



National Science Week 2005 Wrap Up

August 2005 was a month where we celebrated all things science:

- Engaging primary and high school students in interactive and hands-on science at *Science in the City*, a collaborative partnership between the Australian Museum, University of Sydney, University of New South Wales and University of Technology Sydney with support from the Department of Education, Science and Training.
- Acknowledging and rewarding the success of Australia's top scientific researchers at the *Eureka Prizes* dinner.
- Congratulating the winners of this year's *University of Sydney Sleek Geeks Science Eureka Schools Prize*, future bright sparks Thomas Kidd and Sam Jarousek from Brisbane State High School for their fun look at the myth of the 'Supersonic Fly'.
- Conducting a roundtable discussion with education professionals on the future of high school mathematics.
- Hosting *Sydney Uni Live* – an open day designed to give high school students and their families an insight into life at the University of Sydney. The Faculty of Science conducted more than 40 mini-lectures, hands-on science activities in Physics, Maths, IT, Biology, Geoscience, interactive science demonstrations such as the Chemistry Smell-a-thon and featured a Great Moments in Science™ talk by Dr Karl!

All of these events highlight our continuing commitment at the Faculty of Science to science community outreach, schools liaison and to fostering the growth of academic research in Science and Technology.



Faculty of Science staff at *Science in the City* James Millner, Vicki Trebell (Information Officer) and Cath Brown (Marketing & Schools Liaison Officer)

Do you or your students need advice about Sydney University science degrees?

Give our Information Officer Vicki a call and ask away!

**Phone: 02 9351 3021 or
Email: info@science.usyd.edu.au**

Gifted & Talented Exam for Entry in 2006

Do you have students in Years 8 and 9 with advanced science capabilities or the potential to develop these capabilities? Would you like to see their young minds challenged through a program aimed at providing gifted, enthusiastic science students with the opportunity to undertake hands-on experiments and participate in interactive lectures and demonstrations, all in an environment with like-minded peers?

Why not order a set of exam papers today. For information on the program and the entrance exam, see the enclosed flyer. For more information and to view photos of this year's program visit:

www.science.usyd.edu.au/school/gifted/index.shtml

Science in the City



Science café discussion: (L-R) visiting researcher Dr Shae Lee Cox (Monash University, Immunology and Stem Cell Laboratories), Sydney University postgraduate student Tamra Lysaght and senior lecturer in HPS Dr Rachel Ankeny

15,000 students from over 200 schools converged at the Australian Museum August 2-11 for science workshops, shows, demonstrations, exhibitions and more!

As an executive partner to the event, the Faculty of Science showcased exhibitions from the School of Information Technologies, School of Psychology, School of Geosciences, School of Mathematics and Statistics, Electron Microscope Unit in addition to hands-on workshops by the School of

Science in the Suburbs

Why not attend the SITC satellite event Science in the Suburbs, October 25 and 26 encompassing a mini-expo, science shows and workshops.

Don't miss the Faculty of Science's own Electron Microscope Unit with their hands-on exhibit 'Specimens under the Microscope'. For more information visit:

www.scienceinthecity.net

Biology and School of Chemistry, and interactive science shows by the School of Physics 'Physics Air Show', Tony Masters' ever popular 'Great Chemical Disasters' and Dr Karl's Great Moments in Science™.

New to the *Science in the City* program was the *Twilight Science* event. Crowds of all ages stretched around the museum eagerly anticipating the chance to catch a behind the scenes look at the Museum at night under lights, interact with scientists, experiment with hands-on activities, engage in a 'Q and A' with Dr Karl Kruszelnicki, all in a relaxed, casual atmosphere.

The highlight of the night was the 'Science Café discussion: The Ethics of Stem Cell Research' chaired by ABC Radio's Robyn Williams, with researchers from the University of Sydney's Unit for History and Philosophy of Science. Members of the public had the opportunity to engage in discussion and debate with Hans Pols, Director of the unit, Dr Rachel Ankeny, senior lecturer in HPS currently working on the historical, philosophical, and ethical issues involved in stem cell research and Tamra Lysaght, a Sydney University postgraduate student investigating changes in the public understanding of stem cell research. It proved a most thought provoking discussion!



Goggles that turn your world upside down at our Psychology exhibit.

Maths Roundtable Discussion

Excerpt from "University mathematicians host school education forum" by Kate Rosmanith

Mathematics staff from 21 high schools around Sydney, and representatives from the NSW Department of Education and Training, the Maths Association of NSW, and the Office of the Board of Studies, joined University academics, including the Vice-Chancellor, for a breakfast forum on Friday 12 August, the topic of which was the shortage of secondary school mathematics teachers and the decreasing number of students undertaking mathematics for the HSC. Hosted by popular maths trouper Adam Spencer, the event marked a new dialogue between the University and the school system.

The teacher shortage and the drop in student numbers have implications beyond a school education context. One teacher at a Sydney girls school revealed that, of the 150 students completing maths for the HSC, only six went on to take maths at a tertiary level last year. Professor David Day, Dean of the Faculty of Science commented that dropping university enrolments impact on mathematics-based professions and "maths underpins the science and technology industry".

Whilst the Department of Education and Training has been operating initiatives to maintain an adequate supply of teachers, there is still more to be done, suggested guest speaker Peter Gould, chief education officer in Mathematics DET. "The shortfall of maths teachers is, in part, our own doing," he argued. "We have encouraged our most capable students not to go into maths teaching". The issues raised in response were numerous and complex. Several initiatives were explored by the roundtable, including the possibility of re-training talented primary school teachers in maths, so as to alleviate the shortfall of mathematics teachers in secondary schools.

The Roundtable also noted that over the years, the teacher shortage has been coupled with a decline in maths enrolments. The numbers of students taking 2-unit maths for the HSC have been steadily dropping over the last decade, from 21,572 in 1993 to 13,123 in 2005, revealed guest speaker Garry Webb, chief assessment officer at the OBS. "General maths, rather than 2-unit, has become the default course, however the numbers are still down," he said. This is partly due to the change in syllabus in 2001: the courses 'maths-in-practice' and 'maths-in-society' were replaced by the more challenging 'general maths' which may be alienating many students.

Educators at the forum felt that the problem begins early. Pro-Vice Chancellor for the College of Sciences & Technology, Professor Beryl Hesketh argued that mathematics should be taught in primary schools with more rigour. "From those initial years, students should come through the school system with a firm grasp of the subject". Dr Cleo Cresswell, newly appointed Schools Liaison Officer for the School of Maths, agreed: "Maths is training for the mind. It is a language and should be treated as such". Vice Chancellor (and once chief examiner in mathematics for the HSC) Professor Gavin Brown concurred, wondering to what extent the HSC general maths course involves complex problem solving.

Further collaborative events will follow the breakfast forum as the University hopes to contribute to education issues in the school system. Professor Don Taylor, head of the University's School of Mathematics and Statistics highlighted the importance of roundtable discussion stating that "high schools and universities should co-operate in shaping the image of mathematics to the community" and that given awareness of the issues in regard to high school mathematics education, carefully manage the transition from HSC maths to the first year university course.



Maths teachers, representatives from the NSW Department of Education & Training, the Maths Association of NSW and the Office of the Board of Studies, joined University academics, including the Vice Chancellor for a breakfast forum Friday 12 August.

Australian Museum Eureka Prizes Dinner



Two Sydney University scientists have won acclaim for their scientific endeavours at the recent Australian Museum Eureka Prizes dinner. The event sees the convergence of more than 900 leaders of government, science, industry, academia and the media at what has been heralded as 'Australia's most comprehensive national science awards' (Frank Howarth, Director Australian Museum) celebrating and rewarding outstanding science and science communication.

Astrophysicist Dr Peter Tuthill was awarded joint recipient of the \$10,000 University of New South Wales Eureka Prize for Scientific Research for his redevelopment of a 130-year-old photographic technique known as aperture masking, which has 'produced the best infra-red images of life and death among the stars'. What's more, unlike recent research in the area focusing on high-tech adaptive optics using intensive and expensive computing power, Dr Tuthill's technique is based on a shoestring budget. And whilst the technology is not intended to replace space telescopes, as Dr Tuthill explains they will be able to outperform them and perhaps inform the design of future space telescopes. To find out the key to his technique log on to the full article at: www.physics.usyd.edu.au/~gekko/



Professor Jon Patrick chair of Language Technology in the School of Information Technologies was also awarded a prize at the coveted dinner. Professor Patrick, inventor of SCAMSEEK, a software package designed to identify financial scams on the internet, received the \$10,000 Australian Computer Society Eureka Prize for ICT Innovation. Professor Patrick's research is currently being used by the Australian Securities and Investments Commission (ASIC) as a surveillance tool to track down scamsters and prevent illegal practice.

For more details on Professor Patrick's research:

www.science.usyd.edu.au/about_us/it/6_patrick.shtml

Dr Karl Kruszelnicki's Great Moments in Science

Chewing Gum

We humans have been chewing gum for thousands of years, with very few side effects. Even so, many of us believe that if we swallow chewing gum, it will sit, undigested, in the gut for seven years. My suspicions were immediately raised by the use of that nice prime number, "seven", which pops up in the motivational books and programs that offer you Seven Steps to a New and Improved You.

Archaeologists have found 9,000 year-old lumps of black tar, with bite impressions suggesting that most of the chewers were kids aged 6 to 15. Two thousand years ago, the Greeks chewed the pale yellow resin from the mastic tree, while American Indians chewed spruce gum.

Chewing gum came to modern America via the Mexican General, Antonio Lopez de Santa Anna, who was responsible for the massacre at the Alamo, in San Antonio, in Texas. Santa Anna later entered the USA, and settled in Staten Island, New York. He brought with him a big lump of "chicle", the dried milky sap or latex of the Mexican sapodilla tree, which Mexicans had chewed for thousands of years. A local New York inventor, Thomas Adams, tried unsuccessfully to turn it into a cheap rubber - but then he remembered how his son and Santa Anna loved to chew chicle together. In February 1871, small tasteless balls of chicle were first sold in New Jersey as "Adams New York Gum - Snapping and Stretching".

One of the nice side effects of chewing gum is that you increase the production of saliva, which is usually good for oral hygiene and your breath. The bad (and relatively uncommon) side effects include diarrhoea, tummy pain and flatulence (from the sorbitol in "sugarless" gum), mouth ulcers (from cinnamon flavouring), high blood pressure and low blood potassium (from liquorice flavouring) and higher blood mercury levels (from dental amalgam already in your mouth, but only in cases of excessive chewing). Other unpleasant side effects include mechanical injury to the teeth, overuse injury (including temporomandibular joint syndrome) and even extrusion of dental repairs. But the overwhelming majority of us chew happily gum with no harmful side effects whatsoever.

Mind you, chewing gum in public places has given us the word "gumfitti", referring to gum pollution in public places. Gumfitti has created a whole new expensive industry involving fancy gum-removal devices (solvents, liquid nitrogen, etc). Singapore has even made most non-medical uses of chewing gum illegal.

Modern chewing gum has five basic ingredients. First is the gum base (the chewy bit which today is usually a mix of natural and

synthetic gums). The other five ingredients are softeners (such as vegetable oils), flavours, sweeteners and corn syrup. Your mouth's saliva will dissolve all of these - except for the gum. So does the gum stick to the wet and slippery lining of your gut? Nope, it comes out with the rest of your solid wastes - through the same pathway, and almost always, right on schedule.

However, we humans are a very varied bunch, and you might expect that in the occasional human, chewing gum might get trapped. After a very exhaustive search, I tracked down the paper, "Chewing Gum Bezoars of the Gastrointestinal Tract", by Dr. David Milov and his colleagues, in the journal Paediatrics. He discussed three of his patients (aged 1 1/2 to 4 1/2) who had actually developed obstruction of the gut because they swallowed gum. However, the 1 1/2-year-old, who was a regular user and swallower of gum had also swallowed four coins. The other two children had a long history of swallowing gum, just to get another piece - up to seven pieces per day. Dr. Milov noted that the "rectal masses" had to be manually removed, and that they displayed the characteristic "taffy-pull sign" - a long multi-coloured skinny trail of gum, as the doctor pulled out a small lump of the mass.

But there are only a handful of these cases in the medical literature, and only in young kids (so you can

forget the myth of the gum staying in the gut for seven years) and usually in kids that had a previous history of constipation or poor digestion that existed long before they started swallowing huge quantities of chewing gum. The rest of us - we can chew walk and gum at the same time, and we can occasionally swallow it with no problems at all.

For more Great Moments in Science™ log onto Karl's website:

<http://www.abc.net.au/science/k2/>

© Karl S. Kruszelnicki Pty Ltd 2005



Come & See Dr Karl!

Why not book in for a talk with Dr Karl and some hands-on science activities as part of your next school excursion.

The Faculty of Science is happy to organise on-campus school visits.

University of Sydney Sleek Geeks Science Eureka Schools Prize

Whilst the Sleek Geeks Adam Spencer and Dr Karl Kruszelnicki took a year off from their annual tour, the flair and charm for science communication ever present in their shows formed the basis for the University of Sydney Sleek Geeks Science Eureka Schools Prize where secondary students were asked to create a short video piece that communicates a scientific concept in a way that is accessible and entertaining to the general public.

All finalists in the competition were invited on-campus for an intimate lunch with Dr Karl and Adam before heading off to the Eureka Prize Dinner, or as some of the finalists dubbed it the 'Oscars of Science' where they mingled with some of Australia's top scientists and eagerly awaited the announcement of prize winners in their highly competitive category.

Year 10 Brisbane State High School students Thomas Kidd and Sam Jarousek gave Karl and Adam a run for their money with their fun look at 'Busting the myth of the supersonic fly' in which they tested how fast a small fly can travel using logical and practical evidence. They won a \$5,000 prize to be shared with their school.

Second prize and \$3,000 went to Kristian Leadbeater, Faith Lutheran Secondary, Tanunda SA for 'Nobel's Intentions'. Third prize

and \$2,000 went to Andrew Katsis and Michael Steinbach, Gisborne Secondary College, Gisborne Vic for 'Cellular Respiration in Humans' and fourth prize and a \$1,000 book voucher went to Maddie and Lizzy Finnigan, Northern Beaches Christian School for 'Science is your Friend'.

With \$11,000 in prizes (to be shared equally between students and their schools) up for grabs why not encourage your students to start thinking about next year's competition.

For more details log onto:

www.science.usyd.edu.au/school/eureka/index.shtml



Eureka Schools Prize finalists Andrew Katsis, Michael Steinbach, Kristian Leadbeater, Maddie and Lizzy Finnigan and first prize winners Thomas Kidd and Sam Jarousek, flanked by Professor Merlin Crossley (far left) and Professor David Day, Dean of Science (far right).

New in 2006: Bachelor of Science & Technology

Recognising some of the issues raised in the Maths Roundtable discussion (see page 3), The Faculty of Science will launch the Bachelor of Science & Technology (BST) in 2006. The BST is a three year degree which will allow students who may not have selected to study traditional science and maths courses for the HSC to pursue these

interests at University. The program may also be of interest to students who are thinking about further study in the sciences, but who may be unsure which career pathways are available after a degree.

For more information:

www.science.usyd.edu.au

Upcoming Public Lectures

Morti Vivos Docent – "Let the dead teach the living"

By forensic anatomist Dr Meiya Sutisno

Wednesday October 19

"The Unpredictability of Science and its Consequences"

By visiting academic and internationally renowned scientist Sir John Meurig Thomas

Thursday November 3

Times and location for both lectures:

5:30 pm for 5:45 pm start

Eastern Ave Auditorium, The University of Sydney

To book your seat call (02) 9351-3021 or email info@science.usyd.edu.au

For more information: www.science.usyd.edu.au

*School and group bookings encouraged