications (computing, medical diagnosis, new materials etc). The school focuses on skills development for South African, African and also international post graduate students, and in deepening the SA (and African) participation and contribution at CERN, and in global science. Prof Connell announced the successful bid for South Africa (UJ and Wits) to join the ATLAS collaboration @ CERN, taking the number of institutes involved in ATLAS to 174.

OUTSTANDING PERFORMANCE IN THE DEPARTMENTS

Achievements by staff and students



Far left: Prof H Winkler,
Department of Physics

Left: Dr MO de Kock,
Department of Geology

- Mr S Ramaila was elected as Chairperson of the Science Education Group of South African Institute of Physics.
- Dr Doyle is the current Chair of the Synchrotron Research Roadmap Implementation Committee (South Africa).
- Prof V Alberts's research led to a partnership between UJ (through the company PTIP), SASOL, Central Energy Fund and the National Empowerment Fund. This partnership is seen nationally as the most significant in recent times by a university.
- Ms C Lee (temporary staff member and postgraduate student of Prof Connell) won the prize for the best PhD presentation at the 2009 South African Institute of Physics Conference in the field of Nuclear Particular and Radiation Physics.
- The investment of research equipment in the Physics laboratories was a significant event and has broadened the international impact of the research being conducted in the Physics Department at UJ

dramatically. The Department currently operates the only laboratory in Africa where the physical properties of matter can be studied in experimental temperatures below 2 degrees Kelvin and down to within 0.34 Kelvin from the absolute zero of temperature; and in magnetic fields up to close a million times the magnetic field of the earth.

- Prof Steven Karataglidis presented a talk *The Frontiers in Nuclear Structure, Reactions, and Astrophysics, FINUSTAR 3* on Rhodes, Greece. While overseas he visited CEA/Saclay to continue his fruitful research collaboration in the Theory Division with Prof Bertrand Giraud. He also presented seminars at the Institute of Nuclear Physics, Demokritos, Greece and at the University of Paris, Orsay during his trip.

DEPARTMENT OF STATISTICS

- Ms HE Maartens is the winner of the prestigious 2010

Scholarship of the South African Statistical Association (SASA).

- Mr Wickes Robbertse has been awarded the second prize in the South African Statistical Association (SASA) post graduate competition. The competition was sponsored by StatsSA and their interest is mainly on official statistics. His topic was *Likelihood estimation for fractional Gaussian noise*.

DEPARTMENT OF ZOOLOGY

- Achievements include the awards to Masters and Doctoral students at scientific conferences where 16 awards for best presentations were received.
- Prof NJ Smit received the Faculty of Science award for the best researcher in the Faculty of Science on Lecturer/Senior Lecturer level.
- The Australasian Society for Ecotoxicology Prize was recently awarded to Natalie Degger, a postgraduate student of Prof Victor

Wepener, for an Outstanding Oral Presentation at the International Conference on Marine Pollution and Ecotoxicology, held in Hong Kong.

- At the SA Society for Aquatic Scientists Annual Conference at Augrabies, Michelle Soekoe received the prize for the Best Oral Presentation and Melusi Thwala received the prize for Best student poster presentation.
- At the Annual Conference of the Southern African Society of Aquatic Scientists which was held at the Augrabies Falls National Park, Tarryn Botha won second place for the best student presentation (PhD and MSc). The theme of the Conference was *Aquatic biodiversity and climate change – an arid region perspective*.
- Prof Victor Wepener was elected as Chair of Aquatox Form.
- Prof Nico Smit was elected as Vice President of Parasitological Society of Southern Africa (PARSA).

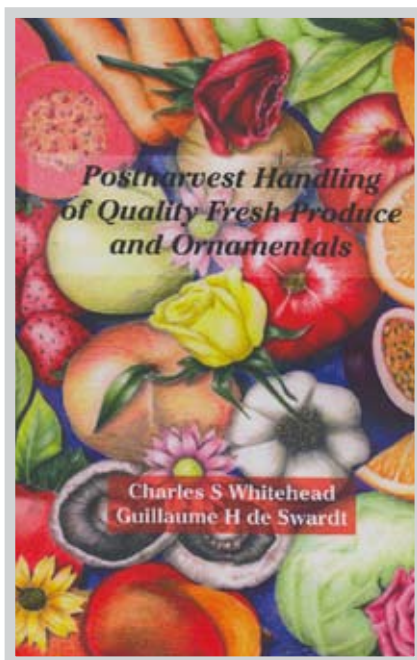
Right: Natalie Degger
receiving her prize
from Dr Kenny Leung

Far right: Ms Maartens (Dept
of Statistics) and Mr
Frederik van der Walt
(HOD, Dept of Statistics)



OUTSTANDING PERFORMANCE IN THE DEPARTMENTS

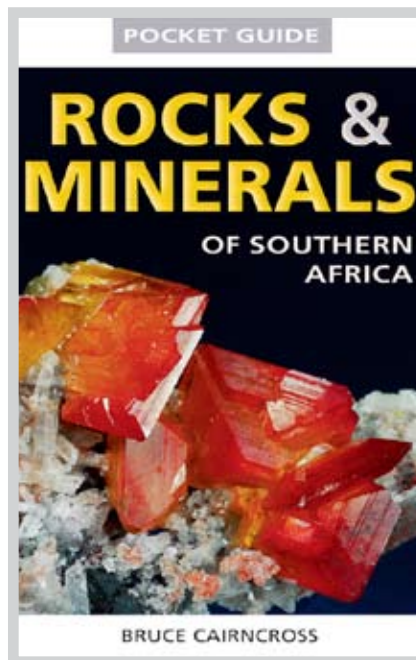
New books published by lecturers



MORE ON PRODUCTION AND MARKETING OF FRESH PLANT PRODUCTS

Prof Charles Whitehead from the Department of Botany and Plant Biotechnology and Prof Guillaume H de Swardt an Emeritus Professor of the Rand Afrikaans University (now University of Johannesburg) have published a new book on the production and marketing of fresh plant products namely *Postharvest Handling of Quality Fresh Produce and Ornamentals*.

The book gives information to increase the proficiency of all role-players in the fresh produce industry in order to meet the growing demand for high quality fresh produce. This book provides the reader with all the information required to obtain a holistic overview of the factors involved in supplying the consumer with high quality fresh produce. It begins by examining the necessity for a basic knowledge of fresh products, the complex nature of fresh fruit, vegetables and ornamentals and the preharvest factors that affect postharvest quality. This is followed by a discussion of certain important metabolic processes such as postharvest respiratory patterns and hormonal control of ripening and senescence. The greater part of the book is dedicated to discussing quality determination and management, ripening and senescence, harvesting, sorting, packing, packaging, cooling, storing and transport of fresh produce.



POCKET GUIDE – ROCKS & MINERALS OF SOUTHERN AFRICA BY BRUCE CAIRNCROSS

Prof Bruce Cairncross from the Department of Geology, has published a new book on rocks and minerals: *Pocket Guide - Rocks & Minerals of Southern Africa*. This handy pocket guide presents a selection of the most fascinating and important rock and mineral species found in southern Africa.

Each entry includes full-colour photographs, a description, uses, and detailed occurrence information. Physical characteristics of each mineral are summarized in tinted panels, and handy icons show other important information. The rock section discusses how the three main rock types form.

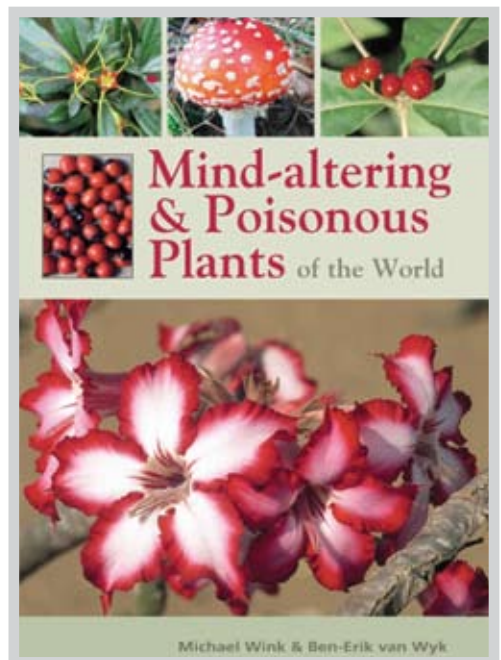
Pocket Guide - Rocks & Minerals of Southern Africa will be invaluable both to amateur geologists and budding collectors.



Prof Charles Whitehead



Prof Bruce Cairncross



MIND-ALTERING AND POISONOUS PLANTS OF THE WORLD BY MICHAEL WINK AND BEN-ERIK VAN WYK,

Mind-Altering And Poisonous Plants Of The World, Michael Wink and Ben-Erik van Wyk, 2008, was nominated for an international literature award.

This guide is a must for gardeners, farmers, veterinarians, students, botanists, pharmacists, chemists, doctors and Poison Centres. The compact format and encyclopedic style will be useful to rapidly access information on poisonous plants.



Prof Ben-Erik van Wyk