

Just coffee and a bob or two will do

Discussion and limited funding spark researchers' creativity

By **BRUCE MUNRO**

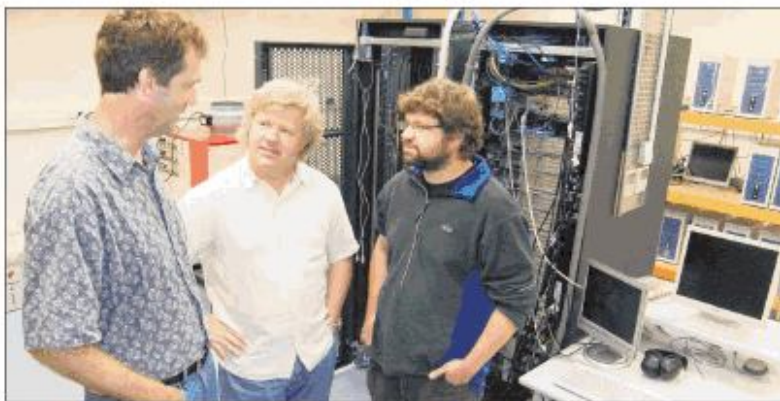
A COFFEE machine and limited funding is enabling University of Otago researchers to lead the world in developing new ways to process and apply vast quantities of information.

Mathematician Associate Professor Colin Fox and physicist Dr Tim Molteno are involved in the Australia-New Zealand bid to host the \$3.1 billion Square Kilometer Array (SKA) radio telescope — the world's largest, but as-yet-unbuilt, radio telescope, comprising about 5000 centrally linked antennae.

It is hoped the telescope will help answer fundamental questions about the origin and development of the universe.

The maths to make the SKA work has not yet been developed, but Dr Fox is leading the global field in that area. And coffee breaks with colleagues such as Dr Molteno and Associate Professor David Bryant are resulting in applications in areas as diverse as population modelling and radio frequency electronics.

"The basic underlying



Does compute: University of Otago researchers (from left) Dr Tim Molteno, Dr Colin Fox and Dr David Bryant discuss the challenge of developing new ways to process vast amounts of data. PHOTO: BRUCE MUNRO

understanding of how to make measurements that tie a lot of areas together — very few people are doing that," said Dr Fox, who attended a gathering of radio astronomers in Holland in August. "It was nice to find people who knew if it's going to be

bigger, then it's not business as usual. They are looking to us at Otago to provide the lead."

One of the key challenges to making the SKA work will be assembling the slightly different bits of information gathered by each antenna

into one accurate picture.

"It's not just how to process the data, but how to work out all the subtle variations between antennae, such as temperature and direction," Dr Molteno said.

"This housekeeping side of the project turns out to be a

huge problem. But we have people whose expertise is developing new algorithms that could solve that."

The algorithms give more efficient ways of calculating probability and inferring new information from data. Probability calculations are

widely used in science and industry.

More efficient ways of doing those calculations would help not just the SKA project, Dr Fox said.

"It will generate a lot of excitement everywhere from oil exploration to medical imaging."

Dr Molteno has already used algorithms developed by Dr Fox in cutting-edge GPS wildlife-tracking devices.

Dr Bryant is working on determining the likely sizes of historic populations from large amounts of genetic information.

The special character of the university was facilitating those inter-disciplinary developments, the men said.

"Otago is quite lucky because we have a diverse group of people who talk to each other," Dr Molteno said.

"The coffee machine is an essential item of research infrastructure."

"If you get big funding, you're on a treadmill," Dr Fox said. "Here, the university supports people to do what they want, as long as it has research excellence."

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