Post HSC – Advice & Information: The Faculty of Science HSC Help-Site

With new and improved features such as information for parents and degree information (including course structure, degree and subject selection advice) we can all understand, we hope this will be a valuable resource for Year 12 students, parents and teachers alike over the coming months.

The time between the release of HSC results and enrolling in a course at University can be particularly confusing for recent school leavers, their teachers, family and friends. There's a lot to think about, and finding accurate information to answer your questions is vital.

We have attempted to collate all the information you need to help answer these questions and provide it in a manner which is clear, concise and discernible to the everyday user. Further, not only does the site provide information to help with degree selection, it provides information on the enrolment process, subject selection, the Faculty’s Transition Workshop and also links to other Faculties and the Scholarships Office.

Faculty of Science Helpline: (02) 9351-3021

If you can't find what you're looking for on the website or you're still confused, please call the Faculty of Science Helpline and speak to our friendly advisers. The Helpline is open 9:00 am – 5:00 pm on weekdays.

University Helpline: 1300 362 006

For more general information or information on degrees from other Faculties, please call the University’s free Helpline. The Helpline will be open during the University shutdown period with the exception of 25, 26, 31 December and 1 January 2006.

Information Day

And don't forget about Information Day being held on Wednesday January 4, 2006. Information Day is your opportunity to speak to academic and course advisers, attend subject seminars and explore the campus before the UAC Main Round change of preferences deadline (Thursday 5 January).

www.science.usyd.edu.au/fstudent/undergrad/entry/hsc/
Meiya Sutisno is familiar with the more gruesome expressions of death. She has pieced together the mangled faces of suicide bombers, reconstructed the head from what was thought to be Ned Kelly’s skull, and provided expert witness testimony in some grisly criminal cases.

Dr Sutisno, specialist anatomist and a Sydney University science graduate with a PhD from the Faculty of Medicine, spoke about her work techniques at the recent Sydney Science Forum, hosted by the University’s Faculty of Science.

“How does forensic facial reconstruction assist in identifying unknown persons?” she asked. Her work requires her to reconstruct faces from skulls and parts of heads found in all stages of decomposition, so that the authorities may identify remains. In this capacity, she assisted Indonesian police after the 2004 Australian Embassy bombing in Jakarta, and the 2002 and 2005 bombings in Bali.

“A person’s bones carry signatures of soft tissues, such as muscles. Therefore, from those bones, forensic anatomists are able to determine with some accuracy the age, sex, ancestry, and race of a particular person,” explained Dr Sutisno. However, more work is needed for the deceased person to be identified.

In one such case, Meiya was asked to perform a historical reconstruction of a skull purporting to be Ned Kelly’s, which had been in the possession of Western Australian farmer, Tom Baxter for more than two decades.

“No two skulls are alike and therefore no two faces are alike,” said Dr Sutisno, who’s approach was to make a duplicate of the skull and begin work. Using the soft tissue signatures on the skull, she replaced or built up the deep muscles of mastication and the craniofacial muscles over the skull. These muscle structures told her the facial features, including what sort of nose and mouth the man had. “Beauty is not skin deep,” she quipped. “It reaches far down to the bone.”

In fact, the skull was found to belong not to the famous Australian bushranger, but to a hanged criminal, Ernest Knox, who was executed in 1894 for murder.

Dr Sutisno also deals with remains more disturbing than century-old skulls. After the 2004 Australian Embassy bombing, she flew to Jakarta and began the difficult task of identifying the scattered remains of the suspected suicide bomber. “There are certain injuries that occur when you have a bomb strapped to you,” she said. But when several bodies sustain similar injury patterns, determining which person is the bomber is not straightforward.

Indonesian authorities do not have access to the same methods of identification used in Australia, such as DNA and dental records. “Until recently, Indonesian dentists have not kept dental records, and DNA tests are not only expensive, but family members are reluctant to give blood, not wishing to admit the possibility that their son or daughter is involved,” she explained.

By using what part of the head remained, Dr Sutisno and her team were able to manually reconstruct the face of a man suspected to be the bomber. “His sister came forward and was able to identify him,” she said.

“A total facial reconstruction only works when there are clear bone structures,” said Dr Sutisno, who removes the flesh to reveal the bony features before starting to map the face. This technique was especially useful after the recent Bali bombing. “One man was convinced that certain remains belonged to his wife, but once we began to build up the face, it turned out to be someone else,” she said.
The aim of the program is to provide students that have a demonstrated aptitude or ability in science with additional challenges and stimulation in the areas of science, specifically in biology, physics and chemistry. The workshop gives students an on-campus experience, providing them with the opportunity to engage with University teaching staff and current researchers, access first-class facilities and make friends with a mutual interest in science.

The September Workshop

Students with results from the Gifted & Talented Qualifying Exam in the top 15-20 percentile band were invited to attend two workshops during the year held in April and September. 60 students from across NSW and ACT converged at the University of Sydney for the September Science Gifted & Talented Discovery Workshop in Biology, Physics and Chemistry.

Workshop Content

The workshops aim to provide challenging material to students, in particular, to provide an experience quite distinct from what they would ordinarily receive at school. This is made possible by: access to materials, equipment and facilities, research staff and a challenging and stimulating learning environment.

In biology, students tackled material otherwise reserved for first year university students. They were given the brief of 'research scientist' for a day and asked to gather and process scientific data for the purpose of designing an artificial garden for a next generation space station orbiting the Earth, and to present those findings to their research colleagues. The ever popular chemistry workshop was all about undertaking experiments with liquid nitrogen, examining the thin layer chromatography of smarties and turning copper to silver to gold. The physics workshop integrated astronomy with historical re-enactments of the great conflicts of science.

What did our workshop convenors think of the program?

Dr Graham Cam – Biology:

'Science in its own right is extremely exciting and teaching science takes on a whole new dimension when you come face to face with 60 dynamic students. And why wouldn't they be excited; the program provides not only an opportunity to explore new areas of science; but you get to try these things with new friends. What's more, it's not just about the science, it provides students with an opportunity to observe, discuss and experience life as a university student and you have not one but three days in which to do so.'

Dr Phil Dooley – Physics:

‘You might think meeting a group of students who have been selected as ‘Gifted and Talented’ that you could predict the type of person participating in the program – not so. There were all kinds of students in the bunch with one thing in common – they all loved science and were prepared to give up some of their holiday time to come to the university and exercise their brains. That pulled the group together and created some unlikely but enriching bonds, challenging stereotypes and teaching the students more than just science.

And in return we tried to give them something a bit different – science with a different angle, some drama, some history and some mystery. And the response from students - fantastic! Even the ‘cool’ set dropped their guard and gave a funky re-enactment of Galileo meeting the Pope. The quite ones yelled out answers while the noisy ones...well, they got more noisy. But can you be critical of too much enthusiasm?’

What did the students think of the program?

'The program was great! It was interesting, fun and provided a lot of information and learning skills!'

'More explosions please!'
A ‘Host a Murder’ party game, amateur photography, computer demolition and conducting interviews might not be what comes to mind when thinking of women in IT. But these were just a few of the activities high school girls from Years 7-10 participated in a three-day ‘Women and Girls in IT’ workshop hosted by the University of Sydney’s School of Information Technologies last month (with sponsorship from industry heavyweights Microsoft, Accenture, Cisco & Linux Australia).

Motivated by concern for the under-representation of women in IT, the School sought to develop an IT based interactive e-workshop for high school girls (and interested teachers) to encourage them to consider IT as a career option. The workshop was designed to provide girls from Years 7-10 with the opportunity to work with female IT students, recent graduates and staff of the University and professionals on an IT project at the University. No prior IT experience was required and activities were specifically designed to cater for different levels of interest and skill.

The idea for the workshop (to design and create a website) was developed by final year Information Systems students (project team – EO Solutions) in conjunction with the School. The groups’ research on IT Education and Employment statistics provided support for the under-representation of women in IT. The data from a 1998 survey showing that:

- On a national basis, although enrolments in IT higher education have increased between 1994 and 1998 by 30%, female enrolments in IT have actually decreased from 22%-19%


- Similarily worldwide, research shows that the number of women pursuing IT & T careers is both low and declining


In developing the workshop, the group ‘wanted the girls to realise that IT wasn’t just about sitting in front of a computer and programming. We wanted them to experience first-hand the diverse application of IT in every industry today’. Indeed the students brought their workshop vision to fruition by providing a jam-packed program, which included guest speakers and mentors who discussed career and study opportunities with the girls.

And the response from participants....

Whilst the energy that kept the room buzzing is difficult to describe, the numbers speak for themselves. Prior to the workshop, 44% of students agreed they would consider a career in IT, and 50% were unsure. After the workshop, the number of students who would consider a career in IT almost doubled to 80%. Figures which support a small but important contribution to addressing the under-representation of women in IT.

For more information on ‘Women in IT’, please visit the following general websites:

- Females in Information Technology and Telecommunications - www.fitt.org.au/

HSC Unit - Art of Scientific Explanation

Science meets creativity & curiosity in this HSC Board-endorsed unit.

The Art of Scientific Explanation is one of three HSC Board-endorsed units of study in science currently offered by the University of Sydney. The course provides talented Year 11 and 12 students with the opportunity to complete an HSC unit outside their school’s program and to gain experience of university-level study. The units are recognised by the Board of Studies as Year 11 preliminary units and will form part of the student’s final HSC record. What’s more, students completing the units receive six credit points towards an Arts or Science degree at the University of Sydney – that’s one semester-length unit of study!

About the Unit

The course has three main themes:

- Communicating Science
- Scientific Modelling
- Science, Chance and Logic

Why not encourage your budding scientists to get a head-start on their university degree and have some fun in the process!

The course is held in intensive mode over summer or during Terms 1-2.

For more information on the course visit the Summer School website: www.summer.usyd.edu.au/hscboard
Dr Karl Kruszelnicki’s Alcohol & Antibiotics

Antibiotics have been one of the greatest success stories of modern medicine - up there with the discovery of vaccination, and the discovery that you shouldn’t mix your drinking water and your toilet water. Like all drugs, antibiotics can have their bad side effects, but their benefits are enormous. Even so, some people wrongly believe the opposite. And in fact, lots of people also wrongly believe that you should not drink any alcohol while taking any of the antibiotics.

The Chinese first used antibiotics about 2,500 years ago. Back then, they realised that the fungus that grew on soybean curd could cure boils. This ancient wisdom was also known to the healers of Egypt and Mesopotamia, even earlier. The fungus was making a chemical (streptomycin), one of the first antibiotics. If you ate this antibiotic, it killed the bacteria that caused the boils. In fact, this same fungus, even today, gives us the antibiotic, streptomycin, that is our main defence against the bacterium (Yersinia pestis) that causes the Bubonic Plague.

The first really powerful and widely used antibiotic, penicillin, was discovered by Alexander Fleming way back in 1928.

Once again, it was made by a fungus. But the “Golden Age” of antibiotics really began only in 1941, when a group of scientists at Oxford University, in England, Howard Florey, Ernst Chain, and Edward Abraham succeeded in making small quantities of pure penicillin. They were so concerned that a Nazi air raid would destroy their building and all their research, that when they went home each night, they would rub some of the fungus inside the pockets of their trousers, so that if their lab was flattened. They then ramped up from small quantities to mass production, by using some of the technology used to brew beer. The first batches of penicillin became available in 1943, and were first used only by the military. Then later, as larger quantities were produced, it was made available to civilians, first only for life-and-death cases, and then for general use in the community.

Penicillin was truly a miracle drug when it was first introduced. It worked quickly and effectively against pneumonia, meningitis and hundreds of other deadly diseases. It was also especially effective against what were then called “Venereal Diseases” (VDs) - now called Sexually Transmitted Diseases (STDs).

The VD Clinics of the 1950s and 1960s gave the somber and serious advice that alcohol should absolutely not be used while taking penicillin. But there were no significant chemical interactions between penicillin and alcohol. The real reason that this advice was given was for moral reasons, not pharmacological reasons. The medicos of the day were worried that alcohol would reduce the inhibitions of the sufferers, and that, while under the influence, they might get a little “frisky” and pass on their infection to another person, before the penicillin had a chance to cure the sexually transmitted diseases.

That’s how the mythconception that alcohol should never be taken with antibiotics arose.

Even so, it’s well known that alcohol can interact quite nastily with a small number of modern drugs such as tinidazole (Fasigyn) and metronidazole (Flagyl), potentially causing nausea, vomiting, abdominal cramps, headaches, fast heart rate and flushing. And alcohol can reduce the absorption of other antibiotics such as the doxycyclines and tetracyclines. But these few interactions are well known to both medical doctors and pharmacists.

Mind you, alcohol can put an extra load on your liver and immune system, can impair your judgment, liberate aggressive tendencies, reduce your energy state - and can be associated with staying up late, behaving recklessly, and not getting all the rest that your body needs to heal itself. So half a glass of an alcoholic beverage of our choice would be fine with most antibiotics.
Top students catch Waves of the Future

By Chris Stewart, Executive Officer, Science Foundation for Physics

In July 2005, 140 of the world's top high school science students descended on the University's School of Physics for Waves of the Future, the 33rd Professor Harry Messel International Science School (ISS).

Each ISS gathers talented high school students from across Australia and eight other countries — Singapore, Thailand, Malaysia, New Zealand, Japan, China, the USA and the UK. It's an intense two weeks of scientific challenges and new friendships.

Waves of the Future featured talks by over a dozen eminent scientists. Oxford's Professor David Cockayne led a tour of the nanoworld, home of buckyballs and nanotubes; Dr Joe Hope from the Australian National University explored the quantum weirdness of atoms and light; and the biologist Dr Frank Seebacher showed the best ways to track crocodiles in the far North of Australia.

The ISS scholars also enjoyed daily activities, tours and talks, including the University of Newcastle's Science and Engineering Challenge, and cheered through the incomparable Dr Karl Kruszelnicki's Great Moments in Science.

Add in the harbour cruise, the quiz night, the talent competition... well, in the words of one of the scholars, "the science school was totally an awesome experience!"

You can catch Waves of the Future — on the web!

The ISS didn't end when the students went home — now anyone, anywhere in the world, can view the entire lecture series on-line through the International Science School Webcasts.

www.scienceschool.usyd.edu.au

SIEMENS SCIENCE EXPERIENCE

With places fully booked for the upcoming Siemens Science Experience, 120 eager Year 9 students look forward to the holidays and three days of exciting hands-on activities, talks, and demonstrations in January 2006, where they will meet and interact with leaders from the Young Scientists of Australia.

Why not suggest the activity for your students in 2007. The program is open to all students entering Year 10 and is a great way to incite and nurture the spirit for science. For program coverage and photos, visit the website in 2006.

Upcoming Events

Information Day
University-wide course information day
January 4 2006

Siemens Science Experience
For students entering Year 10
January 11, 12, 13 2006

Transition Workshop
For new Uni students
25 February 2006

O-Week Festivities
March 1-3 2006
Not just for first year students – music, comedy, theatresports, Open Air Cinema
www.swot.usyd.edu.au

Gifted & Talented Discovery Program
Students at the September Workshop