Matter of Fact

Newsletter from Science & Engineering and Computing & Mathematical Sciences

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

Winter 2014

Lolly sorting a sweet challenge at open days

Sorting different sized lollies without touching them by hand was just one of the tasks encountered by school students at the University of Waikato's Science and Engineering Open Days, held 9-10 July.

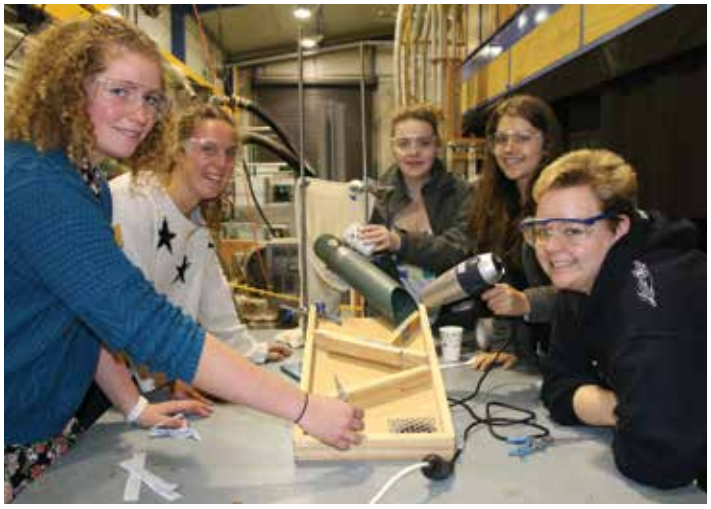
During the two free events nearly 200 Year 11-13 students and many of their parents, moved between sessions learning about the subjects offered by the Faculty of Science & Engineering. The selection of workshops gave potential tertiary students a taste of the fun and varied subjects available to study during a Bachelor of Science, Bachelor of Science(Technology) and a Bachelor of Engineering(Honours), while emphasising the small class sizes and hands-on papers on offer.

The lolly sorting workshop was part of Engineering Open Day. The Chemical and Biological Engineering session challenged groups of students to find a suitable strategy to sort a range of lollies using separation processes such as air classification, filtration and gravity. The project emphasised how engineers must separate materials such as plastics and synthetic fibres to recover useful product within them.

Karena Nisbet and her daughter Tennille Nisbet made the journey down from Whangarei for the Engineering Open Day.

"Because engineering isn't offered at school, the open day has been a great opportunity for Tennille to try the different types of engineering in a truly hands-on way. We've been really impressed with what we've seen and the opportunity to check-out the Waikato University campus," says Karena.

Also on the programme at Engineering Open Day was a Mechanical Engineering workshop where students built model race cars, a Materials and Processing workshop during which students were shown the importance of reinforcing materials, an Electronic Engineering workshop based on programing an electronic mousetrap and a Software Engineering workshop inspiring students to consider how to make sure that the software and user interfaces for critical devices such as medical infusion pumps are correct.



Sweet engineering: Left to right, Monique Schouten (Hauraki Plains College), Nicola Baker (Tauranga Girls' College), Danielle Watson (Waihi College), Kelsey Ferris and Tennille Nisbet (Whangarei Girls' High School).

Science Open Day covered the Faculty's science majors. Students learnt how stream animals can be used to determine the health of a stream in Biological Sciences; explored earthquakes and liquefaction in Earth Sciences; experimented with liquid nitrogen in Chemistry and learnt the science of metrology in Physics.

The events are held annually in July. Information is sent out to schools each May and registration is completed online at www.sci.waikato.ac.nz

Apply now for 2015 Computing and Maths entrance scholarships

Computing and Mathematical Sciences have three scholarships on offer for school leavers. Apply now!

Mathematics Fees Scholarship

Closing date: 27 August 2014

Open to applicants who are enrolling in the first year of study towards an undergraduate degree majoring in Mathematics. The decision will be based on the results of a competitive examination held on 27 August 2014.

Computer Science Undergraduate Scholarship

Closing date: 17 October 2014

Open to applicants enrolling in the first year of study towards a Bachelor of Computing and Mathematical Sciences, Bachelor of Science or Bachelor of Engineering (Honours) degree (in one of the computing streams). The decision will be based on the results of a competitive examination held 17 and 18 October 2014.

Computer Graphic Design Fees Scholarship

Closing date: 17 October 2014

Open to applicants who are enrolling in the first year of study towards an undergraduate degree majoring in Computer Graphic Design. This Scholarship is awarded based on student portfolio work and academic ability.

Find out more: www.waikato.ac.nz/research/scholarships/current/entrance.shtml

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1964-2014 TE WHARE WĀNANGA O WAIKATO

Hands-on at Faculty open days

A student uses a pendulum to measure the acceleration of gravity in the Physics workshop at Science Open Day.

Sacred Heart Girls' College students Alina Rajan, Kimberly Recabar and Tara Ritchie-Fernandez test the strength of their reinforced chocolate in the Materials and Process Engineering workshop, at Engineering Open Day.

Automating wooden mouse traps was the task in the Electronic Engineering workshop, enjoyed by Rosie Green from Mahurangi College .

Students enjoy experimenting with liquid nitrogen in the Chemistry workshop at Science Open Day. Above: An air-filled balloon will shrink when dipped into a bath of liquid nitrogen. When removed it will fill with air once more.

Students experiment with the properties of liquefation during the Earth Sciences workshop.

Associate Professor Mike Duke helps students with their model car building skills in the Mechanical Engineering workshop. The small electric cars were built and raced during the Engineering Open Day.

Healthy career for statistics graduate

Sparked by a passion for numbers, a career in the health industry was just what the doctor ordered for University of Waikato statistics graduate Claire Forsythe.

As a Business Analyst for the Waikato District Health Board (DHB), Claire extracts, investigates, interprets and models patient and other DHB data. This includes creating reports, providing information for capacity planning projects and developing advanced planning models. The information she provides to management groups helps to support decision making processes throughout the DHB.

"Learning about such a complicated and interesting area such as health has been both a challenge and an awesome learning experience," says Claire.

The former Te Awamutu College student completed an undergraduate degree at the University of Otago, majoring in psychology and statistics.

"I wanted to complete further study in the area of statistics, but I also wanted to be closer to friends and family, so I made the move back to Hamilton and began a Postgraduate Diploma (PGDip) in statistics at Waikato University."

After completing the PGDip Claire was offered her current position at the Waikato DHB. A year down the track she decided to continue study part-time, with a Master of Science (MSc) in statistics, again through Waikato University.

"Waikato University was great to work with to complete my masters because it is close to the hospital, plus flexible lecture and meeting times proved to be convenient, even when working full-time."

Claire says that the MSc gave her the opportunity to expand her skills and knowledge, which she has been able to apply to her everyday work.

In the future Claire hopes to specialise in statistical analysis.

Waikato University Statistics graduate Claire Forsythe is a Business Analyst at the Waikato District Health Board.

Surprise win for first-year student boat builders

The banks of Oranga Lake at the University of Waikato were teeming with onlookers, as over 30 student-built model boats battled it out as part of the annual University of Waikato Engineering Design Challenge.

Each year, convenor of the Foundations of Engineering paper Dr Rob Torrens organises the boat building project for all first-year engineering students, who test their designs in a series of elimination races across the campus lake. The fan-propelled boats complete races around a course which test their manoeuvrability and whether they could last the day.

Team Argentina won the final battle, which came as a surprise for first-year engineering students (above from left) Sukhjit Pal Singh, Matthew Gerbich, Hamish Nicoll and Campbell Wray. Also in the team but absent on the day were Miriam Aitken, Pritpal Chahal and Ben Thornton.

"The building of the boat throughout the semester was relatively straightforward. But on the day, when the pressure was on, our boat started to fall apart," says Hamish.

The team had issues with the batteries used to power the boat and had to make several changes to get the boat through the preliminary rounds and into the final race.

"In the end, it all came down to today and how well our team reacted to the challenges."

Organiser Dr Rob Torrens said he was pleased with how the event went: "Good weather, some competitive boats and only one capsizing," says Dr Torrens.

The race has been held, in some form or another, for about 12 years and has become a staple event on the calendar of Waikato engineering students.

The competition also allows for more senior students to share their own experiences and try out their team management skills. During the paper, fourth-year engineering students act as syndicate managers for the teams, as part of a project management paper. Students Frikkie Fleming and Riaan Erasmus were the winning team's leaders.

Sukhjit Pal Singh is a former Morrinsville College student and is studying Chemical and Biological Engineering. Matthew Gerbich is a former student of Waiuku College and along with Spotswood College old boy, Hamish Nicoll, is studying Mechanical Engineering. The fourth team member Campbell Wray hails from Cambridge High School and is studying Software Engineering.

View photos from the event:

www.facebook.com/WaikatoScienceEngineering

‘Wonder drugs’ popular topic at biology event

University of Waikato Biological Sciences lecturer Dr Pawel Olszewski spoke about ‘wonder drugs’ to secondary school students at the annual Waikato Experience Biology Days event.

A talk covering the ‘wonder drug’ effect attracted a packed lecture theatre, during the University of Waikato’s annual Waikato Experience Biology (WEB) Days.

Around 550 Year 12 and 13 secondary school students from around the central North Island attended the event from 10-11 June.

Using scientific findings

University of Waikato Biological Sciences lecturer Dr Pawel Olszewski explained how misinterpretation of scientific findings goes as far back as the Babylonian era, when priests/scientists used the lunar eclipse to convince the king that he was at risk of death and that they had the answers to fix him.

“These days the consumer is the king and companies are effectively the priests/scientists, who are telling us what food, medicine and other products we should buy to help us live longer, be thinner, and look better,” says Dr Olszewski.

He went on to show how claims made on product labels are often exaggerated, and do not give the consumer the full story.

Event aligns with NCEA

“What we look for when bringing students to WEB Days are topics which align well with the NCEA Achievement Standards they are studying at school. Dr Olszewski’s talk was excellent in the way that it emphasised how opinions must be justified with evidence when it comes to science. We’re actually thinking of using the ideas he presented for our Year 9 students, as a great example of why learning science is so important,” says Aquinas College biology teacher Ange McManaway.

The students also attended lectures given by Waikato University lecturers, on topics such as DNA technologies, plant responses to the environment, animal behaviour, human evolution, and the process of evolution.

In addition, the groups of students enjoyed practical workshops which covered microscope work and key biotechnology lab skills. They also heard from current students describing their research experiences while at University of Waikato.

View photos from the event:
www.facebook.com/WaikatoScienceEngineering

Speedy victory for St John’s at physics day

A team of students from St John’s College, Hamilton were the winners of the Model Car Speed Competition at day one of the University of Waikato’s 28th 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 sent 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. The St John’s College team’s winning vehicle travelled the full distance up the ramp in the fastest time of 3.48 seconds, beating competitors, including the School of Engineering’s staff entry. On day two of the event Pukekohe Christian School took things one step further, with a time of 2.98 seconds.

“We bring students to this event every year because we can see the value of showing them how the physics they are learning at school can be used in the wider world,” says St John’s College physics teacher Ms Fiona Wolff.

Over 500 students from as far afield as Auckland and Hawke’s Bay attended the two-day event. The focus was on applications of physics, with speakers providing examples such as optical communication through ultrafast fibre and broadband, the Doppler effect, careers in automotive engineering and the physics behind musical instruments, with a special performance from the Wai Taiko Drummers.

St John’s College students (from left), Jason Carvalho, Jacob Fransen and Luke Orange had the fastest car at day one of the OsPEn Days event at the University of Waikato.

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:
www.facebook.com/WaikatoScienceEngineering

New apps from Summer Research Scholarship

From landscape design to developing apps, Jemma Konig has taken a leap in her learning thanks to a Summer Research Scholarship at the University of Waikato.

Jemma had previously studied and worked as a landscape designer, but found she liked the technology design side of her work more than the landscaping side. She enrolled at Waikato where she is now in the third year of a Bachelor of Computing and Mathematical Sciences, majoring in Computer Science.

The former Rotorua Girls' High School student says she applied for a Summer Research Scholarship as she wanted work either as a software intern or on a software project over the 2013/2014 summer period.

"I saw this scholarship advertised and thought it would be an amazing opportunity. It was a real honour to be selected, as so many people applied for it."

The purpose of the project was to extend the use of FLAX language learning activities to mobile Android devices, with the possibility of iOS development in the future.

FLAX (flexible language acquisition) is open source software that has been developed at the University of Waikato and is used as a tool for teaching and learning a second language.

The language learning activities had already been designed and existed on large-screen web-connected devices but Jemma's job was to modify the design to suit small-screen devices.

Over the summer period, Jemma developed a shared Android library application, which makes it faster and easier for other developers to build other activity applications, an activity template that can be used to base future applications on, and two FLAX activity applications (Collocation Dominoes and Collocation Matching).

"I hadn't had any experience with this magnitude of existing code before so it really built my knowledge of how it all works in the real world."

The two apps are published on Google Play for free download and use.

"One has had 500-plus downloads, the other 100-plus and I was really pleased to see this as I never expected them to get this many downloads," says Jemma.

Having completed a paper based around Android development in 2013, Jemma believes this helped in her selection for the project, which she worked on under the supervision of Computer Science Professor Ian Witten.

Computer Science student Jemma Konig developed a shared Android library app as part of a Summer Research Scholarship.

Summer Research Scholarships are open to students enrolled at a New Zealand or Australian university, and provide undergraduate, final-year honours and first-year masters degree students the opportunity to experience the challenges and rewards of research. The $5000 scholarships are offered in various disciplines for a 10-week full-time research project over the summer study break.

Find out more: www.cms.waikato.ac.nz

Computer Graphic Design degree a hit

Computer Graphic Design student Gage Hall received a Sir Edmund Hillary Scholarship to study at Waikato University.

Former Hamilton Boys' High School student Gage Hall is in the final year of a Bachelor of Computer Graphic Design at the University of Waikato.

Before choosing his degree, Gage says he'd spoken to another student who had taken the course and highly recommended it because of its web design element.

"I love the freedom of being able to create something, especially motion graphics and film. This is what I've enjoyed most about the course. Also the lecturers are really interesting and you can talk to them pretty much anytime. They're really helpful."

Gage is a Sir Edmund Hillary Scholar for graphic design and says being awarded the scholarship was a large part of what helped him decide to study at Waikato.

Sir Edmund Hillary Scholarships are the University's most prestigious scholarships and are awarded to high academic achievers who are also achieving in the arts or sport. Scholars have their course fees covered, receive specialist coaching and mentoring and take part in personal development and leadership programmes.

Gage says he's enjoying his study and also the social side of uni life, having joined an indoor netball competition at the University's Recreation Centre.

Once he's finished his study, Gage hopes to get into feature film-making, having already made a couple of short films as part of his degree.

Find out more: www.cgd.waikato.ac.nz

Interested in Computer Graphic Design and planning to study in 2015? Check out the Computer Graphic Design Fees Scholarship details on page one of this issue.

Making every drop count

Monitoring water allocation in the Waikato is an important job, especially after the hot, dry summers of recent years.

Waikato University Earth Sciences graduate Leah Adlam is a resource officer for Waikato Regional Council's water allocation programme.

"Water availability and allocation is increasingly topical, with the demand for resources often exceeding what is available to be allocated, particularly from surface water bodies," says Leah.

"Those who want to use water from a well, lake, river or stream for irrigation, dairy shed wash downs or small community water supplies and so on must apply for consent. Once consent is given, it's also important to ensure those individuals or businesses are taking and using water in accordance with the conditions of their resource consent."

Leah receives these applications and assesses them against the requirements of the Resource Management Act and the provisions of the Waikato Regional Plan and Waikato Regional Policy Statement. Following this assessment, she provides a recommendation to Council on whether the water take consent should be granted.

"I find my science background helps enormously when it comes to understanding the potential impacts of the proposed resource consent activities. I also love to get outdoors, so the field work that comes with this position is fantastic."

The former Cambridge High School student completed a Bachelor of Science (BSc) and a Master of Science (MSc) focusing on Earth Sciences.

Leah says she would not hesitate to recommend a BSc at Waikato to anyone. "I started my science degree with the intention of majoring in Physics but along the way found Earth Sciences was where I thrived."

Record win for Hamilton Boys' at chemistry challenge

Prizes winners: From left, Hamilton Boys' High School's Daniel Carson, Andrew Sledger, Adam Cameron, Ross McDougal, Nic Portegys, Ben Yeung, Alex Hartopeaunu and Codi Merito were the first and second place winners at the 2014 NZIC Analytical Chemistry Competition.

Hamilton Boys' High School teams were awarded first and second place at the annual NZIC Analytical Chemistry Competition.

The University of Waikato event held in June, challenged 96 enthusiastic Year 13 students to spend a day in the University's chemistry laboratories.

Repeating history

This was the second year in a row that Hamilton Boys' High School has won first place in the competition and also follows a win in October last year when the school scored first place at the University's ChemQuest chemistry quiz.

"The task was to analyse the individual levels of zinc and sulphate ions in a sample of zinc sulphate. One pair from each group of four used a gravimetric procedure to find the sulphate ion content, while the other half of the team used a volumetric method to find the zinc ion level," says competition judge and key organiser, Dr Michele Prinsep.

First place went to Ben Yeung, Adam Cameron, Daniel Carson and Nic Portegys of Hamilton Boys' High School, while second was awarded to Codi Merito, Alex Hartopeaunu, Andrew Sledger and Ross McDougal.

Teams overcome challenge

"The task this year proved to be particularly challenging, but those who did well, did very well, and the winning team achieved a near perfect result," says Dr Prinsep.

Tauranga Boys' College were awarded third place, followed by Lynfield College in fourth and Tauranga Girls' College in fifth place.

Twenty-four 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 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:
www.facebook.com/WaikatoScienceEngineering

Event organiser Dr Michele Prinsep provides guidance to Mount Maunganui College student Danika Hotham at the NZIC Analytical Chemistry Competition held at the University of Waikato in June.

Scholarships galore at Waikato Uni

Multi-award success for engineering student

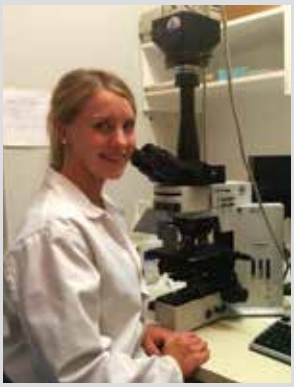
Talented University of Waikato engineering student Lindi Engelbrecht is reaping the benefits of her hard work, winning two scholarships and two awards in recent months.

The former Sacred Heart Girls' College student recently received a Freemasons University Scholarship, alongside three other Waikato students. The $6000 scholarship rewards Lindi for both academic excellence and community involvement and was presented at a ceremony held in Wellington's Parliament Buildings.

Alongside this prestigious scholarship, Lindi was also recently awarded an Energy Education Trust Scholarship worth $5000, based on academic merit and a keen interest in the energy sector.

In addition she has received a $1000 New Zealand Federation of Graduate Women (NZFGW) Waikato Graduate Women Engineering Prize and the Institute of Chemical Engineer's (IChemE) Society of Chemical Engineers New Zealand (SCENZ) Award of Excellence for the top 2013 student at Waikato University studying chemical and process engineering.

"I am both honoured and proud to have received these awards and scholarships as it recognises all the hard work that I have put in throughout my engineering degree. I am also very grateful for the financial support as it allows me to focus on my studies without the stress of how I am going to pay for it," says Lindi.



Fieldays scholarship to study embryonic development in cattle

Waikato University student Brooke Wilson has been awarded a $5000 New Zealand National Agricultural Fieldays Sir Don Llewellyn Scholarship for her study into the effects of NANOG down-regulation in bovine embryos.

Brooke is studying for her Master of Science in biological sciences while working for AgResearch's Stem Cell research team. The team is investigating the expression of genes throughout the early stages of embryonic development in cattle.

"The results from this project will assist in improving our understanding of cattle reproduction and embryology, with the future goal of generating a truly embryonic stem cell line for livestock animals."

Brooke says that the research will have a significant economic impact on the nation, due to its potential to improve animal productivity and ensure that desirable traits can be passed on to the next livestock generation with much more certainty and speed.

The New Zealand National Agricultural Fieldays Scholarships are awarded each year to graduate students undertaking research at the University of Waikato with a specific focus on the agricultural sector.

Masters research explores pasture pulling in pumice soils

University of Waikato Earth Sciences student Emma Bagley has won a C. Alma Baker Postgraduate Scholarship for her agriculture-focused masters research project.

The scholarship, worth $13,000, will go towards Emma's research into the occurrence and causes of pasture pulling under dairy farming on pumice soils.

"Pasture pulling occurs when grazing cows pull whole clumps of pasture from the soil. Pasture pulling can be a serious issue because it can diminish pasture production and can result in the pasture becoming less palatable to livestock," says Emma.

The former Huntly College student says she'll be undertaking a monitoring programme to investigate seasonal changes, measuring parameters such as weather and soil moisture conditions, pasture composition, rooting depth, and presence of grass grub or black beetle.

Waikato engineering students win Beca Awards

Three University of Waikato students have received annual Beca Awards for excellence in engineering. From left, Ian Garside (Beca, Manager Hamilton Infrastructure), Carl Lickfold, Logan Curry, Holly Armit and Terry Littlewood (Beca Technical Director, Electrical and Controls).

Three University of Waikato students have received Beca Awards for academic excellence and potential as a promising engineer.

The annual awards of $2500 are granted to students in their third year of study towards a Bachelor of Engineering (Honours) degree. Carl Lickfold, Logan Curry (former student of Reporoa College) and Holly Armit (former student of Otumoetai College) were the successful students this year.

Beca is a New Zealand-owned professional services and consulting engineering firm which undertakes projects across a range of market segments from its hubs in New Zealand, Australia and Asia.

Richard Douch, Manager for Beca in Hamilton, was again impressed by the calibre of the candidates and in particular their passion for the engineering industry. "In recent years we have seen a number of the previous scholarship recipients complete their studies and commence their careers within Beca."

University Open Day a chance to explore options

The Faculty of Science & Engineering and the Faculty of Computing & Mathematical Sciences were both on show last May at the annual University Open Day. A Community Open Day was also held the following day. Check out these photos of our event displays and interactive games.

Lily Keats-Farr (left) from Whanganui High School won an 'On the ice penguin encounter' at Kelly Tarlton's following the Open Day Antarctica photo competition.

A student uses bananas to play the 'Makey Makey' game.

The mathematics Soma Cube was a hit with students.

Visiting academic, Professor Garon Smith (aka G-Wiz) performed chemistry magic shows during Community Open Day.

Engineering student Benson Chang discusses electronics.

Chemistry student Lewis Dean pours liquid nitrogen into a flask.

What's on

18 SEPTEMBER 2014

Kīngitanga Day

Kīngitanga Day is an annual event that recognises the unique connection of the University of Waikato with Waikato-Tainui and the Kīngitanga. 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/provcmaori/kingitanga/

21-22 OCTOBER 2014

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

22 OCTOBER 2014

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

31 OCTOBER - 6 NOVEMBER 2014

Computer Graphic Design Show

Join the Department of Computer Science for their annual Computer Graphic Design Show, open 10am to 4pm daily during the dates above. The event is a chance for secondary school students to check out the amazing design work completed by our students during their final year design project.
Email cms@waikato.ac.nz for more information.

30 NOVEMBER - 5 DECEMBER 2014

Hill Laboratories Waikato Science Summer School

Applications for this week-long event close 14 August 2014.
Visit www.sci.waikato.ac.nz/sciencesummerschool

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