

Matter of Fact

Newsletter from Science & Engineering and Computing & Mathematical Sciences



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Summer 2010

Summer science fun



Students Jonathan Mayo from Mt Maunganui College and Liza Bolton from Te Awamutu College experience Biochemical Engineering in the Waikato University labs during the Science Summer School.
Photo: Michelle Armstrong

Budding young scientists are given the chance to experience the latest scientific techniques, meet like-minded science students and experience university life first hand every year at the Hill Laboratories Waikato Science Summer School. In December 2009, the summer school saw 40 Year 12 science students from the central North Island descended on Waikato University for the annual week-long event.

The students began their week with a field trip to Waihi, investigating the area's past and present mining sites, visiting spots such as Martha Mine, Golden Cross, Lake Gilmour and Karanaghake Gorge. They collected samples and returned to Waikato University's laboratories, examining plankton from the waters of Lake Gilmour (biological sciences), rocks from Karanaghake Gorge (earth sciences), analyse rocks and tailings for gold and silver (chemistry) from Martha Mine and also learning about various areas of

electronic and biochemical engineering.

On the last day of the Summer School, the students presented their opinions on possible new mining sites in New Zealand, as well as rehabilitation plans for when mining has ended.

The Science Summer School, initiated by Rotary Club, has been running for 14 years, and is the result of strong partnerships between Rotary, the University of Waikato, and sponsors Hill Laboratories and The Gallagher Group.

Main sponsor Hill Laboratories says it's committed to providing funds and resources to activities that support the future of science in New Zealand. "The Science Summer School is a key event for us to support, as it provides an opportunity for young people to come together and learn in the field of science and technology – an important step towards a career in this industry" says Steve Howse, Hill Laboratories General Manager.

New Tauranga-based degree on offer

A new Tauranga-based pathway to a Bachelor of Science in Computer Science with the University of Waikato is now offered at the Bay of Plenty Polytechnic.

The new degree pathway is open to students who enrol at Bay of Plenty Polytechnic in the Diploma in Applied Computing Level 5 (DipAppCompL5) and then Level 6 (DipAppCompL6) following the prescribed degree pathway. If successful, these students will be guaranteed entry to their third (final) degree year at the University of Waikato based in Tauranga.

This is the latest degree pathway to be established at Tauranga under the deed of co-operation signed by the University of Waikato and Bay of Plenty Polytechnic in 2006 to strengthen their commitment to work together to provide high-quality tertiary education and research in the Bay of Plenty region.

Other degree level courses offered in Tauranga under the arrangement include a Bachelor of Tourism, Bachelor of Teaching (Early Childhood Education), Bachelor of Business Analysis and a Bachelor of Management Studies. A Bachelor of Social Work is also available at the university's Tauranga campus.

There were 781 University of Waikato students studying papers towards formal programmes in Tauranga in 2009, representing an increase in enrolments of 33% from the previous year.

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Golden career for science grad

Jacob Croall graduated from the University of Waikato with a Bachelor of Science (Technology) and a Masters degree in Science. Here he shares his experiences as the Senior Metallurgist at Newmont Mine in Waihi.



Science graduate Jacob Croall has secured a top job as the Senior Metallurgist at Newmont Mine.

My degree from Waikato University gave me the base skills to get a job in the mining industry. Since starting in the industry, I have developed into a senior chemical processing role at Newmont's Waihi operation. In my role as Senior Metallurgist I provide a supporting role to the gold extraction process, tracking plant performance and continuous improvement. I work to facilitate testing for potential future ore sources and how they will be processed. A big part of my job has been site water management, developing an understanding of volumes, flows and geochemistry, and working with predictive modelling software.

Working at Newmont Mine, I have experienced an eight-week secondment to Denver, Colorado; training in Tucson, Arizona; and in Belo Horizonte, Brazil; as well as numerous site visits to Newmont operations in Western Australia, and conferences and professional development. Mining pays well too!

Working within the Waihi community has also

been a highlight. It's a small town and I quickly became involved in the community; playing for the local soccer team, joining the mines rescue team and enjoying what the location has to offer, taking up fishing and surfing.

The breadth of experiences gained at Waikato has been essential to my success in my job. The metallurgist role is significantly wider than simply the gold extraction process, and requires a person with aptitude across a wide range of disciplines, including chemistry, environmental science and process engineering. The skills gained from my degree were directly applicable to this role, not just in the academic sense, but from field trips and practical assignments, and in particular my field work in Antarctica.

For those of you considering tertiary study, keep your options open early and find what interests you; it may not be what you expect. Work hard and extend yourself, don't limit yourself by thinking you're not capable. Waikato is a great university, its degrees can take you anywhere!

Shaken, not stirred

The kitchen might seem an odd place to find a context-aware system – a computer system that's aware of its physical environment. Not for a group of computer science students, who've brought computers into the kitchen to help them cook up a storm.

It was University of Waikato computer science student Yaver Mir's first-ever attempt at mixing a cocktail, and although the Bloody Mary turned out a little salty (plus it was missing the vodka), the computer software demo worked.

Yaver and his student team-mates—Jordan Schwab, Jeremy Tuson, Robert Collard and Steven Marsh – were trialling software they'd developed for a University course on context-aware information systems. Their program guided Mir through the cocktail recipe step by step – the perfect aid for the inexperienced cook or bar-tender.

Senior lecturer Dr Annika Hinze, who developed the Waikato course for senior students, says they had to work in teams and come up with a practical application of a context-aware system.

"Context-aware systems behave differently depending on what's around them, such as who or where the user is," she says. Examples include GPS systems and 'smart' phones that might, for example, detect that the user is currently in a meeting room and so reject any unimportant calls.



Wondering what to cook with what's in the fridge? Waikato Computer Science students have you sorted.

"Most of the other students on the course used location as a context," says computer science student Jeremy Tuson, who's just completing his Bachelor of Computing and Mathematical Sciences (BCMS). "This is a bit different – the context is what's in the fridge.

"What we've built is actually a program that has an inventory (ie a list of what's in the fridge or pantry) linked to a server with a bunch of recipes, so the system picks a recipe that fits what you've got and then guides you through how to cook it."

Hot summer on the ice

Waikato University masters student Stephen Archer's back from a month in Antarctica where he went to study planktonic communities in meltwater ponds. He found it a lot warmer than he'd expected which meant the special adaptations he'd made to his rig weren't needed.

Stephen is studying planktonic communities in meltwater ponds and was awarded a Waikato University masters research scholarship of \$12,000 and a New Zealand Post Antarctica New Zealand research scholarship to go to Antarctica to collect samples. "I'd built myself a sampling rig with a special heating element which I didn't need as the weather wasn't extreme enough for me to use it."

But it was still cold enough for his samples to freeze before he could get them back to the science hut to process them. His samples have now been brought back to Waikato for analysis. "You can't see these life forms with the naked eye, but they're important for our understanding of what organisms live where and to monitor their differences and development in different environments."

Based mostly in the Miers Valley, Stephen assisted on several projects with scientists from Waikato and other New Zealand universities, the US, Hong Kong and Australia.

"On one American project we built a little dam and diverted a stream. The aim was to see how populations change in areas that haven't seen water before. Other projects involved studying the micro-organisms under mummified seals, invertebrates and DNA longevity."

For Stephen it was a once in a lifetime opportunity to work with so many experts on great projects in a unique environment. "The views were breathtaking – imagine waking up, opening the tent and there in front of you are two glaciers. From a practical point of view, I'm glad the conditions are better now than they were for the first explorers. Even so, out in the field there's no running water, no flushing toilets and I went without a shower for two weeks."



Waikato University masters student Stephen Archer, well prepared for a month in Antarctica. *Photo: Stephen Archer*



Polar Haven in the Miers Valley in Antarctica – a large deluxe tent set up for scientists working on the ice. *Photo: Stephen Archer*

Better wine in a flash



From left, Professor Jonathan Scott, summer research scholarship recipient Mark Benseman and Dr Sadhana Talele. *Photo: Donna Walsh*

Professor of electronics Jonathan Scott and lecturer Dr Sadhana Talele are overseeing a summer research project in the university's electrical engineering department, testing the validity of overseas research that claims wine can be rapidly matured using electric fields – even the equivalent of one year's maturation in one minute.

Dr Talele's optimism in the project was validated when an astringent-tasting young mandarin wine poured through the maturation device, built by summer research scholarship recipient Mark Benseman, became noticeably smoother and sweeter after less than three minutes' exposure to a 1000-volt electric field.

The next step for the researchers is to run different wines through the device, including traditional varieties. Then there will be tests to prove molecular changes.

But to take the research to the next level, they will have to win over the wine industry. An investment from a wine company would allow them to rebuild the maturation device on a much larger scale, Dr Talele said.

This story and accompanying picture were provided by The Waikato Times

Congratulations

Work placement award

Materials and Process Engineering graduate Jordan Van der Wel was awarded 'Best practical work report' from the Association of Consulting Engineers New Zealand (ACENZ). The award recognises excellence in report writing of final year engineering students completing the work placement component of their degree, and every year ACENZ grant three awards nationwide. Jordan worked for Connell Wagner (now Aurecon) for his final placement and wrote a report titled "Process Engineering Consultation experience".

Something fishy

What makes fish stress? Rainbow trout in particular. Waikato University PhD student Grant Tempero has received a \$4,000 Claude McCarthy Fellowship from the New Zealand Vice-Chancellors Committee to assist his study into changes in fish haemoglobin under different environmental stressors.

With his fellowship, Tempero will travel to Barcelona to present a paper at The International Congress on the Biology of Fish.

Top scholarship for biochemist



A Waikato University biochemistry student has been awarded a prestigious Woolf Fisher Scholarship, worth \$100,000 a year for up to four years, to study for a PhD at either Oxford or Cambridge University in the UK.

Ashley Easter is one of three recipients and the first Waikato student to win a Woolf Fisher Scholarship, which rewards exceptional young New Zealanders who possess integrity, kindness and boldness of vision – qualities admired by the late Sir Woolf Fisher, co-founder of Fisher and Paykel.

New Science Blogging Network

Four Waikato scientists are among 25 bloggers whose output will be easier to find with the launch of a new blogging network. Sciblogs, found at www.sciblogs.co.nz covers topics from healthcare to climate change and is intended to become an online hub for discussion of scientific topics.

Associate Professor Vic Arcus is new on the blogging scene with his blog, *Lab Rinth*. Fellow Biologist Dr Alison Campbell's popular *BioBlog* will also appear on the network, as well as physics lecturer Dr Marcus Wilson's *Physics Stop* and Hill Laboratories technologist Darcy Cowan's blog, *Scepticon*.

Time to celebrate

The School of Science & Engineering has just celebrated 40 years since its inception with a dinner featuring past and present staff, and a cocktail function with stakeholders and alumni.

Dean Professor Richard Price says the two gatherings helped highlight the School's successes over the years and remind people of current achievements. "It was very satisfying to see how our teaching and research excellence has impacted on lives and careers."

The 40th anniversary was also commemorated by a 12-page publication titled *Celebrating 40 years of Science & Engineering*. If you would like a copy of this publication please email Michelle Armstrong at m.armstrong@waikato.ac.nz with your postal address.

What's on

21 APRIL

Kīngitanga Day

Kīngitanga Day is a celebration of the relationship between the University and the Kīngitanga – an opportunity for our students, staff and the wider community to gather on campus and celebrate our distinctive heritage, histories and relationships.

30 APRIL

University Open Day

The University of Waikato Open Day is an invitation to the public to come on campus and experience a taste of university life. The free open day offers visitors a chance to attend mini lectures on a wide range of topics, get involved with interactive displays and view a range of fun activities and entertainment. The School of Science & Engineering will have an exciting range of lab displays, tours and mini-lectures.

8-9 JUNE

Waikato Experience Biology Days

Come along to the Department of Biological Sciences' WEB days, for Year 13 Biology students and teachers. Seminars and lab work cover topics including DNA technology, human evolution, biotechnology, and animal behaviour/plant responses to the environment. Contact biology@waikato.ac.nz

10-11 JUNE

Osborne Physics Lectures

Upper high school students and teachers are invited to lectures and demonstrations relevant to the Physics curriculum and current research. Contact engineering@waikato.ac.nz

16 JUNE

Analytical Chemistry Competition

Teams of Year 13 students are set an analytical task, requiring accurate and careful analysis of an unknown substance. The results will be judged, with prizes and trophy awarded on the day. Contact chemistry@waikato.ac.nz

15 JULY

Engineering Open Day

Prospective students are invited to find out what engineering is all about, what study options are available, and to participate in hands-on workshops at Waikato University. Numbers are limited so early registration is advisable. Contact science@waikato.ac.nz

Contact us

Science & Engineering

Phone +64 7 838 4625

Fax +64 7 838 4218

Email science@waikato.ac.nz

Toll free 0800 438 254

www.sci.waikato.ac.nz

Computing & Mathematical Sciences

Phone +64 7 838 4322

Fax +64 7 838 4155

Email scms@waikato.ac.nz

www.scms.waikato.ac.nz