

# Science

## A weather eye on Africa

**Christina Scott** reports on how South Africa and Egypt are using supercomputers to avert disasters

**A** marriage between the only two civilian high-power computing centres in Africa should help improve disaster response times and track epidemics using satellite data.

The one partner is the Centre for High Performance Computing, based at the Council for Scientific and Industrial Research's Meraka Institute in Cape Town. The centre is capable of downloading information in the seven seconds it takes a satellite to pass over the African continent.

The other partner is Egypt's National Authority for Remote Sensing and Space Sciences, chaired by researcher Ayman el-Dessouky Ibrahim. It runs a receiving station at Aswan, 1 000km south of Cairo, which covers much of Africa, Arabia and southern Europe.

The two are seeking a site for their new home in Egypt, which already has a name: the Kamal Ewida Earth Observatory. Bidding for construction of two ground stations — one to track selected satellites orbiting the poles and another for fixed or geostationary

satellites — is expected to begin soon. By the time of the 2010 Fifa World Cup, receiving dishes, computers and software should be operational.

Both centres have installed IBM Blue Gene supercomputers, which can run more than a trillion multiplications a second.

The South African centre has also installed a high-performance multi-core cluster from Silicon Valley's Sun Microsystems, according to director Dr Happy Sithole.

"Whether natural or man-made, disasters do not respect nation-state boundaries. This is why collaboration between the African continent's supercomputer centres is absolutely necessary," Sithole said.

The high-powered computer centres are needed to process huge amounts of data beamed down by satellites keeping an eye on Africa, said Dr Gilbert Rochon of Purdue University in the United States.

Rochon made the announcement at a session on high-performance geocomputing at the International Geoscience and Remote Sensing Symposium, held in Africa for the first time. It was organised by Mike Inggs



**Working together: Africa will be in a better position to monitor floods and diseases because of high performance computing.** Photo: AP

of the University of Cape Town and Harold Annegarn of the University of Johannesburg.

The project should process bandwidth-hungry satellite data that can be used to monitor for floods, drought and global warming, said Rochon, who is chief scientist at Purdue's Rosen Centre for Advanced Computing.

He said the receiving station is important because it will get warn-

ings of environmental triggers for parasites that threaten humans — such as malaria, river blindness and sleeping sickness — as well as economically significant diseases such as heartwater, which strikes cattle.

He showed a map indicating that, given climate change, many of these diseases are moving beyond Asia, Africa and Latin America and may in the future threaten the developed world.

The bulk of the money is being

put up by the Science for Peace Programme of the North Atlantic Treaty Organisation, the military alliance spanning North America and Europe, with contributions from the Egyptian government.

The project's co-directors believe in the Kamal Ewida Earth Observatory so much that they do not draw a salary and their academic institutions receive no administrative compensation.

This remarkable group of scientific altruists includes Dr Gamal Salah el-Afandi of the 1 020-year-old al-Azhar University, established in AD 988, and Dr Magdy Abdel Wahab of the century-old Cairo University, both in Egypt.

They're joined by Dr Gülay Altay of Kandili Observatory and Earthquake Research at Turkey's Boğaziçi University, as well as Rochon and Purdue University Professor Okan Ersoy.

"The partners recognise that this project has scientific and humanitarian implications that can be replicated in other regions vulnerable to disasters," Rochon said.

Rochon showed the delegates a map showing computer information flows around the world. "There are these big pipes linking the US to Europe and Asia and there are only little spaghetti strings in Africa, mostly to Egypt and South Africa," he said.



**Genie in a bottle: the Council for Scientific and Industrial Research is trying to convert algae to biofuel.** Photo: Oupa Nkosi

## Swimming in fuel

**Christina Scott**

The same algae that turns a swimming pool green and nasty could one day fuel your bakkie, says University of Cape Town chemical engineering doctoral student Melinda Griffiths.

Each microscopic life form contains a tiny drop of oil, which can be harvested with relative ease, she told 150 female high school learners at a Women's Day event at the MTN Sciencentre in Cape Town.

"The algae grows so fast, two weeks until harvesting, and it doesn't take up much space. The oil can be extracted in an hour and converted to biodiesel in a couple of hours," she said.

Griffiths was speaking at a series of talks for young women scientists organised by Element Six industrial diamond makers and South African Women in Science and Engineering.

"We think this is going to be a fantastic way of making biofuel," said Griffiths, showing a picture of a pos-

sible algae farm of the future.

"We get vegetable oil from soybeans, sunflowers and canola so why not fuel oil from algae?"

After all, she said, it's better to use fresh plants rather than rely on old plants — which died millions of years before dinosaurs roamed the land — because fossil fuels will not last forever. And the carbon cycle using this form of fuel has more benefits for our overheated atmosphere.

"Harvest algae and save the world," said Griffiths. Of course, there are still many technical challenges to be overcome by the team at UCT's Centre for Bioprocess Engineering Research — including that the algae is so small it clogs filters.

Other speakers included UCT chemistry researcher Denise Sarvanakumar, who is investigating 20 local species of seaweed with promising chemical compounds that might help in the design of new drugs, and geologist Thakane Ntholi.