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Foreword

Dear Reader

In this volume, the focus is on Information, Communications and Technology (ICT) as the Department of Science and Technology has recently organised ICT roadmapping shows in various provinces across the country.

Technology roadmapping is a tool to help firms understand their markets and make informed technology decisions. The potential that ICT has to achieve business success through its ability to share pre-competitive technologies are endless. Technology roadmaps may be used to source affordable bandwidth, for innovative applications of wireless and satellite applications and the development of more efficient Internet computing networks.

The August month was one in which we celebrated the contribution of women in society, and the Department of Science and Technology recognised two of South Africa's leading women scientists. Professor Patricia Berjak was honoured with the Distinguished Woman Scientist Award and Professor Helen Rees received the Distinguished Scientist Award.

With the article on modern humans and the debate on their origins, archaeology is once again proving that the modern human form originated in Africa. Other articles in this issue include mapping techniques used by the African Coelacanth Ecosystem Programme, the significance of zoos and the construction of the West Coast Fossil Park. We hope that you will find the content both stimulating and engaging.

Buhle Khumalo
Specialist Editor



Precocious Human Behaviour in South African Prehistory

By John Parkington and Cedric Poggenpoel

For some time now, the results of southern African archaeological excavations and analyses have been significant in the study of modern human origins.

To understand why this is so, we need first to unpack the idea of 'modern humans' and the debate on 'origins'. The framework for both has been set by the well-researched prehistory of ice-age Europe, where Neandertalers were replaced abruptly by 'moderns' some 40 000 years ago. Modern skeletons are defined as gracile and largely undistinguishable from ours today.

The Neandertalers were certainly not modern in this sense, being robust and morphologically quite distinctive. These cousins of ours, though buried their dead had cranial capacities as large as, if somewhat differently configured than our own.

What has struck European archaeologists, however, is the abundance of decorated bone and ivory, perforated objects and graphic representations that have been found with modern people, compared with a dearth, if not a complete absence, of such with the Neandertalers. Because these skeletal and artefactual changes happen so fast in Europe, one research direction has been to trace the origins of decorated objects and modern skeletal morphology outside Europe. This is the search for 'modern human origins'.

In sub-Saharan Africa there are no Neandertalers. Whereas the European

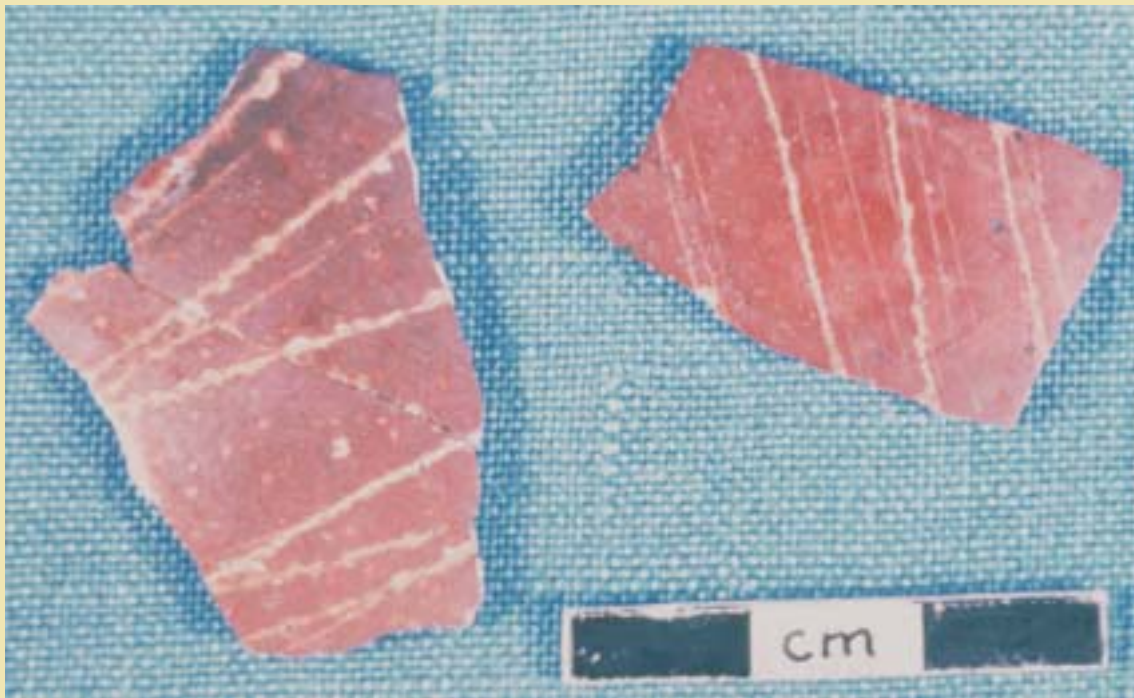
fossil human record illustrates an increasingly Neandertal direction from about 300 000 years ago to 50 000 years ago, that of southern Africa in those times - scrappy though it is - illustrates an undeniable trend toward the modern form. Many anthropologists believe this shows that the modern form originated in Africa and spread to Europe and elsewhere.

But what about the origins of the artefactual remains that are taken to reflect 'modern behaviour'? What seems to underpin the manufacture of decorated and ornamental objects and of graphic designs and forms is an ability to think (and talk?) symbolically, to develop a set of material forms that are conventionally used to represent otherwise intangible concepts, among them personal identity and ownership.

Of course this is extremely difficult to recognise, since we have no extrinsic way of knowing when or how a repeated form reflects an intangible concept. The millions of hand-axes from Africa are patterned artefacts from as much as a million years ago, which might reflect such symbolic behaviour. Research has focused on artefact-making in bone, shell and ochre.

Recent excavations at sites in southern Africa have produced evidence that symbolic systems must undoubtedly have been in place here 80 000 years ago, well before the equivalent manifestation in Europe.

At Blombos Cave, for example, a coastal site in the southern Cape Province, Chris Henshilwood has



Two small chunks of ochre with cross-hatched markings on them offer clues on modern humans.

reported a number of interesting discoveries stratified below a windblown sand level well, dated to about 75 000 years. There are several carefully made bone points, not that dissimilar from ones that have been found in much more recent contexts all over the world. From these levels, too, he has found at least two small chunks of ochre that have cross-hatched markings on them.

Most recently he announced the finding of a large number of, in his view, intentionally pierced marine shells that may have been parts of necklaces. The stone tools associated with all of these finds could be described as precocious, in that they manifest advanced flaking techniques that become widespread and common later in the prehistoric record.

At Diepkloof Cave in the Western Cape Province, about 17 kilometres from the present shoreline, we, along with French colleagues Jean-Philippe Rigaud and Pierre-Jean Texier, have also been investigating levels that are

between 60 000 and 80 000 years old, with exciting and interesting results. The stone tools differ from those of Blombos in form and may be a little younger, but they also reflect sophisticated manufacturing techniques that appear for the first time in these levels.

The long stone blades, struck from the cores with soft organic hammers such as bone, and patterned geometrically-shaped finished pieces imply very skillful and innovative stone-working behaviours. Along with these artefacts there are large numbers of bevelled pieces of ochre that were arguably a source of pigment. Of particular significance, however, are more than 100 intentionally marked fragments of ostrich eggshell.

Ostrich eggshell fragments are fairly common throughout the deposits at Diepkloof, but ones with structured sets of incised lines are limited to a particular part of the stratigraphy dated beyond 55 000 years and probably not as old as 70 000 years. These age



The cross-hatched marked chunks have been discovered at the Blombos Cave in the southern Cape Province below a windblown sand level by Chris Henshilwood.

estimates are based on a series of radiocarbon and luminescence dates that are still accumulating. What is important about this large collection of intentionally marked fragments is the combination of variety and patterning that is manifested.

Some pieces are characterised by sets of parallel and acutely angled lines with interesting variations in the depth and breadth of the incisions. On other pieces, there are parallel lines infilled with hatching. Most remarkable, however, are a few pieces that show strongly defined grid patterns of intersecting lines. This variety of repeated design must mean that the makers were responding to a systematic and agreed set of conventions in producing their work. There was a socially constructed framework outside the brains of the participants that guided their artefact marking (and making) behaviour.

At least two of these intentionally marked ostrich eggshell fragments show the worn profiles typical of the mouths of ostrich eggshell water containers. This seems to imply that at least some of the intentional marking was applied to whole eggs and ones intended to have a substantial use in life as both storage and transport devices.

We are attracted to the idea that the intentional marking served the purpose of identifying and distinguishing between objects that, when plain, are remarkably similar to one another. Ownership and identity may be the kinds of intangibles that needed to become manifest in the patterns of incised lines on the egg surfaces.

Similarly marked ostrich eggshell fragments, as well as other presumed water flask mouths, have come from the excavations at Apollo XI Cave in southern Namibia, and similar precocious stone tools come from several sites in southern Africa, including the current excavations of Lyn Wadley at Sibudu in KwaZulu Natal. Although human skeletal remains from these sites are few and fragmentary, they look modern, as do the similarly aged remains from Klasies River, Border Cave, Die Kelders and Sea Harvest.

It seems entirely likely that well before 40 000 years ago, and perhaps as much as 100 000 years ago, southern Africans were crossing or had crossed the boundaries of behavioural and skeletal modernity. This gives South African prehistorians a unique research advantage and an opportunity to develop internationally significant research programmes.

The Case for Zoos: The National Zoological Gardens

By Buhle Khumalo



Children enjoying a day at the National Zoological Gardens of South Africa. For many people this is the only way of meeting the African Elephant.

With the abundance of national/game parks in this country, the question most often asked is: Why then do we need zoos? Willie Labuschagne, the Director for the National Zoological Gardens, explains the important and critical role that zoos perform in today's society.

In a country where the majority of the citizens are unemployed, only a few people can access national parks. Zoos' primary function is to conserve natural biodiversity. While they are specie-specific, their role is also to entertain and educate.

"In terms of accessibility, if we were to do a survey, how many people would be able to visit the national parks as opposed to zoos? Zoos are more accessible. The primary users of the environment and biodiversity will never have the opportunity to visit a National Park," argues Labuschagne.

The National Zoological Gardens (NZG) has 600 000 visitors every year, 200 000 of whom are school children. For these children, the visit is part of their formal education.

"By closing down zoos, one will become a signatory for the death warrants of species that would become extinct," cautions Labuschagne.

Gone are the days when animals in zoos were caged and today animals are not captured in the wild to be kept in zoos. There was a time in history when keeping exotic species in an *ex-situ* environment was common among royalty and formed part of certain religious practices.

In ancient China, about 3000 years ago, people were familiar with the keeping of wild animals. This trend was also evident in ancient Egypt, where wild animals had a strong religious and cultural purpose - with religious powers attributed to the animals. It was a privilege for royalty to keep exotic animals, which they received as gifts or would bring back with them from crusades.

The trend changed about 250 years ago, when Vienna's Schönbrunn Zoo, the oldest zoo in the world, opened its gates to the public. The zoo was part of the Austrian Palace, the royal menagerie, which it saw fit for the public to enjoy. "For the people, most of these animals were unheard of," said Labuschagne and zoos began to mushroom everywhere.

One hundred years ago, zoos began to realise that they could play an important role in the conservation and protection of threatened species. This was sparked by the threatened Pere David's Deer, which came from China. The Duke of Bedford, who realised that the future survival of the deer was dependent on zoos' collaboration,

facilitated France, and Europe's, acquisition of Pere David's Deer from Beijing. He managed to persuade the owners of all collections of Pere David's Deer to house them in a common place.

At the time, the world population of Pere David's Deer consisted of just five deer and it was through the collaboration of zoos, that today, there are almost 1000 of them. The National Zoological Gardens boasts 75 of these deer.

Today, zoos have changed dramatically. The emphasis is now on the optimal design of animal exhibits, to which all zoos must conform if they are of international quality, that simulate the animals' natural habitat, so as to bring about their natural behaviour. Labuschagne argues that the loss of natural habitat has perpetuated the loss of species, although environmental enrichment in zoos will allow animals to display their natural behaviour.

About 99 percent of the animals in the NZG were born there, through the game breeding centre and some are introduced into the wild. Over-breeding is never a problem, as the animals are put on contraceptives.

According to the World Zoo Association, 700 million people visit zoos annually, worldwide. "It is undoubtedly the most powerful education medium used today," argues Labuschagne.

The research capacity of zoos has also been recognised, as research is made easier due to the ready availability of animals. The number of species and the instances of collaboration internationally means zoo-based research can range from nutritional and pathological, to

reproductive or environmental enrichment projects.

In 2004, Dr Ben Ngubane, former Minister of Arts and Culture, Science and Technology, positioned the National Zoological Gardens as a science, as opposed to a cultural institution and declared it a National Facility. It has since been transferred to the umbrella of the National Research Foundation. "This means that we have the responsibility to align administration and our core functions with those of the National Research Foundation," says Labuschagne. "Research will become the fundamental function of the NZG."

The NZG is the largest such organisation in the world, with three breeding stations - one each in the North West, Gauteng and Limpopo Provinces. With four satellite stations including the Pretoria Zoo, the NZG is spread over 6000 hectares.

The NZG is analysing the type of research it will undertake in its research capacity. The research will be beneficial to relevant institutions in the African continent. With the NZG's research capacity, animal extinction will now be history and breakthroughs can be expected in the maintenance of their well being.



Arabian Oryx. Saved from extinction by captive breeding programs in zoos. These animals have been released back into their natural habitat in the Middle East.



Ongoing research on renal disease in cheetahs (here a kidney biopsy is being performed) in the National Zoological Gardens.



Wisent (European Bison). Saved by zoos from the brink of extinction.

Technology: A Key to Coelacanth Riddles

By Moira Tuck

The study of coelacanths is, by its very nature, technology-intensive.

Answers to such questions as why the 'fossil fish' prefer specific habitats, what prompts them to move from one habitat to another, and how they came to be along the African coast in the first place, can only be answered by studies of the deep water environment in which they are found. Studies of simultaneous and long-term measurements of water quality are necessary - including conditions of temperature, salinity, current strength and direction, and oxygen content.

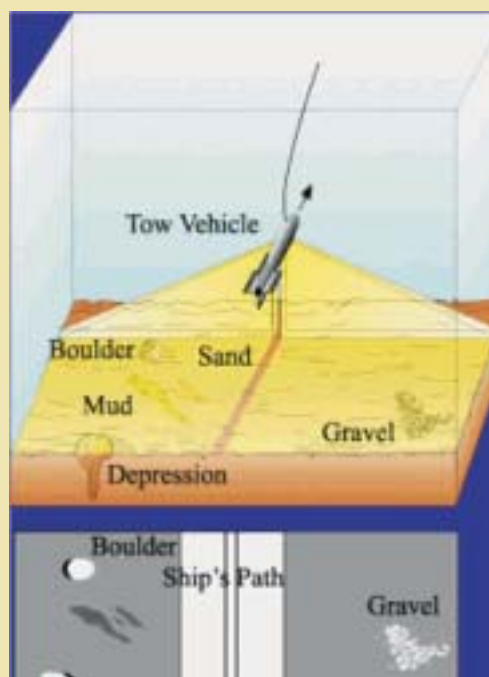
Also, coelacanths live at depths of 100 metres or more – a depth at which it is far too dangerous for humans to go without the help of very sophisticated scuba diving equipment and submersibles. Even then, humans cannot make lengthy observations and the risk of fatal accidents is high. Scuba, at those depths, only allows a bottom-time of 12 minutes, while submersible diving time is too expensive to allow for continuous, long-term use.

All of this makes submarine and therefore coelacanth research absolutely dependent on outstandingly good engineering, sophisticated computerisation and high technology – especially technology that is minimally reliant on human operation, such as remotely operated vehicles, long-term underwater measuring devices and automated shipboard instrumentation.

Even so, deploying the technology creates its own challenges, especially if bad weather hampers activities.

Mapping the ocean floor

In order to establish what habitat coelacanths prefer in order to predict where more populations might be found, one of the first tasks undertaken by Acep was to map the canyons in which coelacanths occur.



The intensity of sound received by the side-scan sonar towfish from the seafloor (backscatter) provides information as to the general distribution and characteristics of the seafloor sediment. In the lower left schematic, strong reflections (high backscatter) from boulders, gravel and vertical features facing the sonar transducers are white; weak reflections (low backscatter) from finer sediments or shadows behind positive topographic features are black. [Graphic courtesy Marine GeoSolutions]

Two techniques were used – multi-beam bathymetry and side-scan sonar.

A multibeam echo-sounding system measures the seafloor depth in a line extending outwards from the vessel's transducer with a typical beam width of 150°. The system provides depth data with 100% coverage, producing a depth point every few centimetres or decimetres over the entire seafloor. No anomalous features are missed. The data is used to produce highly accurate topographic and three-dimensional terrain maps of the seafloor.

Side-scan sonar produces an image of seafloor surface features using sound in the way that an aerial survey camera produces an image of land using light. A towfish, which looks like a torpedo and is towed astern of the ship, is used to transmit narrow beams of sound across the seafloor. Hard objects reflect more energy, causing a strong signal on the image. Soft objects show up as weaker signals.

The absence of sound behind objects shows up as shadows.

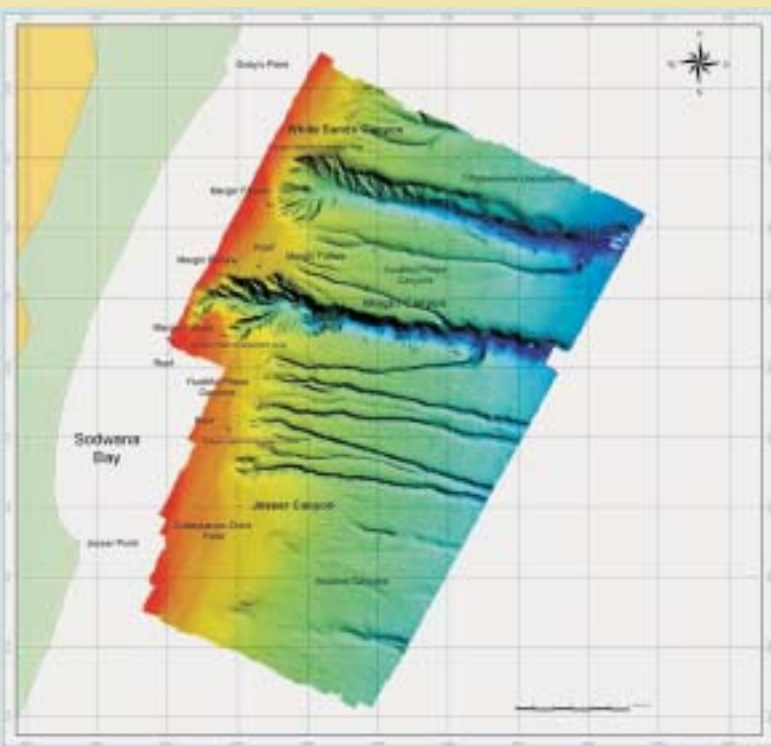
The equipment used in multi-beam bathymetry is attached to a strong pole extending from the ship's side and is at risk in bad weather but, as a rule, not otherwise. A towfish, on the other hand, is at risk of crashing into pinnacles or reefs that jut up from the seafloor. So, it is equipped with an altimeter that alerts its human operators, who lift or lower the towfish on a high-speed winch, to avoid accidents and record data optimally.

“It's a continuous, 24-hour, seven days a week data collection process,” says Dr Pete Ramsay of Marine GeoSolutions (Pty) Ltd, who undertook the multi-beam and side-scan surveys for Acep, “So operators not only have to be highly skilled but also able to stay awake in relentlessly demanding conditions, in order not to crash R600 000 worth of equipment and possibly derail an expensive expedition.”

Tracking currents, tides, temperature

South African coelacanths seem to prefer some caves to others and several individuals have been seen in more than one canyon. What dictates their choice of cave and canyon? Are they prompted to move around by changes in temperature, oxygen concentration or food availability? And how do the slow and awkward animals move from one site to another several kilometres distance when the Agulhas current sweeps the Sodwana coastline at velocities as high as 2-2.5 m s⁻¹?

To find the answers, Acep is studying not only the animals, but the movement, temperature and quality of the water.





Correlations between coelacanth behaviour and changes in the physical environment will define the sensitivity of coelacanths to such features and enable predictions to be made regarding vulnerability to change. These in turn have consequences for conservation and management. Acep plans to attach miniature electronic acoustic transmitter tags to several coelacanths. Each transmitter has a unique acoustic code and transmits its depth over specified time intervals, using an omni-directional signal that covers 600 metres. An array of acoustic 'listening receivers' (data-loggers), set up at distances of 500 to 700 metres, collect and store the transmitted data.

Data will reveal whether a coelacanth was in its listening circle and, if so, for how long and at what depth. Stringing all the data sets together will enable Acep to determine how, why and when the coelacanths migrate within and between canyons and also to more accurately establish their population size and distribution.

Because the canyons are so convoluted and steep sided, the data-loggers have to be suspended offshore to eliminate acoustic shadows. This requires knowing

exactly the geo-referenced profile of the shelf edge in which the canyons are found. This is where the geophysical mapping begins to pay off – apart from forming the basis of a geographic information system (GIS) into which all Acep research data are integrated for easy, interactive querying and reference.

Precisely positioning the data-loggers' on long mooring lines from a ship in a strong current requires a highly-skilled team of oceanographers and ship's officers and crew.

In order to gauge currents in the water column, Acep is using Acoustic Doppler Current Profilers (ADCPs) that measure the backscatter from minute particles in the ocean at various depths, thereby determining the water velocity throughout the water column. ADCPs are mounted on a ship, requiring complex sensors and sophisticated computer programmes to compensate for the speed, direction, rolling and pitching of the ship.

The ADCPs also operate from the ocean floor, often in tandem with thermistor arrays that simultaneously monitor the temperature structure of the water column.

Sampling the ocean floor

Finding out why the coelacanths choose particular canyons also involves understanding how the sea level has changed over the millennia. We know, for instance, that the Sodwana canyons were above sea level during the last glaciation some 20 000 years ago. Where did the coelacanths go during that time, or did they move in only after the sea engulfed their current homes?

In times of crisis, species tend to withdraw to a habitat 'centre' which has been proven to be safe for them before. Do our coelacanths have such a centre? If we answer such questions, then we shall be better placed to conserve them if their present habitat is threatened, by for example, global warming.

Dating rock samples taken from the seafloor will provide some answers to these riddles. So too will identification of marine fossils in the rock, telling us what sort of creatures were alive at given times in the Western Indian Ocean's history and therefore what sort of habitat the area might have offered the coelacanths.

Dr Ron Uken of the Marine Geoscience Unit at the University of KwaZulu-Natal says good-humouredly that this is the least technology-intensive part of Acep, compared to the oceanography and geophysical mapping. "But, of course, a submersible is useful for collecting rock samples in the dark at that depth," he says.

"Deep ocean work poses particular problems for geologists in that marine organisms burrow into the rock, leaving their carbon skeletons behind to confuse the uranium dating equipment.

That's when we take out our low-technology hammers to break open the rock until we get 'fresh', unaltered rock to study."

For more information about Acep, go to www.coelacanth.ac.za.

Information Box

- This is the second in a series of articles about the activities of the African Coelacanth Ecosystem Programme (Acep) – an integrated, multidisciplinary, biophysical programme of marine research triggered by the need to conserve the coelacanths discovered in the Greater St Lucia Wetland Park in 2000. Later articles will focus on Acep's physical, genetic, education and ecology sub-programmes.
- The African Coelacanth Ecosystem Programme (Acep) is the first multidisciplinary biophysical research programme to be undertaken on the east coast of South Africa and in Africa.
- It is an international programme that is facilitated by the South African Institute for Aquatic Biodiversity, in Grahamstown. Research activities include the use of ships, submersibles, remotely operated vehicles, satellite drifters, acoustic tags and listening devices, and involve stable isotope analyses, genome resource studies and genetics. Acep also undertakes environmental education.
- Seven African countries - Comoros, Kenya, Madagascar, Mozambique, South Africa, the Seychelles, and Tanzania - are Acep partners, realising the Nepad objective of Africa managing its own resources for the benefit of Africans.

ICT: TECHNOLOGY ROADMAPS

By Linley Nadasen and Imraan Salojee

The Department of Science and Technology (DST)'s 1998 foresight study provided South Africa with a glimpse of what possible technological futures will exist and what can be expected in terms of emerging technologies over a 10-year-plus timeframe, in twelve industry sectors.

The foresight study identified the key technological areas that could play a pivotal role in driving and growing existing and new economic areas. In this context and in recognition of the need to engage many role-players, particularly industry, an ICT (Information and Communications Technology) roadmapping exercise, facilitated by the Council for Scientific and Industrial Research, has been initiated by the DST.

Technology roadmapping is a tool to help firms better understand their markets and make informed technology decisions. The challenges of operating in the global business environment often mean that no single firm or industry has the resources to develop the full spectrum of technologies required. Technology roadmaps identify, evaluate and promote the development of collaborative projects within and between industries, to fill gaps and capture technology-related opportunities.

Through roadmapping, firms collaborate with research and government stakeholders, form new partnerships and develop creative

solutions to the technology issues and research needs identified. By sharing pre-competitive technologies and knowledge, firms can leverage financial and intellectual resources to achieve market success.



Mr Guy Vellacot and Mr Johan Eksteen at the ICT roadmap show.

There are a number of areas where collaborative development of pre-competitive technologies could benefit the ICT sector. Previous studies have shown, for example, that the need for affordable bandwidth, improved efficiencies in networks, innovative applications of wireless and satellite applications and the development of more efficient Internet computing networks are possible areas where technology roadmaps may be usefully applied.

The outcomes of the technology roadmaps can provide major benefits to government in streamlining research and development activities,



based on inputs from the industry, as well as to contribute to the policy aims of government.

The key to successful roadmapping is for it to be an industry-led, industry-owned and industry-driven process. The information and communications technology roadmap adopts this approach. The role of DST is to facilitate the necessary processes by consolidating existing knowledge and incorporating new insights as the process unfolds.

A crucial element for the successful involvement and identification of industry participants is a comprehensive and appropriate communications strategy addressing business' concerns and soliciting their participation.

The use of roadmaps in the South African environment is not yet commonplace and one of the challenges is to ensure industry buy-in. Business leadership of the ICT roadmap is dependent on many factors; the levels of interest in stimulating innovation in the ICT sector, being prepared to devote resources (financial and human) to growing ICT research and development in this country and the willingness to develop technologies that could create local and international markets for the local sector.

In the first phase of the ICT roadmapping exercise, a team of ICT

experts from industry, government and academia analysed existing research on the sector in South Africa and abroad. These experts identified five technology focus areas for the ICT roadmap, namely; human computer interface (HCI), wireless and satellite applications, Futureweb, Geomatics and high performance computing.

The experts developed preliminary roadmap reports in each of these five areas, which can be viewed on the ICT roadmap website. The outcomes of phase one are the identification of the priority focus areas, the emergence of industry champions and the preliminary ICT technology roadmaps in the five areas.

The technology area entitled human computer interface will focus on usability, with the main focus on human-language and visualisation technologies. This emphasis is especially important in South Africa, with its multiple cultures and languages, low levels of literacy and commitment to e-government to improve service delivery – necessitating successful research and development.

Wireless and satellite application technologies can increase access amongst the wider South African population, especially in rural areas and in inaccessible mining and agricultural areas. Computer-assisted learning can be enhanced using a combination of wireless and satellite communication technology.

To provide effective services in areas of health, government services and electronic commerce to a broad audience, the Internet has to be accessible from almost anywhere. Research and development of the next generation Internet will have to be synchronised with new developments in human computer interface and wireless satellite technologies.



At the ICT roadmap launch for Phase 2. Front row: Linley Nadasen, Sandra Mackie and Dr Bethuel Sehlapelo; Back row: Eroni Louw, Done Louw and Dumisani Ngqesha.

Geomatics deals with collecting, managing, processing and using data related to the earth's surface, subsurface, water bodies and the atmosphere. Technologies in geomatics assist in emergency services and disaster relief. Research and development in wireless and satellite technologies, human computer interface and Futureweb supports and greatly enhances geomatic technology.

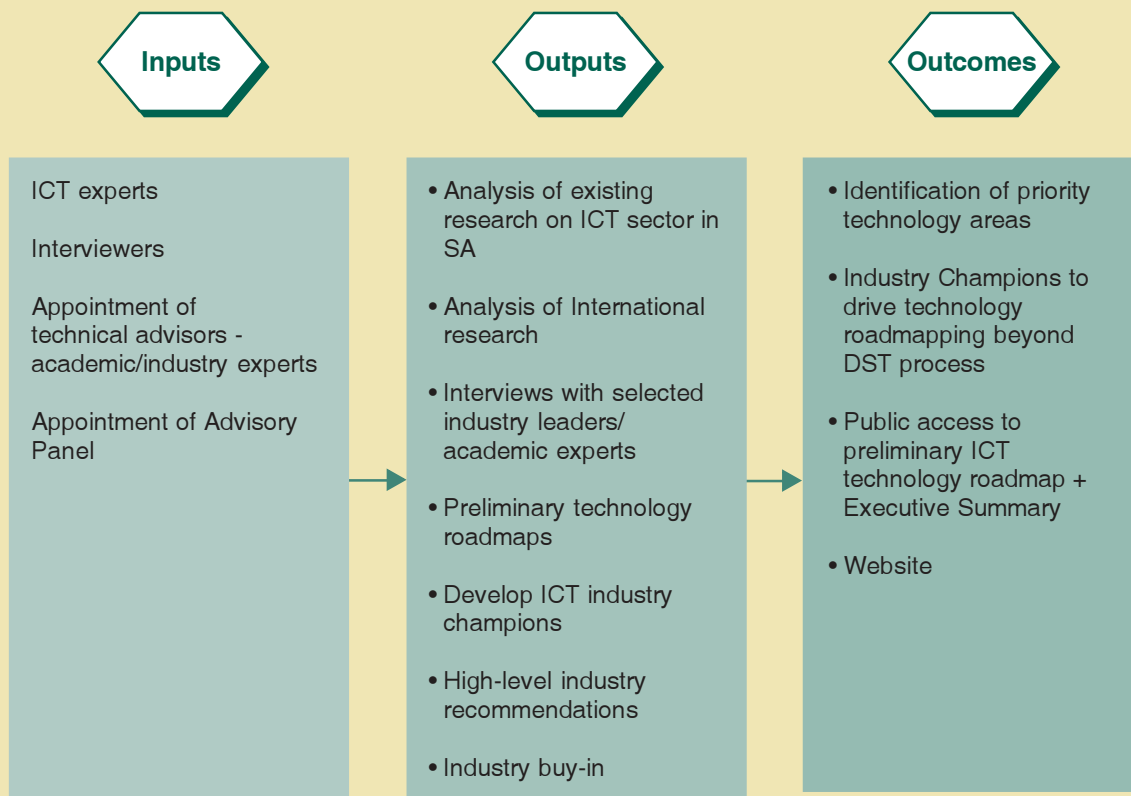
The scientific and research community has made increasing demands for more computing power to solve complex problems using large data sets. Research and development in high performance computing would provide new technologies for grid computing, supercomputing and parallel computing, accelerating scientific discovery. High performance computing affords opportunities for academia and industry to work together to position South Africa as a leader in both high performance computing hardware and software technologies.

Phase two of the roadmapping process, launched in June 2004, by Mosibudi Mangena, Minister of

Science and Technology, began with an awareness campaign comprising roadshows in three provinces and will continue with roadmap workshops in the five technology areas during the next few months. During the workshops, the preliminary technology roadmaps from phase one will be revised by industry participants and specific roadmaps developed.

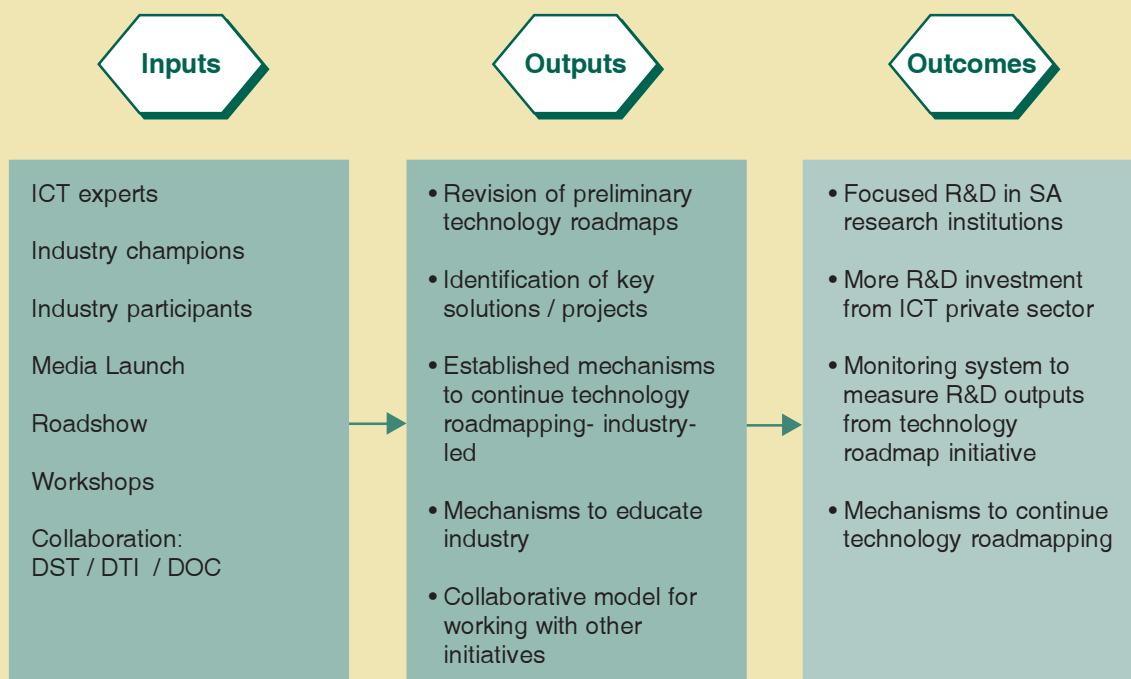
For more information on the roadmapping workshops to be held around the country from September, or for more information on the technology roadmapping project, visit www.ictroadmap.co.za.

The ICT Technology Roadmap Process – Phase I



Open process Public access to all results

The ICT Technology Roadmap Process – Phase 2



Closed process Only industries participating will have access to results

SOUTH AFRICA'S WOMEN SCIENTISTS ARE WINNERS

Professor Patricia Berjak *- Distinguished Woman Scientist Award*

Professor Patricia Berjak, the University of KwaZulu-Natal (UKZN)'s A-rated biologist, received the prestigious Distinguished Woman Scientist Award at the 2004 South African Women in Science function in August, in recognition of her consistent contribution to science over an entire career.

Professor Berjak, who began her academic career with a BSc degree at the University of the Witwatersrand in 1962, is well-published in top-ranked international journals and is a speaker of note at international conferences. Berjak, who is one of only two A-rated women scientists in this country, is on a quest to establish an Africa-wide cryo-preservation facility in Durban to rescue plants from extinction, by finding new and innovative ways to preserve rare seeds for future generations. The facility utilises the latest flash-drying techniques and keeps seeds in flasks of liquid nitrogen.

Her latest award recognises her 'consistent contribution to science over an entire career'. Berjak was nominated for the award by her students at the UKZN School of Life and Environmental Sciences, where she now supervises more than a



dozen Honours, Masters and Doctoral students. Berjak is married to a plant physiologist and UKZN co-researcher, Professor Norman Pamerter.

Professor Helen Rees

- *Distinguished Scientist Award*

Professor Helen Rees won the Distinguished Scientist Award for improving the quality of life of South African women. Professor Rees received R50,000 in recognition of her pioneering work in ensuring the safety of South African women within the context of the AIDS epidemic and widespread sexual violence against women.

In acknowledging her award, Professor Rees said: "I am honoured to have received this award on the same platform as so many talented researchers. We have come a long way in South Africa, but we cannot really say that we are addressing the health needs of women in this country and the developing world. We cannot afford to be complacent and should continue to strive to meet the challenges faced by women in the country and on the continent."

Among other female scientists who were honoured at the Awards was first runner-up in the Distinguished Woman Scientist category, biochemistry Professor Valerie Mizrahi of the University of the Witwatersrand. She works with a team of scientists at the National Health Laboratory Services in Johannesburg, conducting ground-breaking research into how the tuberculosis bacteria develops resistance to drugs.

The second runner-up in the Distinguished Woman Scientist category was University of the Witwatersrand Professor Maureen Coetzee, based at the National Institute for Communicable Diseases. She is one of the people responsible for bringing the recent upsurge in malaria in southern Africa under



temporary control, through careful application of the pesticide DDT.

Special mention was made of the world-class work conducted by University of Cape Town's palaeobiologist Professor Anusuya Chinsamy-Turan, a global expert on the microscopic structure of the bones of dinosaurs. Her work provides important clues to life hundreds of millions of years ago and proves that dinosaur's bones were not very different from human bones today.

Dr Raluca-Ioanna Stefan, a University of Pretoria chemist, also received mention for her easy, on-the-spot diagnostic tool for HIV/AIDS, tuberculosis and hepatitis B, that uses small samples of the patient's blood or urine, so that samples do not have to be sent off to pathology labs for lengthy and specialised testing.

In the Quality of Life category, the first runner-up was University of Cape Town gynaecologist Professor Zephne van der Spuy. Her work as a reproductive endocrinologist covers a spectrum of outstanding laboratory and clinical research for the improvement of women's health.

Rhodes University chemistry Professor Tebello Nyokong, who has been designing a special range of drugs which are extremely light-sensitive and attracted to cancerous tissue, was also a runner-up in this category.



The Boyden Science Centre

By Dr Matie Hoffman

The need for a fully-fledged science centre in the Free State Province was identified some time ago. This vision is now becoming reality, through the Boyden Observatory, a unique facility of the University of the Free State (UFS). Over the last two years, it has been revitalised as a combined research, educational and public facility.

The sod-turning for the first phase of the Boyden Science Centre took place on 27 August 2003 and in February 2004, the construction of the new Boyden Auditorium and reception area were completed. The new facilities at Boyden were part-sponsored by Africa's first astronaut, Mark Shuttleworth, through the Shuttleworth Foundation. The UFS-Boyden 1.5m telescope was also recently refurbished and is already used for research as well as science-awareness activities.

The new public and educational facilities will be officially introduced to the educational community during a Boyden Celebration on 5 October 2004, as part of the UFS centennial year. The Boyden celebration will also make a contribution to South Africa's

participation in International Space Week.

This year, 2004, is the 100th year since the original 1.5m telescope was purchased by Harvard University and the 70th year of operation of the telescope at its present site at Boyden near Bloemfontein.

The UFS is still one of only a handful of universities worldwide that possess a large telescope of the 1.5m class. A small, though sophisticated robotic telescope controlled over the Internet from Ireland, will also be established at Boyden during October.

Being close to Bloemfontein and Botshabelo, the Boyden site is excellently situated as an educational facility while still being in a rural setting, therefore sensitising the community to the need for environmental conservation. Other populated centres, such as the Free State Gold Fields, Kroonstad and Kimberley, are within a two-hour drive.

The new centre has been designed as a powerful outdoor and celestial learning environment that should have a significant impact on the quality of science education in the region. It is



particularly suited to augmenting general and physical science teaching at secondary level.

Exciting activities for science learners will be used to increase enthusiasm for science, while workshops for general science and physical science teachers should have a significant impact on the quality of science education. The project will take advantage of the experience from the informal Boyden education programme which has taken place over the last few years.

A typical educational visit to the Boyden Science Centre would be a late afternoon visit, running into the early evening. A short multi-media presentation in the space theatre introduces the programme. Learners are subsequently taken around the first phase of the Education Walk, to receive themed information and take part in activities. More activities underneath the night-sky, related to the constellations and satellite viewing form part of an early evening schedule which is the most memorable learning experience of the programme.

The challenge of improving the quality of science education amongst thousands of science learners in the Free State requires a broad strategy.

With this in mind, the Boyden project has been structured in phases. The facilities will also be improved to take better advantage of Boyden's tourist potential.

Such improvements would include integrating awareness of the natural fauna and flora along the Charl van der Merwe Education Walk with the other educational activities, as well as the addition of interactive exhibits.



The Boyden Auditorium.

There are also plans to make the facilities more accessible to wheelchair users. Revenue generated through tourist and general public programmes will be important for the long-term sustainability of the Science Centre.

Boyden Observatory has a long history of astronomical and astrophysical research, so it is entirely appropriate that astronomy forms the basis of the theme for the Science Centre. In addition, the modern astrophysical research projects with international co-operation, create the ideal backdrop against which young people can be exposed to the practice of high-standard science.

For more details on the tours at Boyden Science Centre, contact:

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THE WEST COAST FOSSIL PARK:

Incorporating the Langebaanweg Palaeontological Site

By Pippa Haarhoff



Fossils were first discovered at Langebaanweg in the Western Cape in the late 1950s, during phosphate mining operations by Chemfos Mine. Since then, it has been established that this deposit contains possibly the greatest diversity of five million year-old fossils in the world.

These fossils have attracted the interest of leading overseas scientists and local researchers, generating over seventy publications. Some important discoveries include *Agriotherium africanum*, the first bear ever found in Africa south of the Sahara; *Homiphoca capensis*, an extinct true seal and four extinct species of penguins.

Over the past 40 years, the South African Museum, now part of Iziko Museums in Cape Town, has forged an excellent working relationship with the mine, to ensure that the palaeontological wealth of the site is properly sampled. When mining operations ceased in 1993, various stakeholders recognised the potential for the development of a fossil park.

The first phase of the West Coast Fossil Park was launched in September 1998.

A unique field centre for further palaeontological research, education and specialist tourism programmes is currently being established. A 14 hectare area of the mine floor has already been proclaimed a National Heritage Site, in an effort to protect the fossil deposits for posterity.

The Fossil Park offers students and eco-tourists an on-site fossil experience, providing facilities that enable visitors to learn about environmental changes in the West Coast region over the last five million years. To realise the aims of the Park, several public facilities are being created. A simple structure covering the excavation site allows visitors to view *in situ* fossils. Existing mine buildings are being converted into education and scientific facilities, which will provide space for displays, a library, lecture room, fossil laboratory and other facilities.

The site is also suitable as a training ground for tertiary learners studying geology, archaeology, palaeontology, zoology, botany, environmental and geographical science and tourism. Many opportunities exist for post-graduate studies on the Langebaanweg site in these disciplines.

The mining area is being rehabilitated to remove unsightly dumps and to achieve the grading and landscaping



of some 300,000 cubic metres of soil to suit the Fossil Park's requirements.

Alien vegetation, predominantly *Acacia cyclops*, has been replaced with local indigenous strandveld flora. Through this process, a buffer reserve around the National Monument Fossil Site is being created. Permanent water bodies created by the mine situated within the buffer reserve attract a variety of bird life and the reserve is also a refuge for several local indigenous insects, frogs, reptiles and small mammals. Ultimately, the area surrounding the fossil monument site could serve as a model for rehabilitation and showcase various ways of reducing human impact on the natural environment.

Langebaanweg is scientifically important nationally and internationally for a number of reasons. The Langebaanweg fossil site is extremely rich in preserved specimens and in diversity of species represented. These two factors have allowed scientists to reconstruct a reasonably detailed picture of the West Coast palaeo-habitat. This information is useful when comparing the past with the present and when tackling questions relating to ecological constraints, evolutionary opportunities and exactly what impact humans have had on biodiversity.

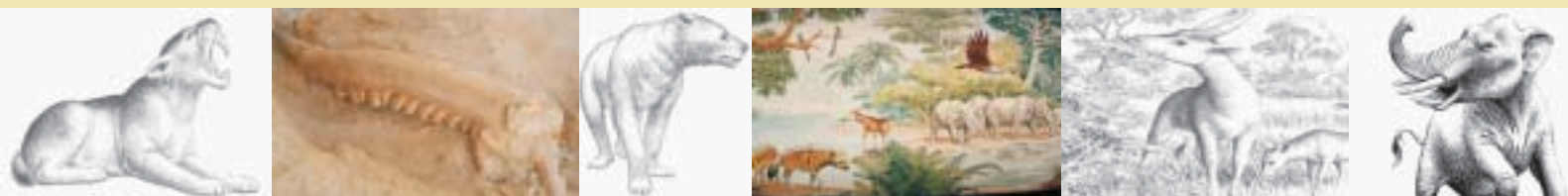
The many different animal groups represented have provided significant scientific data relevant to understanding their evolution and biogeography. Langebaanweg is the richest pre-Pleistocene site in

Southern Africa. It records an era otherwise unknown in this region and thus provides a reference for comparison with other important sites such as those in East Africa and Europe.

A greater understanding of our past promotes opportunities for responsible planning for the present and the future. A wealth of information still remains relatively untapped and the closure of the mine has presented a perfect opportunity to expand and build on the scientific exploration already carried out by Doctors Ronald Singer, Brett Hendey and their colleagues.

Along with the West Coast National Park, the Fossil Park provides the necessary balance to the industrial development taking place in this region, and creates an opportunity for people to satisfy their ever-present need to get in touch with the natural world. Sound business principles and active marketing will ensure that the eco-tourism value of the West Coast Fossil Park is fully developed.

The West Coast Fossil Park is open to the public seven days of the week, for guided tours and school programmes.



ICT: Enabling the Future

By Johan Eksteen and Imraan Salojee

The establishment of an environment where ICT innovation can flourish is a challenging and complex task and one that can only be achieved in partnership with all relevant players. A strong, sustainable partnership between community, industry, research and technology institutions and government is required to reach this goal.

What does this task entail? To answer this question, one needs to explore a range of issues such as the impact of ICT, the role of research and development, role players and the areas for intervention and focus.

A major challenge, especially for the developing world, is to ensure that the benefit of ICT experienced in the first world is not confined to these more privileged sections of our society, but spread throughout every sector and area of society. It is also not only the benefit that needs to be shared more equally. There is a need to change the developing world's participation in the knowledge-based economy from one of pure consumption to that of a full participant, encompassing both creation and consumption activities.

The need for innovation in these areas is evident.

A number of international and local trends further indicate the need for a comprehensive national approach to ICT and related innovation: Technology chains are increasingly more complex. This makes it difficult for any single institution to establish a position of leadership in the domain. A national approach provides the critical mass to achieve such leadership.

As global markets expand and change, ICT research and development are increasingly organised on an international scale as enterprises respond to new challenges. An important trend is the relocation of research and development activities, and a national approach will create a local market that is well suited to respond to these changes.

Innovation processes are more open and ideas exchange beyond traditional enterprise boundaries is becoming commonplace. A national system of innovation that supports these knowledge flows in general, and in ICT



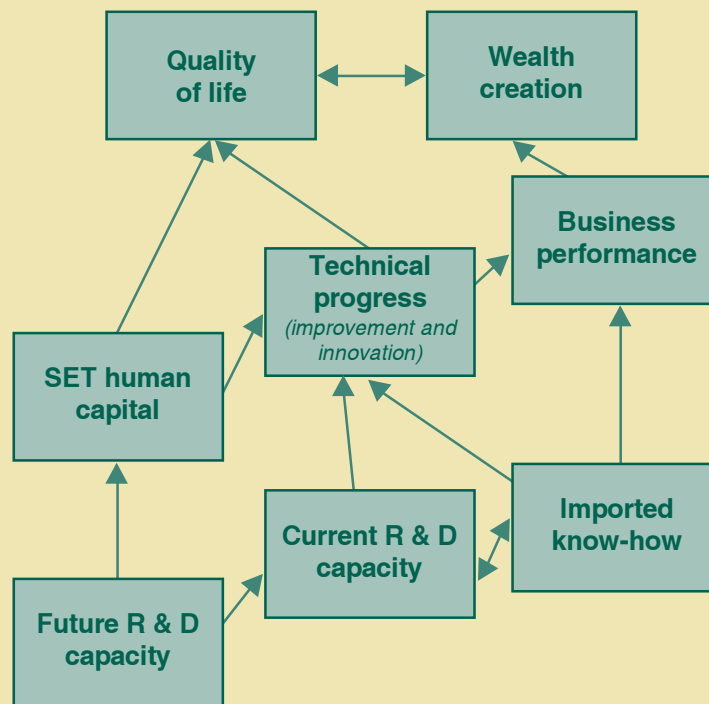


Figure 1

specifically, is necessary to capitalise on this trend. The National Research and Development Strategy, describes the South African National System of Information and identifies the ICT as one of the key focus areas.

A number of studies, reports and strategies, least not the National Research and Development Strategy, illustrate how research and development impacts on economic growth and quality of life (see figure 1).

In a similar fashion, a longer term view needs to be developed and communicated, with the aim of enabling South Africa and the region

to take full advantage of ICT and to contribute significantly to the progress towards an inclusive, sustainable knowledge society for all. This goal is based on three interlinked pillars and based on the strategic framework, that is support, facilitation and contribution to wider deployment and adoption in a sustainable manner, of ICT products and services within our context; research and technological development (RTD) in ICT. This takes into account the full value network and innovation process; and strong influence and support of regulatory frameworks and initiatives to accelerate the benefit of ICT for all.



We cannot build this based only on the extrapolation from the past, but need to look to the future. For example, we need to ask: “How many engineering and computer science graduates do we need in ten years to fulfil the vision?” and work backwards from this, identifying bottlenecks and opportunities to achieve these goals.

We need to be firmly rooted in South Africa’s own context with all its opportunities and challenges, seeing this as a platform for building global leadership in a number of areas.

In order to give substance to this plan, three areas need specific attention, that is human resource development; critical mass approaches to research and development and investment; and appropriate partnerships to realise the plan.

The availability of appropriately skilled human resources is the single most important resource in developing appropriate, competitive and innovative ICT businesses, and building a world-class research and development environment. Skilled people are the lifeblood of the knowledge-based economy.

A number of studies show that there is a strong positive correlation between the number of PhDs produced within a country and its competitiveness. South Africa currently produces less than 30 ICT-related PhDs per year.

Appropriate interventions are necessary to address this shortfall, such as the stimulation of more post-graduate study opportunities and leveraging our international networks to access the appropriate skills in a sustainable fashion.

We need to concentrate our resources in areas where there is clear potential to succeed. While concentration helps achieve critical mass of resources and people and thus increases the chances of successful outcomes, it is still important to allow a spread of projects, as new successes in ICT can come from unexpected sources. However, the general trend needs to be moving towards focus and concentration. Regardless of size or scope or area, the research and innovation that are supported must be world-class.

In order for us to capitalise on the promise that ICT presents, and at the same time, ensure that the benefit accrues equitably to all areas of our society, we need to work together on the enabling environment in which this can be realised.

The challenge is to act now, act in a strategic, yet pragmatic fashion with a clear view of the possible future in mind.



Incubating Business, Growing Profits

By Tshepo Motlounq

In various centres throughout the country, business is getting a boost through Godisa, a development programme that assists inventors to optimise technology and improve the competitiveness of products and services.

Zenzele technology demonstration centre, based at Mintek in Randburg, Johannesburg, has successfully transferred technology to a small mining company, the Springs PGM Project, which now generates an annual turnover of R12 million. Zenzele has also assisted small, medium and micro enterprises (SMEs) to mine diamonds, as well as to produce value-added products from primary mineral products, such as jewellery, household articles and decorative items.

Zenzele is an easily accessible centre that aims to reduce business failure by providing technology and services appropriate to the needs of small-scale miners. The centre has technical demonstration facilities for large and small-scale processing facilities for a number of commodities and assists organisations to access finance or to develop a business plan. Small-scale miners from Mpumalanga, Gauteng, KwaZulu-Natal, the Northern Cape including Namaqualand, the Free State and the Northern Province, have

benefited from centres such as Zenzele.

The centres' focus range from biotechnology, life sciences, software development and embedded systems, to fine chemicals, small-scale mining and hydroponics for cut-flower export.

The Godisa Programme, which boasts eight centres that focus on the enhancement of technological innovation and the international competitiveness of South African SMEs, is funded by the Department of Science and Technology, the Department of Trade and Industry and the European Union. The centres' focus range from biotechnology, life sciences, software development and embedded systems, to fine chemicals, small-scale mining and hydroponics for cut-flower export.

Godisa has successfully implemented technology transfer in South Africa and as a result, the Department of



Trade and Industry has ceded four of its technology programme centres in various sectors to Godisa. The centres are the Middleburg Stainless Initiatives, the National Fibre, Textile and Clothing Centre, Downstream Aluminum Centre for Technology and the Furniture Technology Centre.

To date, 1,266 SMEs have been established and more than 2400 jobs created. The former number includes more than 800 tenants housed either as incubates or technology demonstrations. The addition of the four centres from the Department of Trade and Industry will further increase technology capacity and employment opportunities.

Two more incubation centres, Biodiesel and Emerging Contractors are on the verge of becoming operational. The Biodiesel Incubator will support the establishment of small-scale farmers and entrepreneurs in the production of biodiesel fuels. It is estimated that several SMEs will be created to handle the production and distillation processes. Limpopo has been identified for the establishment of this incubator.

The Emerging Contractor Incubator will support the growth and development of emerging small-scale building contractors and has significant direct and indirect job creation potential.

Timbali Technology Incubator, situated in the Mbombela region in Mpumalanga, is handling the largest cut-flower project in Africa and already

major developments in floriculture have been achieved. An average monthly nett profit of R12 000 is currently generated from cultivating vibrantly-coloured Maxi Gerberas. The flowers are already exported to Mozambique, with plans to expand this market to the Northern Hemisphere.

According to Charles Wyeth, the Chief Executive Officer for Godisa, research conducted by the European Union has concluded that one of the leading strategies to enhance the overall survival rates of SMEs is by means of business incubation.

The study indicated that “the survival rate of firms reared in an incubator environment was significantly higher than the business success rate amongst the wider SME community”. In fact, the research further indicated that “the effectiveness regarding incubation in OECD countries show that the survival rate of incubated firms ranges from approximately 80 to 85 percent.”

Wyeth said research suggests that business incubators are very effective methods of promoting knowledge-intensive, new technology-based activities.

“There is strong evidence to suggest that incubator initiatives help promising entrepreneurs launch their business and succeed. Incubation can create the stimulation that is needed to foster economic growth in a developing country,” he said.



National Systems of Innovation and Economic Development

By Vuyani Lingela

The Global Network for Economics of Learning, Innovation and Competence Building Systems (Globelics), a global network that brings together scholars working on national systems of innovation, launched a PhD School on national systems of innovation and economic development.

Thirty-four PhD candidates from 19 countries were selected from a list of applicants, to participate in what is known as the 2004 Globelics Academy, from 25 May to 3 June 2004, in Lisbon, Portugal.

“The Development of a Co-evolutionary Framework to Improve Competitiveness in the South African System of Innovation”, registered at the University of Pretoria, was among the papers selected by the academy. The study is based on the hypothesis that growth in national competitiveness is influenced by the development of coherent functional relationships between human resource development, research and development and business development activities in the national system of innovation.

The study recognises that the South African system of innovation remains fragmented and that the country is becoming less competitive. It identifies the need for a common framework understood by government, higher education, research councils, technology companies and venture capital, to help identify roles and functional relationships in the system of innovation.

As a result, the research aims to develop a framework that can be used by innovation actors to: Identify and manage systemic failures limiting competitiveness in the South African system of innovation; to measure and assess changes in the development path of the South African system of innovation; and to evaluate functional relationships between actors’ activities in the South African system of innovation.

The Globelics Academy brought together frontier researchers within innovation studies and PhD candidates from different parts of the world, in order to expose those candidates to high-quality research networks in this field. Eminent professors reviewed, commented and encouraged researchers’ activities, providing insight into how to undertake theoretically informed and policy-relevant empirical work on issues related to systems of innovation.

A proposal was announced by Professor Bengt-Åke Lundvall, founder of the Globelics Academy, of a new research initiative focusing on Brazil, Russia, India, China, and South Africa (BRICS). BRICS’s key focus will be on the contribution of innovation to solving poverty and environmental problems and will include innovation surveys with primary focus on organisation and human resource surveys.

The papers presented at the Globelics Academy are accessible on the Globelics Academy website at www.globelicsacademy.net.

The Africa Institute

By Zanele Khoza and Elizabeth le Roux

The Africa Institute of South Africa (AISA) is a statutory body primarily focusing on political, socio-economic, international and development issues in contemporary Africa. It was established in terms of the AISA Act of 2001, although historically the research council has functioned since 1960 as a non-profit organisation.

The AISA Act was based on a number of key principles that are particularly relevant for African development, especially in terms of the confluence of initiatives aimed at advancing the renewal of the continent, such as the African Union and the New Partnership for Africa's Development (NEPAD).

The Minister of Science and Technology appoints AISA council members, who are accountable to the Minister. The AISA council consists of a chairperson, a chief executive officer and seven other members, all of whom are authorities in the area of research and corporate governance.

The council is supported by a small staff, which includes functional experts in technical matters and support services. AISA's role is to provide research and policy development; to conduct research and embark on training programmes; and to establish, participate in and maintain networks for peace, development and prosperity on the African continent. This is expressed through three main divisions: research and development; publications and communications; and library and documentation services.

AISA contributes to the goals of the National System of Innovation.



Former Public Enterprise Minister Jeff Radebe addressing the "South Africa: Ten Years After Apartheid" conference earlier this year.

Its research programmes have a particular impact on knowledge generation, human resources development (especially developing capacity in African studies, a scarce resource in South Africa), social sciences and innovation. AISA's research also ensures the quality of policy decision-making, as it has an impact on various government departments, non-governmental organisations and other bodies.

The research division is divided into programmes that focus on topical issues such as African unity, peace and governance, sustainable development and area studies - forming a significant source of expertise in a country that is still coming to terms with its role as a part of the African continent.



At the AISA conference is President Thabo Mbeki, AISA CEO Eddy Maloka and Professor Abdoulaye Bathily from Senegal.

The research division is supported by an internship programme and a liaison division that coordinate events, partnerships and fellowships. Early in 2004, AISA hosted a highly successful international conference entitled 'South Africa: Ten Years After Apartheid', which was attended by hundreds of scholars from around the world.

AISA's research findings are disseminated to the general public through the publications and communications division. This division aims to disseminate information as widely as possible, to promote awareness and consciousness of Africa, and to create awareness about and raise the visibility of, AISA. The Institute's publications include a quarterly, peer-review journal, *Africa Insight*, a book series to showcase AISA's research, occasional papers to provoke debate and keep decision-makers informed and reference works such as the ever-popular country

profiles *Africa A-Z* and the 'facts and figures' manual, *Africa at a Glance*.

AISA's library and documentation centre comprises one of the most comprehensive collections on African post-independence resources in respect of politics, economics and development issues, as well as having a special focus on current affairs and maps. Visitors are encouraged to email or fax AISA with requests for documentation, and can also visit the library on site.

The most recent development is a project on the AISA Knowledge Bank, which will enable researchers to integrate geographical information systems and data analysis for the purposes of forecasting. An extraordinary amount of diverse information can be mapped and analysed in this way.

For more information on AISA, please contact AISA at ai@ai.org.za or at www.ai.org.za.

BOOST FOR SOUTH AFRICAN BIOMEDICAL RESEARCH

By Daan du Toit



Minister of Science and Technology, Mosibudi Mangena and Minister of Health, Dr Manto Tshabala-Msimang, during the official opening of the EDCTP Cape Town Secretariat Office.

South Africa is to host the African Secretariat of the European Developing Countries Clinical Trials Partnership (EDCTP) at the Medical Research Council (MRC) in Cape Town, further boosting South Africa's growing reputation as a centre of scientific excellence in the international effort to combat poverty related-diseases.

The EDCTP is a major new initiative of the European Union (EU) designed to accelerate the development of effective, new interventions for the prevention and treatment of diseases such as HIV/AIDS, malaria and tuberculosis. This unique North-South partnership seeks to achieve these objectives by concertedly strengthening African countries' capacities to undertake clinical trials for the evaluation of new vaccines, drugs as well as innovative interventions such as microbicides.

The MRC, with the active support of the Departments of Science and Technology and Health, won a competitive international bidding contest, to secure the right to be appointed as host institution for the EDCTP's African Secretariat. The latter institution will play a critical, central role in the initiation, management and funding of EDCTP activities in Africa.

The EDCTP Cape Town Secretariat Office, as the office will be officially known, was formally opened on 26 July 2004 by the Minister of Science and Technology, Mr Mosibudi Mangena, and his counterpart, Dr Manto Tshabalala-Msimang, the Minister of Health. The Cape Town Office will enjoy equal status with its sister office in Europe, based at the Netherlands Organisation for Scientific Research (NWO) in The Hague.

The EDCTP activities are undertaken through a range of instruments such as competitive calls for project proposals, which are open for participation to research groups in the EU and Africa. The partnership, which will be in operation until at least 2007, has an initial budget of €400 million, contributed by the European Commission and EU member states. It is also anticipated that an additional co-investment of at least €200 million will be leveraged from partners such as the pharmaceutical industry and international foundations, to support EDCTP activities.

At the launch of the Cape Town Office, Minister Mangena lauded the EU's investment as a powerful response to the dire need for new funding to assist Africa in the alleviation and the eradication of the burdens of disease and poverty. The Minister also pledged that South Africa would actively promote synergy between national programmes, such as, for example, the South African Aids Vaccine Initiative (SAAVI) and the EDCTP.

During his address, the Minister highlighted the important role the EDCTP will play in delivering scientific knowledge to inform policy- and decision-making in Africa, especially within the public health and sustainable development domains. He stressed that the EDCTP will provide an invaluable mechanism for translating the work of Africa's biomedical and other scientific communities into concrete improvements in the quality of life of people on the continent.

Both Ministers Mangena and Tshabala-Msimang also pointed to the important contribution the EDCTP will render to the implementation of continental programmes such as the New Partnership for Africa's Development (NEPAD) science and technology and health programmes. Dr Pascoal Mocumbi, the EDCTP High Representative and former Mozambican Prime Minister, pledged the EDCTP's commitment to close collaboration with African programmes, particularly NEPAD.

The success of the MRC in winning the bidding contest is indicative of the considerable strengthening of the science and technology partnership between South Africa and the EU.

The EDCTP is administrated in Europe by the European Commission's Directorate-General: Research, the Department of Science and Technology's (DST) direct counterpart, with whom the DST engages in regular and high-level dialogue.

Building on the successful South African participation in the biomedical activities of the EU's Sixth Framework Programme (FP6), the results of the first EDCTP calls for proposals announced at the opening of the Cape Town Office, saw EDCTP contracts awarded to several South African research groups. These included the Universities of the Witwatersrand, Cape Town and Stellenbosch, as well as the Council for Scientific and Industrial Research (CSIR).

In order to further promote and facilitate South African participation in the EDCTP, a National Co-ordinator will be appointed. This position will be filled by an expert who will pro-actively assist South African researchers in their EDCTP participation and co-ordinate individual South African participation from a strategic national perspective, in order to ensure optimally beneficial impact.

The MRC's successful bid is a good example of the successful execution of the DST's responsibility to initiate and foster smart partnerships with sister departments and public research organisations, in order to strengthen South Africa's knowledge generation and innovation capacities.

Postscript

Dear Reader

I sincerely hope you found this issue of *Innovation for Development* informative.

In the next volume, we cover palaeontology, oceanography and astronomy; we profile a science council and review the WSSD+2. We also bring you a feature on a prominent South African woman's contribution to science.

The Boyden Observatory will officially introduce the new educational and public facility during a Boyden Celebration on 5 October 2004, as part of the University of Free State centennial year activities. The Boyden celebration will also make a contribution to South Africa's participation in International Space Week.

Do look out for the International Science Fair, from 1-3 November at the Gallagher Estate, in Midrand, Johannesburg. Professor Sydney Brenner, the 2002 Nobel Prize in Physiology or Medicine winner, will deliver an inaugural lecture in honour of Professor Phillip Tobias's lifelong contribution to anatomical science. This lecture will be held on 2 November in Hall 2, at the Gallagher Estate.

Remember to send in your contributions and opinions to Buhle.Khumalo@dst.gov.za, and put INNOVATION in the first sentence. Should you wish to be added to the mailing list, please send us your postal address.

The magazine is also available on the DST website at: www.dst.gov.za.