Waikato open days attract budding scientists and engineers

Building and racing small electric cars and experimenting with liquid nitrogen were the top ranked activities by secondary school students at the University of Waikato’s Science and Engineering Open Days last month.

During the Science and Engineering Open Days, Year 11-13 students and their parents attended five sessions learning about the subjects offered by the Faculty of Science & Engineering.

Science Open Day on Wednesday 8 July attracted about 100 student registrations and 40 parents. Students tested their physiology in Biological Sciences; learnt how earthquakes travel in Earth & Ocean Sciences; set liquid nitrogen alight in Chemistry, created a game using the Game Maker software in Computer Sciences, and experimented with catapults in Physics.

Engineering Open Day on Thursday 9 July attracted 100 students and 30 parents. The day focused on the Bachelor of Engineering’s five specified programmes. Workshops included creating and racing small electric cars in Mechanical Engineering, using chocolate to test how reinforcing makes materials stronger in Materials & Process Engineering; and creating a strategy to separate different sized lollies using methods such as gravity and air filtration in Chemical & Biological Engineering. Other interactive workshops included experimenting with user interfaces in Software Engineering and using electronics to make wooden mouse traps more reliable in Electronic Engineering.

The selection of workshops gave potential tertiary students a taste of the fun and varied subjects available to study during a Bachelor of Science, Bachelor of Science(Technology) and Bachelor of Engineering.

This was the tenth annual Engineering Open Day, and the fifth annual Science Open Day. The events are held annually in July.

View photos from the event on our Facebook page:
www.facebook.com/WaikatoScienceEngineering

Speedy victory for Pukekohe Christian School at OsPEn Days

A team of students from Pukekohe Christian School were the winners of the Model Car Speed Competition at day two of the University of Waikato’s 29th annual Osborne Physics and Engineering (OsPEn) Days.

The lunchtime competition was part of the overall programme aimed at Year 12 and 13 students who are high achievers in science and included physics and engineering-themed lectures and practical demonstrations.

Participating schools were given a 3-volt electric motor and a set of nylon gears for students to work on in teams. Their aim was to design and build a small battery-powered model car that could travel a distance of five metres up a 4° inclined plane. Over 600 students from as far afield as Auckland and Hawke’s Bay attended the two-day event.

Osborne Lectures began in 1986 in honour of Dr Roger Osborne, who taught physics at Waikato University from 1970 to 1985. During this time he was responsible for organising and presenting a significant number of lectures for Year 12 and 13 physics students in the Waikato region. From 2002 the lectures became known as the OsPEn Days.

View photos from the event on our Facebook page:
www.facebook.com/WaikatoScienceEngineering

Hamilton Boys’ High make their mark at chemistry challenge

A Hamilton Boys’ High School team was awarded first place at the annual NZIC Analytical Chemistry Competition on Wednesday 17th June.

The University of Waikato event challenged 92 enthusiastic Year 13 students to spend a day in the University’s chemistry laboratories.

This was the third year in a row that Hamilton Boys’ High School has won first place in the competition. St Peters Cambridge placed second with a marginal difference between theirs and the Hamilton Boys’ High School team results.

“The task was to analyse the individual levels of nickel and sulphate ions in a sample of nickel sulphate and to use these values to determine how many water molecules were associated with each nickel sulphate molecule. One pair from each group of four used a gravimetric procedure to find the nickel ion content, while the other half of the team used a volumetric method to find the sulphate ion level,” says competition judge and key organiser, Dr Michèle Prinsep.

First place went to Hayden Lee, Christopher Mayo, Visharn Sathiyakumar, and Lucas Sherlock of Hamilton Boys’ High School, while second place was awarded to Sam Frengley, Erin Gatenby, Shenaz Husain, Rishi Kumar of St Peter’s School Cambridge.

“This year, the top few teams were very close and it was difficult to separate them. The winning team from Hamilton Boys’ High school however ultimately achieved a near perfect result” says Dr Prinsep.

Twenty-three teams of four students from the Waikato/Bay of Plenty regions entered in this year’s competition. All students were treated to lunch sponsored by the Waikato branch of the New Zealand Institute of Chemistry (NZIC), at the University’s halls of residence. The winning team received $200 from sponsor Hill Laboratories and a trophy, with prize money also awarded to all other place-getters.

View photos from the event on our Facebook page: www.facebook.com/WaikatoScienceEngineering

$10k scholarship for higher levels of achievement amongst Māori

University of Waikato science technology student Ashleigh Weatherwall has been awarded a $10,000 Whānui Scholarship for Agriculture from Te Pūtea Whakatupu Trust.

The scholarship is intended to encourage and support Māori to be leaders in the Agribusiness Sector with the aim of achieving higher levels of educational achievement amongst Māori; and higher levels of workforce participation by Māori in key sectors of the economy.

The recipient of this scholarship will be committed to the future economic and social development of Māori, iwi, hapū and whānau.

“It’s fantastic to see so many of our Māori students being recognised for their achievements. These scholarships have opened doors to some great opportunities and we’re working hard to encourage even more students to apply for the awards available,” says Kevin Eastwood, Science & Engineering Māori Student Achievement Coordinator at the University of Waikato.

Ashleigh is currently completing Bachelor of Science (Technology) (BSc(Tech)) majoring in Animal Behaviour and Biological Sciences at Waikato University and plans to do her Master’s at Waikato in the near future.

In 2014, more than $174,000 in scholarships was awarded to Māori Science and Engineering students from the University of Waikato.

Current scholarship listings can be found online at: http://www.waikato.ac.nz/research/scholarships/
After completing a Master of Science in biological sciences (with first class honours) at the University of Waikato, Alice Chibnall made the move south from Hamilton to Wellington.

The move was for a job. A pretty good job at that – as a researcher at the prestigious Gillies McIndoe Research Institute (GMRI), next door to Wellington Regional Hospital.

“The research is based on the concept of cancer stem cells being the origin of cancer and the finding that these cells are regulated by the body’s in-built primitive systems,” says Alice.

“Cancer stem cells are resistant to conventional treatment such as radiotherapy and chemotherapy, which could explain why some cancers recur after having seemingly gone into remission.”

Alice did her masters research with AgResearch, where she studied the genetics of bovine embryonic stem cells. She was first exposed to stem cell research during her Bachelor of Science (Technology) degree.

“I was placed at AgResearch during my undergraduate degree,” says Alice. “I actually didn’t think I had much of a shot getting into the programme, but my placement co-ordinator Sue McCurdy was really encouraging and thought it’d be something I’d be good at.”

Read more about Alice at: www.waikato.ac.nz/news-events/media/2015/alumna-on-the-road-to-curing-cancer

Alumna on the road to curing cancer at research institute

Hands-on experience at Waikato Biology Days

High school students inspect ancient human skulls and extract DNA at the 2015 ‘Waikato Experience Biology Days’ laboratory sessions.

Over 600 kiwi high school students gained some hands on practice at the University of Waikato’s annual Waikato Experience Biology (WEB) Days.

The year 12 and 13 students from around the central North Island joined us for the two-day biology events and spent time in the University’s biological science laboratories from 9th-10th June. The school students were able to attend several exciting lectures given by University of Waikato academics, on topics such as skulls/human evolution, DNA technologies, and animal behaviour.

Schools were invited to register their students for the laboratory sessions and lectures which covered topics relevant to the Year 13 curriculum.

Photos from the event can be found on our Facebook page: www.facebook.com/WaikatoScienceEngineering

High school students inspect ancient human skulls and extract DNA at the 2015 ‘Waikato Experience Biology Days’ laboratory sessions.
Chemistry
Create positive change for future generations with a degree in Chemistry at the University of Waikato.

Which degrees include Chemistry as a major?
You can study Chemistry as a major in the Bachelor of Science or Bachelor of Science (Technology). Chemistry can also be taken as a second major or supporting subject within most degrees at Waikato University.

What subjects do I need to study at school?
The normal entry level into 100 Level Chemistry papers is 16 credits at NCEA Level 3 in Chemistry. NCEA Statistics, Calculus and Biology are also highly recommended.

What papers can I expect to take in my first year?
During your first year of full-time study you will take a selection of eight papers. To major in Chemistry this must include CHEM111 - Structure and Spectroscopy, which covers analytical and inorganic chemistry, plus CHEM112 - Chemical Reactivity, which includes physical and organic chemistry.

What about papers in my second year and beyond?
From year two you have the opportunity to branch off into your area of interest. Papers cover a wide range of topics including organic chemistry, inorganic chemistry, physical chemistry, environmental chemistry, geochemistry, and forensic, toxilogical and medicinal chemistry.

Grab a copy of the Chemistry brochure
Check out the Chemistry brochure, which outlines in more detail the study options available. Download the brochure from www.sci.waikato.ac.nz/about-us/chemistry or request a hard copy via science@waikato.ac.nz

Doctoral student wins $40K for Antarctic research

University of Waikato doctoral student Gemma Collins has been awarded a top national scholarship to do research in Antarctica.

Gemma is the recipient of the $40,000 Antarctica New Zealand Sir Robin Irvine Scholarship, offered to one PhD student in New Zealand every two years.

Gemma was ecstatic to hear the news and honoured to be the 2015 recipient. “I usually don’t like to make a big deal of things but I couldn’t contain my excitement about this award – it means so much,” says Gemma.

Having completed a Bachelor of Science (Technology) and a Master of Science in Molecular Ecology, Gemma’s PhD will focus on the ecology of springtails, bugs that live in Antarctic soils, and their ability to perform in changing environments. She hopes her research will provide insights into how biological systems may be affected by climate change.

“Climate change is going to affect populations around the globe and because Antarctic organisms live in such a harsh environment, we’d expect any increase in temperature or rainfall to have a big impact on them,” says Gemma.

The Antarctica New Zealand scholarship will cover two more trips to Antarctica and a stipend for the first two years of Gemma’s PhD.

Gemma says the application process for the scholarship was difficult as she had to “switch off her Masters brain” and write a research proposal that was different to her masters thesis.

“Usually you would just re-work something you’d already written but I decided this was a great opportunity to start again and introduce some new ideas,” she says. “I think this helped my application because it was fresh and I actually enjoyed writing it.”

Gemma has also been awarded a University of Waikato Doctoral Scholarship to cover her tuition fees for the full three years of her PhD.

“Together, these generous scholarships have covered my course fees and made doctoral study a possibility for me,” she says. “I’m so grateful for all the support I’ve received and I look forward to what the next three years will bring.”

Find out more about the University of Waikato’s Bachelor of Science (Technology): www.sci.waikato.ac.nz/study/qualifications/bscTech
Sir William Gallagher Cyber Security Scholarship

From protecting confidential cloud data to developing security software, Sjoerd de Feijter has taken a leap in his learning thanks to recently being awarded the Sir William Gallagher Cyber Security Scholarship.

With the goal of becoming a cyber security technician for the Government Communications Security Bureau, Sjoerd credits his recent success to knowledge gained while studying at Waikato University.

Following schooling at Trident High School in Whakatane, he began his degree at the University of Waikato due to the excellent reputation of the Computer Science department.

"I've been able to apply the technical knowledge gained from study, at my part-time job at Gallagher Group and was awarded the Sir William Gallagher Cyber Security Scholarship."

"The scholarship has allowed me to further my study towards a Master of Cyber Security this year, which has proven to be an interesting programme and had a positive impact on my working career."

A Master of Cyber Security (MCS) introduces students to the frontiers of knowledge and trains them in the relevant techniques of cyber security. Students gain an advanced understanding and knowledge of cyber security from the point of view of preventative security, detection of security breaches, and offensive security (such as computer system penetration testing).

Find out more: www.cms.waikato.ac.nz/study-with-us/qualifications/mcs
“I don’t know what I want to do when I leave school!”

It’s ok not to know the exact job that you want to have when you leave school or university. In fact working towards a specific job or career is becoming more and more uncommon. Some researchers suggest that you can expect to change your career 5-7 times in your lifetime. If you’re struggling to decide which path to go down, or even if you think you’ve decided, have a think about these key ideas first.

Find a flexible degree

Having the flexibility to change your area of focus as you progress through your study can make a huge difference; especially if like most school leavers, you’re not 100% sure you’re heading in the right direction. All bachelors degrees offered by The University of Waikato give you lots of options in your first year, giving you the room to try a bit of everything, before deciding which major to focus on in your second year. In many instances you will also have the flexibility to switch the focus of your study after just a few papers, after your first year and beyond.

Which subject should I study?

Consider your interests, skills, values and qualities. You should also ask yourself: What am I good at? What do I like to do in my spare time? What have I achieved already? What things am I passionate about? If you love to fix things, mechanical engineering may be for you. If you love animals a science degree majoring in animal behaviour may suit you perfectly. If you pick a career path which incorporates something you know that you enjoy, you are more likely to stay in that career long term.

Working conditions

Another important thing to consider is the type of working environment you would enjoy. Do you want to work indoors or outdoors? Do you want to work Monday-Friday, 8.30am-5.00pm or are you happy to work long hours and/or shift work? Do you want to work with people? Do you want to work in front of a computer? An easy example is the working conditions of a doctor. Saving lives is an amazing feeling, but with the job often comes working long, unsocial hours, indoors, dealing with stressful situations, emotions and potentially lots of blood.

Family expectations

Family expectations can be difficult at times. Maybe your parents or whānau have a strong opinion about what career you should pursue which does not match your own views. Beginning a course because someone else thinks it’s a good idea is not a good way to start your career. Talk through your feelings with someone who will listen and work out a plan so that both you and your parents or whānau are happy with the situation.

Useful tools


Remember, it’s ok to feel uncertain about your career plan at this stage in your life. As you grow and learn new skills, new opportunities will arise where you least expect them and you may find your career plan changes entirely!

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### Biological Sciences

Study Biological Sciences at Waikato and begin your adventure on a lifelong journey of learning. Whether you enjoy solving problems in a laboratory or working outdoors, our degrees are hands-on from day one.

#### Which degrees include Biological Sciences as a major?

You can study Biological Sciences as a major in the Bachelor of Science or Bachelor of Science(Technology). Biological Sciences can also be taken as a second major or supporting subject within most degrees at Waikato University.

#### What subjects do I need to study at school?

As well as biology, you will find chemistry and mathematics useful. If you have no credits in NCEA Level 3 Biology you are advised to discuss your options with the Faculty of Science & Engineering’s Biological Sciences first-year student mentor.

#### What type of papers can I expect to take in my first year?

During your first year of full-time study you will take a selection of eight papers. To major in Biological Sciences this must include the two 100 level Biological Sciences papers. These papers cover topics such as cellular and molecular biology, genetics, cell function and the biology of organisms.

#### What about papers in my second year and beyond?

From year two you have the opportunity to branch off into your area of interest. Papers cover a range of topics such as evolution, genetics, ecology, plant biology, aquaculture, flora of Aotearoa/New Zealand, animal biology, microbiology, biochemistry, freshwater ecology, marine biology, animal behaviour and zoology.

#### How can I find out more about Biological Sciences at Waikato?

If you would like to try out some hands-on experiments in the University labs, make sure you’re registered for Waikato Experience Biology Days and/or Science Open Day in 2016.

#### Grab a copy of the new Biological Sciences booklet

Check out the new Biological Sciences brochure, which outlines in more detail the study options available. Download the brochure from [www.sci.waikato.ac.nz/about-us/biological-sciences](http://www.sci.waikato.ac.nz/about-us/biological-sciences) or request a hard copy via science@waikato.ac.nz

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### Career Opportunities

- Marine Biologist
- Freshwater Scientist
- Forensic Scientist
- Botanist
- Restoration Ecologist
- Animal Welfare Officer
And Ellen is answering that call by cleverly combining her expertise in computer graphic design and computer science to revolutionise business practices via custom-designed IT systems.

Technological boundaries are being pushed further than ever before. Graduates like Ellen, who have a deep understanding of both software development and graphic design, are becoming increasingly sought after as we transform the way we communicate, administrate, process and create in our constantly changing digital world.

Find out more about studying computer graphic design and computer science at the University of Waikato at cms.waikato.ac.nz/thefutureiscalling

Ellen Clarkson
Bachelor of Computer Graphic Design
and Graduate Diploma in Computer Science
Fairfield College

Faculty of Computing and Mathematical Sciences
Rarohika me ngā Pūkenga Pāngarau
University Open Day a chance to explore options

The Faculty of Science & Engineering and the Faculty of Computing & Mathematical Sciences were both on show in May at the annual University Open Day.

Check out these photos of our event displays and interactive games.

Visit www.waikato.ac.nz/events/openday

What’s on

17 SEPTEMBER 2015
Kingitanga Day

Kingitanga Day is an annual event that recognises the unique connection of the University of Waikato with Waikato-Tainui and the Kingitanga. The community are encouraged to come along and enjoy a University-wide programme of presentations, panels, workshops, exhibitions, performances and activities.

Visit www.waikato.ac.nz/events/kingitanga

19-21 OCTOBER 2015
Carter Holt Harvey Pulp & Paper Engineering Design Show

Join the School of Engineering’s second, third and fourth-year students as they showcase their research and design projects in the form of posters, displays and seminars. The Design Show is open to the public and is the perfect opportunity for secondary school students to meet talented engineering students.

Visit www.sci.waikato.ac.nz/engineeringdesignshow

21 OCTOBER 2015
ChemQuest

Year 12 students from local secondary schools visit our Waikato campus for the opportunity to compete in the ChemQuest chemistry quiz. Register with your school science teacher.

Visit www.sci.waikato.ac.nz/chemquest

28 NOVEMBER - 4 DECEMBER 2015
Māori Science Summer School

Te Huakirangi Māori Science Summer School is a fun-packed week-long science experience, held on campus at the University of Waikato. This summer school is open to Year 11 students who have an interest in science, and who will continue to study science in Year 12.

Visit www.sci.waikato.ac.nz/news-events/whats-on

29 NOVEMBER - 4 DECEMBER 2015
Hill Laboratories Waikato Science Summer School

Applications for this week-long event have closed.

Visit www.sci.waikato.ac.nz/sciencesummerschool

Contact us

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