



features:

*Announcing  
the NUS Bursary for  
Science Students ...  
Make a Difference for  
OUR Science Students!*

## Faculty of Science

*Cultivate passion  
Catalyze change  
Create future*

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### OmniSci

January 2008

News from Faculty of Science,  
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OmniSci is a production of the  
Faculty of Science to inform alumni  
and friends about the current  
programmes and activities in the  
Faculty.

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# OmniSci

## Content

### Page

- 1 Dean's Message
- 2 Competitive Research Funding Scheme
- 4 Interesting Courses - Current Trends
- 5 Alumni Updates
- 6 An Alumnus Who Reaches For The Stars
- 9 The CHAOS'07
- 10 NUS High School Inaugural
- 10 19th Science Research Congress
- 11 Sci• Mentorship Programmes
- 12 From Poly to Uni - Polytechnic And Their Students
- 14 You Can Help to Make A Difference
- 16 Pushing The Frontiers of Information Processing
- 18 Students Then & Now
- 19 Off The Beaten Path
  - Civil Service Student Internship Programme
- 20 Another Good Year - NUS Students' Science Club
  - Freshmen Orientation Projects 07/08
  - Science Camp
  - Science Orientation Week
  - NUS Rag & Flag Day
  - Dinner And Dance
- 24 Faculty of Science Awards for Academic Year 2006/2007
- 26 Meet Our Professors
- 26 Academia Promotions And Tenure
- 27 A\*Star Awards
- 27 In The Forefront
- 28 The Inter-Faculty Games 2007-2008 Swimming Meet
- 28 In The News

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### Acknowledgement

We thank the Shaw Foundation for its continuing sponsorship and support of the Faculty.

### Errata

In the last issue of OmniSci - 07/08 issue 1 - in the report on the NUS University Awards 2007, the following award titles were omitted:  
Outstanding Researcher Award went to Liu Xiang-Yang, Associate Professor of Physics.  
Outstanding Service Award went to Lui Pao Chuen, alumnus, and Saw Swee Hock, an alumnus and former Professor of Statistics, currently Professorial Fellow at the Institute of Southeast Asian Studies and member of the NUS Board of Trustees.

We apologise for these mistakes and any other errors made in that issue.



## Dean's MESSAGE

Each year begins with great excitement as we look back at our achievements and look ahead to new challenges.

In August, we welcomed 1,245 freshmen who make up 28% of our current enrolment of 4,455 undergraduates. We offered them the choice of 18 majors managed by our 6 departments. Overall, Faculty of Science undergraduate and graduate students make up 19% of all the students on campus. Their future looks very bright indeed. Our alumni have successful careers not only in education and research, but also manufacturing, finance, entertainment, information technology, and tourism, to name a few.

This issue we celebrate students. Student groups, such as the NUS Students' Science Club, foster leadership. Science Club is the largest student organisation in the Faculty. All orientation activities are managed by the Club. The most visible of these is Rag and Flag. This year, Science Club brought Bollywood to the Padang, and they came home with many awards. Students nowadays have the best of all worlds in internship programmes. Also, more polytechnic graduates are doing well here.

Science students have opportunities now that never existed even a few years ago. For example, they can now take advantage of a range of overseas programmes. Science Summer Programme attracts about 20% of our students. This programme, which is exclusive to Science students, takes them to University of New South Wales (Australia), University of Waterloo

(Canada), UCLA (USA) or University of Toronto (Canada). Course fees are fully funded. Financially disadvantaged students may seek assistance from the Science Student Overseas Exposure Fund (SSOEF). The SSOEF also finances the Science Club's Project Angel, an overseas humanitarian effort.

This semester, we launch the NUS Bursary for Science Students. Science students who apply for university financial aid are, at the same time, eligible to receive this bursary. Support for this bursary will go a long way towards promoting science university education to students from all walks of life. I would like to invite you to join us in providing opportunities for the next generation. Our efforts give needy students a chance to follow their hearts. By participating in the Annual Giving campaign you are giving another Science student an opportunity to receive the best educational experiences he/she deserves. To make a donation, visit the webpage [www.SayYes.nus.edu.sg/sci/](http://www.SayYes.nus.edu.sg/sci/). This year, some \$300,000 was given away in bursaries for Science undergraduates. We would like to be able to give more. Emergency financial aid is also available to students through the Science Student Fund, a new fund set up by the Faculty.

Our school outreach programmes highlight our biggest strength – mentoring of young talent. Interest in Science is higher than ever now in schools. Our outreach efforts provide the right stimuli for this interest to grow.

Students become alumni.

The story of Kevin Heng exemplifies the commitment of our own faculty to Science.

The FoS honour our own with Teaching, and for the first time, Research and Service Awards. Our faculty members consistently bring home the most number of top research awards for NUS, as can be seen in the National Science Awards and Young Scientist Awards. More of them deserve recognition at the Faculty level. Our service staff are the backbone of the Faculty. They work with efficiency and effectiveness, facilitating the excellent research and conducive teaching environments. The highlight of our research efforts was the clinching of the first Research Centre of Excellence (RCE) in Singapore, the Centre for Quantum Technologies. We also performed well in the National Research Foundation's Competitive Research Funding Scheme where 3 out of 6 teams involved FoS faculty members.

It leaves me to wish you all the very best in the new year!

Andrew Wee  
Dean, Faculty of Science

Extracted from PMO press release on 13 Nov. 2007

# COMPETITIVE RESEARCH FUNDING SCHEME

## AWARDS MORE THAN \$50 MILLION TO SIX PROGRAMMES IN ITS INAUGURAL GRANT CALL

Dr Tony Tan, Chairman of the National Research Foundation (NRF), and Dr Rita Colwell, Chairman of the International Evaluation Panel (IEP) for NRF's Competitive Research Programme (CRP) Funding Scheme, announced today the first group of researchers to be awarded grants under the CRP Funding Scheme.

The CRP Funding Scheme, which was approved at the Research, Innovation and Enterprise Council (RIEC) meeting chaired by the Prime Minister on 16 March 2007, offers funding support of up to S\$10 million per programme, over three to five years. The aim of the CRP Funding Scheme is to help identify potential strategic research areas in which Singapore can invest to develop new industries for the future, by funding a broad base of research ideas at the programme level and facilitating a more integrated and sustained way of supporting high-impact interdisciplinary research.

The first CRP grant call, launched on 16 April 2007, received a total of 124 preliminary proposals submitted by Singapore-based researchers from local universities, public sector research entities as well as private sector companies. The proposals ranged across various disciplines of science and technology. Seventeen preliminary proposals were selected to be developed into full proposals. These full proposals were internationally peer-reviewed. The IEP met to review the full proposals and recommended six for funding.

The six research programmes awarded funding by NRF are (in alphabetical order):

- Artificial mesoscopic structures for next generation electronic and photonic Technology (NTU)
- Combined-cycle solar energy self-sustaining membrane distillation (MD) and membrane distillation bioreactor (MDBR) water production and recycling system (NTU)
- Graphene related materials and devices (NUS)\*

- Lipidomics: Novel tools and applications (NUS)\*
- Molecular engineering of membrane materials research and technology for energy development: Hydrogen, natural gas and syngas (NUS)
- Multi-functional spintronic materials and devices (NUS)\*

Dr Rita Colwell, Chairman of the IEP and a member of NRF's Scientific Advisory Board, said: "The quality of the proposals submitted was excellent and we're very enthusiastic about those selected for funding. Each programme demonstrated internationally competitive high-impact science, strong research teams and strong potential to generate economic and/or societal benefits for Singapore. The final programmes selected also involved meaningful partnerships between industry and academia aimed at realising the potential of use-inspired research to generate solutions and opportunities."

Rounding up the inaugural meeting, Dr Tan described the first CRP grant call as "well-received and highly competitive". Dr Tan said: "We hope that this scheme will encourage and support good use-inspired research ideas to be surfaced bottom-up and bring about greater collaboration between industry and academia. We are also positive that the CRP will identify the best ideas for Singapore to invest in, through open competition and international review."

NUS Faculty of Science Assoc Prof Markus Wenk, whose programme was selected to receive funding, said: "I'm pleased to have been selected as one of the first recipients of a CRP grant. Our team looks forward to embarking on the exciting research and will work hard to deliver what we have promised in the grant proposal."

\* Programmes with Faculty of Science involvement



- *International panel of distinguished scientific industrial experts met to evaluate full proposals submitted for the inaugural grant call under the National Research Foundation's (NRF) Competitive Research Funding Scheme*
- *Six research programmes selected to receive funding*



# INTERESTING COURSES - CURRENT TRENDS Science Modules

*Did you know that NUS Science students are offered a wide array of modules to choose from? This issue of OmniSci introduces you to a graduate module that prepares students to identify innovations and seek out entrepreneurial opportunities.*



## Scientist-Entrepreneurs of the Future

On 19 March 2007, Sanjay Swarup, an associate professor in the Department

of Biological Sciences, read an email from former student Lim Leng Hiong which pleased him greatly. Leng Hiong reported that he and a classmate in Swarup's class submitted an executive summary for a business plan to Start-Up@Singapore, and were now on their way to the semi-finals.

This confirmed Swarup's belief that, with the right push, our students have the right stuff.

The year before, he had learned that another of his BL5204 students Mahesh Uttamchandani had won the LKY Global Business Competition with a submission he made together with other NUS and Ngee Ann Polytechnic students.

As Leng Hiong, who called himself the sceptical student who was always full of questions, recalled, the course "made him think deeper about identifying nascent technologies with good economic potential."



## So what is BL5204?

Professor Swarup describes the course as follows:

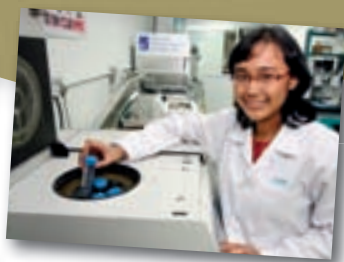
*"BL5204 Current Trends in Biotechnology aims to provide a view on the breadth and scope of the modern life sciences and biotechnology related disciplines. As part of the course, current innovations, emerging frontiers and commercialization aspects are covered. At the end of the course, we hope to provide students with knowledge on research-to-commercialization path, at what stage and how to protect intellectual property and what are the avenues and challenges in technopreneurship."*

*"We take a very hands-on approach in the learning and training process. Students group themselves and choose an area based on real invention disclosures, develop a business plan and defend it in class presentations. Members of the group take-up roles of CEO, CFO, Manager or CSO/CTO/CIO, depending on their themes."*

*"As the field is vast, no one or two people can possibly do justice teaching this course. Hence, we rely on experts in the different disciplines and invite them for lectures and discussions in a relaxed atmosphere. One set of talks are by researchers who have either licensed or patented commercially relevant technologies. The other set consists of speakers closely or loosely associated with the biotech business community in Singapore or overseas. For example, we had participation from EDB officials, patent attorneys, technology managers from NUS and A\*STAR, investors, biotechnology business consultants and successful entrepreneurs. Such participation from experts in the field, in the previous years has helped provide highly practical perspectives to the students and given them ground realities."*

*"This line-up of speakers and topics has been so attractive that some NUS staff have commented that they wish they were students attending this course. You may call this a 'crash course' in biotechnology developments and commercialization. It has motivated on average one group every two years to chase their interests beyond the course."*

# Alumni Updates



Nurmawati  
Muhammad  
Hanafiah was  
featured in the

publication *The Next Wave*. This coffee table book was produced to commemorate 25 years of MENDAKI (a self-help group for the Malay/Muslim community).

Wati, as she is affectionately known, received her BSc in Applied Chemistry in 2001 and an MSc in 2003 under Professor Siow Kok Siong and Professor Ignatius Rasiah. She is one of a small number of Singaporeans pursuing research in Nanotechnology. "The first time I learned how to use an electron microscope, my heart fluttered, to actually see an atom. In research, it is interest and excitement that keeps you going."

Wati recently joined the Institute of Materials Research and Engineering as a researcher. She is also working on a PhD, and hopes to teach at a tertiary institution some day.

Koh Lian Pin, BSc(Hons) '01, MSc '03, will be receiving his PhD in 2008 from Princeton University and has been accepted at a postdoctoral candidate at the ETH Zurich (Swiss Federal Institute of Technology). His article, written together with Princeton Professor David S. Wilcove, "Cashing in on Palm Oil for Conservation", which appeared a recent issue of *Nature* caught our attention.

"There were many instructors and lecturers from the Department of Biological Sciences, NUS, who had strong positive influences on my career. But I have to credit Associate Professor Hugh Tan and Professor Navjot Sodhi as my 'academic parents'. Prof Tan showed me the importance of being meticulous and organized in my work. From Prof Sodhi, I learnt the importance of having a razor-sharp and critical mind. I don't think I would have survived in the academia without these skills."



"After spending several months living in oil palm plantations in Borneo and talking to the insiders, I became convinced that this agriculture will continue to expand regardless of what the environmental groups do. The governments are of course 100% behind the heavily-taxed companies. I also began to think that the oil palm business itself, being so profitable, can somehow be co-opted to help save some of the remaining tropical rain forests. That's how I came up with this crazy idea of farming with the enemy. There have already been environmental groups such as the World Wide Fund for Nature (WWF) working with oil palm companies to develop a set of principles and criteria for producing palm oil in a sustainable and environmentally-friendly manner, and where workers are treated fairly and their families are given the appropriate employee benefits and welfare. Most of the major oil palm companies in Malaysia and Indonesia have signed up as members of this international forum (the Roundtable on Sustainable Palm Oil) – primarily due to increasing pressure from environmentally-conscious consumers. So I think if environmental groups approach these companies, they will likely be amenable to some kind of collaboration that satisfies the agendas of both parties. So maybe it's not such a crazy idea after-all."



Tan Meng Chwan,  
MSc '03, PhD '07, is  
now an NUS Overseas  
Postdoctoral Fellow  
at the Institute of  
Advance Study in

Princeton. He is working with his mentor string theorist Professor Edward Witten, and will soon move to California Institute of Technology (Caltech) to work with Professor Anton Kasputin. Although the USA is, as Meng Chwan described "the holy grail of string theory", he is looking forward to returning to Singapore to put NUS on the world map of theoretical physics.



# Kevin Heng, astrophysicist – *An alumnus who*

Dr. Helmer Aslaksen has been a mentor to many a student during his 18-year stint as an Associate Professor in the Department of Mathematics at NUS. One of them is Dr. Kevin Heng, who obtained his BSc(Hons) in Physics in 2003. In 2002, Dr. Aslaksen encouraged Kevin to take a leap of faith and attend graduate school at the University of Colorado at Boulder (CU-Boulder), where he earned his MS and PhD degrees in Astrophysics, between 2003 and 2007, under the tutelage of the George Gamow Distinguished Professor Richard McCray. During his time in Colorado, Dr. Heng earned several honours, including the Martin & Beate Block Prize from the Aspen Center for Physics and the Sigma Xi Grants-in-Aid of Research. The astronomical instruments he has used in the course of his research include the Hubble Space Telescope, and he is part of a research group led by Harvard which studies supernova remnant (SNR) 1987A. As a graduate student, he served as a journal referee for the *Astrophysical Journal*, and on selection committees for prospective PhD students and assistant professors in the Astrophysical & Planetary Sciences Department at CU-Boulder. In December 2006, he won a three-year, post-doctoral position (“Member”) at the Institute for Advanced Study (IAS) at Princeton, where luminaries such as Albert Einstein and Kurt Gödel served as professors (“Faculty”). Prior to joining the astrophysics group at IAS in November 2007, he resided at the Max Planck Institutes for Astrophysics (MPA) and Extraterrestrial Physics (MPE) as a visiting scientist. Recently, the Department of Physics at NUS nominated Dr. Heng for the National Research Foundation fellowship.

This conversation took place during Kevin’s visit to Singapore in June 2007.



**Helmer Aslaksen (HA):**

Congratulations on your upcoming post-doc at the IAS! We are very proud that one of our graduates has received such an honour. Can you tell me about the IAS and what you will be working on?

**Kevin Heng (KH):**

I am indeed honoured and humbled by the IAS appointment, which will be a great opportunity to represent NUS and Singapore. In the words of the English historian G.M. Trevelyan, “Disinterested intellectual curiosity is the life-blood of civilization.” As described on its website, the IAS exists to “encourage and support fundamental scholarship – the original, often speculative, thinking that produces advances in knowledge”. (Rather than paraphrase excellent documentation that already exists, one can visit [www.ias.edu](http://www.ias.edu) for more information.) During my one-week visit to IAS in December 2006, my impression was that it is a sanctuary for pure intellectual thought, unperturbed by the rumbles of industry. The astrophysics group is led by Professors Peter Goldreich and Scott Tremaine; Peter just won the 2007 Shaw Prize for Astronomy. The young, post-doctoral researchers in the group are some of the brightest and most motivated individuals I have ever met, and I am really

*Graduation at University of Colorado, Boulder: Kevin and supervisor George Gamow Distinguished Professor Richard McCray.*

looking forward to working with them. My attitude towards research is that regardless of the eventual technological application of a solution to a problem, one gains deeper insight if one approaches it with the pure motivation of interest. Currently, my plan is to pursue research in SNRs, gamma-ray bursts (GRBs) and the physics of shocks, while also being on the lookout for interesting problems to work on and opportunities to collaborate with other IAS Members and Faculty. Astrophysical research probes physical conditions unattainable on Earth, thus complimenting terrestrial studies. For example, GRBs motivate us to study mechanisms for accelerating large quantities of matter almost to the speed of light.

**HA:**

How did you first get interested in astrophysics/astronomy?

**KH:**

Like many kids, I wanted to be an astronaut when I grew up. I later “settled” for the “less lofty” goal of astronomer, without realizing that the two professions require entirely different --- and not necessarily easier or more difficult – sets of skills. I was full of energy as a child, but did not know how to focus it. In fact, neither did my parents – I later realized that it was because I was so curious about and interested in everything. Science is the channelling of this curiosity and “energy” towards the understanding of Nature, in an objective and progressive manner, independent of race, culture or religion; I was deeply attracted to its universality. To a child, astronomy is greatly attractive because it is so accessible and allows him or her to ask really fundamental questions.

Besides fulfilling my childhood dream, astrophysics is one of the few disciplines which combines the advances and techniques from a



# reaches for the stars



myriad of fields, including biology, chemistry, computer science, geology, mathematics, physics and various branches of engineering. Being competent at astrophysical research requires at least a working knowledge in several of these fields, and this is where my strength as a scientist lies. Astrophysics is a discipline fiercely driven by astronomical observations – theorists, observers and instrumentalists often have to work hand-in-hand to identify, procure, analyze and model data – and allows us to push the boundaries of our understanding in all of the fields mentioned above.

Many of the big scientific questions we are asking are being answered by astrophysicists. Is the universe expanding at an accelerating or decelerating rate? (Accelerating, as found by groups at Berkeley and Harvard.) Are there planets beyond our Solar System and how common are Earth-like ones? (Hundreds of extra-solar planets have been found by various research groups around the world; these groups are beginning to make technological breakthroughs that will enable us to detect Earth-like ones.) Many scientists, including Professor Belal Baaquie from the Department of Physics at NUS, believe that vindication for superstring theory will eventually come from astrophysical observations. Currently, researchers are able to constrain the evolution of the fine structure constant using observations of astrophysical masers.

■ HA:

I believe that many junior college (JC) and NUS students will be interested in hearing a bit about your background. You did not take the usual “scholar route” of GEP and “elite” schools. Can you tell us a bit about your schooling before you came to NUS?

KH:

(Laughs.) Yes, I indeed took the less-trodden path. In fact, one can say that I cut out my own. Before NUS, I attended school at Maha Bodhi Primary, Temasek Secondary and Serangoon JC. Most of my teachers found me to be overly garrulous, inquisitive to the point

of being disruptive and basically a pain. I was a B or C student on average, though I excelled at English because it was the only subject where rote-learning was relatively unimportant. I barely made it to NUS and when I did, my first semester as a Physics major was less than spectacular – I got a “D” for Physics I! But I had the good fortune to meet you and Professor Tay Yong Chiang – let’s just say that I would have left science altogether if not for the encouragement and support from the both of you. Other mentors, including Professor Lim Hock, provided guidance as well. Along the way, I developed my own techniques for excelling in a university environment.

My eventual realization is that rote-learning is only for learning the “alphabet” of science. Research is the forming of “words” using this alphabet. Pre-university learning teaches you how to solve pre-defined problems; good grades only partially reflect how well a student has learnt the skills these problems are designed to impart. This falls under “technical ability”, which is only one trait of being a successful researcher. Other required traits include the ability to collaborate and interact with fellow scientists, to write research papers and communicate your findings at conferences and, most importantly, to identify and define a problem. You cannot begin to solve a problem if you do not know what it is, and unlike in homework sets and textbooks, you have to construct, constrain and itemize the problem, as well as invent strategies to tackle it. You also have to judge if it is worth your effort, matches your skill set and soluble in a reasonable period of time – we live in an age where the number of problems that exist exceed the amount of time we have, in a human lifetime, to solve them. Furthermore, the public’s image of a physicist as a genius working in solitude is a misleading one – many discoveries are made via collaborations and interactions; successful research groups comprise scientists with complimentary skill sets. Einstein was an exception, not the norm, and even he had to learn mathematics from his collaborators!

Finally, be happy! This is a lot easier said than done. Science for me is not just a job – it is a way of life, a worldview. It is not a “club” you join, but a way of examining the world using the iterative technique of acquiring data, forming hypotheses and analyzing how well they agree. People who scoff at the way scientists repeatedly “correct” themselves are entirely missing the point – this is precisely the point, precisely how empiricism works!

■ HA:

Many people would have given up after such a start at NUS. How were you able to turn around your results?

KH:

The first step was to realize that one only learns something if one is able to communicate one’s understanding. In my case, I found it very effective to combine what I had learnt from lectures, homework sets, text- and reference books, etc. and summarize the salient points into a set of very compact and concise notes. These notes not only enhanced my understanding, but cut down my revision time by a factor of 3 to 5 (relative to my course-mates). In essence, I developed a system to communicate what I had learnt to myself.

The second step is to recognize that learning is not a “nine-to-five” process, but transcends boundaries of time and social structure. As long as you are humble and patient, you can learn valuable lessons from unlikely people at unexpected times. If you construct a metaphorical cave or ivory tower and convince yourself that no one can teach you anything new, even the best teachers in the world will be wasted on you. My words are encapsulated in an ancient saying, “Once the student is ready, the master appears.”

The third step is to acquire the qualities I described earlier that I feel are essential to being a successful researcher. These qualities are general to being a happy and successful human being who will contribute to society.

■ HA:

When did you decide that you wanted to go to graduate school in the United States? Why did you not want to go to graduate school in Singapore?

KH:

I decided at some point that financial gain was a poor reason for choosing my path in life. I had the opportunity and means to pursue a successful career in Singapore, but it would have probably not been in science, my first love. Without mentioning names, there were a few people, including a professor, who told me that astrophysics was “impractical” and that I should pursue something “practical” in graduate school. The said professor also derided my choice of CU-Boulder, not appreciating that excellence in research and the perceived prestige of a university by Singaporeans are often poorly correlated. (CU-Boulder researchers have since won three Nobel Prizes in Physics in five years; one of them, Professor Carl Wieman, was invited to deliver the NUS Centennial Nobel Laureate lecture in 2005.) Such a mindset discouraged and saddened me, so I decided that I had to leave. At the time of my departure, there was simply no infrastructure in place to study astrophysics in Singapore. I am encouraged that this is starting to change.

A related and important point I wish to harp on is how history has taught us that crucial discoveries are usually made by people driven almost entirely by curiosity and passion. When he first tinkered with electromagnetism, people regarded James Clerk Maxwell's findings as mere curiosities, not anticipating the eventual, immense contributions his work later made to fields such as quantum mechanics and special relativity. If Maxwell's curiosity had been inhibited by “practicality”, many of us would not be using everyday devices such as mobile/hand phones!

Abstract, speculative research often leads to the development of industrial applications. For example, the desire of astronomers to study celestial objects in the X-ray wavelengths led engineers and scientists to develop revolutionary ways to focus X-rays, culminating in the launching of NASA's Chandra X-ray Observatory. These X-ray focusing techniques are now used by doctors for medical purposes. Another example is the invention of a computer language called “IDL” (Interactive Data Language) by astronomers, who used it for intensive image analysis; IDL is now widely used in other fields.

■ HA:

You have a broad range of interests outside of astrophysics? Can you tell us a bit more about this?

KH:

One of my philosophies in life is to see beyond the boundaries of disciplines, as these lines are man-made. I have a great interest in the culinary arts. During my stint in Colorado, I spent 6 months at the Culinary School of the Rockies, earning a diploma in American-French cooking. Cooking is a great example of why a degree/diploma is only a representation of what you learnt; no one will hire a chef because he or she has a fancy degree but cannot cook.

My other great loves are fitness, music, writing and travel. I picked up snowboarding in Colorado, which is home to some of the world's best skiers and snowboarders --- on a good day, I can zip down a “black mogul” run; “double blacks” are still a little beyond me. I also met several rock-climbers, who taught me how to do “bouldering” and led me on various “multi-pitch” climbs. And I am a little bit of a gym rat. Music always interested me, but I only pursue it at the level of being able to entertain myself, mostly on the guitar. I had brief stints at Power 98.0 FM and Sports4Asia, where I served as journalist/producer/sound-engineer and foreign correspondent, respectively. As for travelling, I only begun to enjoy it when I met my wife, Stefanie, who is from Germany; she made me fully appreciate that the joy is in the journey and not the destination, and that great pleasure is derived from the simplest things. Life is beautiful when variety exists.

■ HA:

How do you see yourself contributing to science and education in Singapore in the future?

KH:

Currently, I feel that I will contribute most in a role analogous to that of an ambassador. I wish to tell kids who are not in the so-called “elite” local schools that it is possible to pursue a successful research career, that one does not always have to walk down a red carpet laid out for you by the scholarship agencies. Isn't it more challenging and fulfilling to make your own carpet? I feel that our culture is too caught up with the rankings and prestige

associated with schools. Elitism breeds arrogance, which is a hindrance to life-long learning. As many later find out, coming from a prestigious school opens doors for you, but once you get in, it is up to you to stay in the room.

During my trips back to Singapore, I will do my best to give as many public outreach lectures/talks as possible and interact with young people, as I have a long-term interest in the communication of science to the masses. In the future, I hope to seek joint positions in Europe, Singapore and the United States, and act as a conduit for scientific exchange between these cultures.

■ HA:

Thanks a lot for taking time off your busy schedule to share your thoughts with us! On behalf of everybody at the Faculty of Science I would like to wish you the best of luck with your future adventures in science! We are all looking forward to having you back here as a frequent visitor.

KH:

I thank you and everyone at NUS Science!



*Picture of IAS in Princeton.*

# The CHAOS '07

The Creative & Heuristic Application of Science (CHAOS) is an internet-based science competition for secondary school students. The programme is a joint initiative of the Faculty of Science and the Gifted Education Branch of MOE, with the support of the Defence Science & Technology Agency and DSO National Laboratories.

The competition is opened to all students who are currently enrolled in secondary school in Singapore. Participants are to work on challenging open-ended science problems which will require them to engage in high-intensity research work, utilize higher-order thinking and critical analysis, and employ creative thinking in the development of their solutions. It encourages the participants to integrate their knowledge of the various science disciplines and to instil confidence in applying scientific ideas in tackling real-life issues. The theme for CHAOS 2007 was: "Marina Bay Dam". Participants were asked to form teams and to role play as a team of multidisciplinary experts of a consultant firm and address the issues caused by the construction of the dam.



*The judges for the CHAOS 2007 Finals*



*Presentation by Hwa Chong Institution Team 2*



*Mr. Yap Kheng Guan presenting to the winners (from left to right) Champion team - Hwa Chong Institution, 1st Runner Up - Raffles Institution, 2nd Runner Up - Methodist Girl's School and the "Best Newcomer" award - Mayflower Secondary School.*

In its 7th year running, the final was held on Wednesday, 18 July 2007 at Faculty of Science LT32. The welcome address was made by Associate Professor Lim Tit Meng, Chairman of Science CHAOS Coordinating Committee and Vice-Dean of FoS. The Guest-of-Honour was Mr. Yap Kheng Guan, Director, 3P network department, Public Utilities Board (PUB). Mr. Yap's topic on "Waterways, Our New Way of Life" gave insights on how the actual dam was being built by highlighting the benefits and key features of the Marina Barrage. Mr. Yap also updated the audience on the completed and upcoming projects of the Active, Beautiful and Clean (ABC) Waters Programme.

The following teams made it to the CHAOS 2007 finals:

***Dunman High School – Team 2***  
***Hwa Chong Institution – Team 2***  
***Methodist Girls' School – Team 2***  
***National Junior College – Team 1***  
***Raffles Girls' School – Team 1***  
***Raffles Institution – Team 1***

Hwa Chong Institution – Team 2 edged out Raffles Institution Team 1 to emerge as the Champion for CHAOS Finals 2007. While Methodist Girls' School – Team 2 was the 2nd Runner Up. A new award, "The Best Newcomer" Award, was awarded to Mayflower Secondary School.





# Inaugural

Eileen Lim  
Manager (Partnership & Outreach)  
NUS High School of Mathematics and Science



Research Congress organized by the Office of Research, Innovation and Enterprise on 17th October 2007. The event was commemorated by the Guest of Honour, Professor Leo Tan from National Institute of Education.

Research topics such as "Identification of Molecular Markers for use in sex determination of economically important dioecious fruit trees" and "Tetre-P-Terphenylparacyclophanes: A double layered Oligoparaphenylene model for organic electroluminescent materials" were presented during the event.

Research being one of the key pillars of NUS HIGH School, it is one of the features that set NUS High School apart from the other educational institutes. The Research Programme aims to

nurture and increase core competencies to enable creativity and innovation in all our students. In line with the school vision, the Research Programme is integrated into the school curriculum and is unique to this specialised school. This Research Congress demonstrates our commitment towards our Research Programme. During that one day event, our students showcased their developments and achievements in the Independent Research Programme, Innovation Programme and Future Problem Solving Programme.

The Congress theme "Research: The Leap Ahead" described the focus of our school's Research Programme. Since the school's inception merely three years ago, our students had presented their research works locally and internationally in Science fairs, congresses and conferences. They were supervised by university mentors, and worked closely with partners such as A\*STAR, DSTA, DSO, NUS and NTU.

By the year 2009, we aim to extend the Congress to include both local as well as international students. We will continue to provide this excellent platform in pursuit of grooming great scientists for the future.

## 30 May, 19<sup>th</sup> Science Research Congress

The Science Research Congress (SRC) is the culmination of the Science Research Programme (SRP). It is a collaborative effort between the NUS Faculty of Science and the Gifted Education Branch, MOE. It was launched in 1988 with the aim to provide selected first year JC students the opportunity to participate in research projects. These students did their research projects under the guidance of scientists and engineers from established laboratories and research centres in NUS, NTU and supportive organisations.

This year's SRC was held to commemorate the successful achievements of the 106 participants from 10 participating junior colleges, under the mentorship of scientists from NUS and partner agencies. 53 of the participants opted to have their projects registered under the new MOE JC curriculum at the H3 level. This expressed their confidence that they were able to undertake rigorous scientific research at a more in-depth level.

The 19th Science Research Congress was successfully held on Wednesday, 30 May 2007 at Faculty of Science Lecture Theatre 25. The welcome address was made by Associate Professor Lim Tit Meng, Chairman of Science Research Programme Coordinating Committee (SRPCC) and Vice-Dean of Faculty of Science. The Guest-of-Honour was Professor Andrew Wee, Dean of the Faculty of Science, NUS. Professor Andrew Wee gave an inspiring keynote address on the topic "A Life in Nanoscience". In his address, he highlighted the latest research developments and applications in the world of Nanoscience. Professor Wee hoped that the SRP enhanced the students' interest in science and urged them to seriously consider a career in scientific research.

Three projects which won Gold Awards at the recent Singapore Science and Engineering Fair (SSEF) organised by A\*STAR and the Singapore Science Centre, were selected to be presented at the Congress:

- ◆ **Elucidating the functional diversity of BCH/SEC14 domains**  
by Wee Liang En, Ian, Hwa Chong Institution (College Section)
- ◆ **Reflection Within Conics**  
by Hang Hao Chuien, Hwa Chong Institution (College Section)
- ◆ **Development of a Novel Approach for Applications in Preimplantation Genetic Diagnosis of Duchenne Muscular Dystrophy**  
by Chang Nong Shin, Amelia; Raffles Junior College

Sponsor for the event was the Shaw Foundation.



Professor Andrew Wee presenting Certificates of Participation to a SRP student representative from the National Junior College

# Sci. Mentorship Programmes

The Science Mentorship Programmes strive to cultivate the spirit of inquiry in secondary school students who are interested in science, by providing them with opportunities for interaction with scientists and to perform scientific investigations in research laboratories. The programmes are jointly organized by the Gifted Education Branch of the Ministry of Education and the following tertiary institutions and specialized organisations : National University of Singapore, National Institute of Education/ Nanyang Technological University, Nanyang Polytechnic, Ngee Ann Polytechnic, Singapore Polytechnic, Nanyang Polytechnic, Republic Polytechnic, Defence Science & Technology Agency, Institute of High Performance Computing, Institute for Infocomm Research and Singapore Botanic Gardens.

Each programme comprises a Mentorship Attachment which will end with the Youth Science Conference

## ◆ Mentorship Attachment

Mentors from the participating tertiary institutions and specialised organisations are invited to offer projects for the programmes. Students who are keen to participate in the programmes select the projects that interest them. Each student will make an in depth study of the selected topic and identify meaningful problems for investigation. Students will be exposed to the process of problem-finding, problem-solving, exploration and discovery to develop intellectual skills and curiosity that will stimulate them to evaluate and challenge information rather than be passive learners. Students will meet their mentors to work on their projects on a weekly basis from January to July and 2 weeks full time during the June school holidays. They will write a scientific paper for publication in the Proceedings of the Youth Science Conference.

## ◆ Youth Science Conference

The Youth Science Conference will showcase posters and oral presentations of projects in the programmes to an audience of peers, teachers and scientists.

The 13th Youth Science Conference was held on Saturday, 15 September 2007 at the Convention Centre, Singapore Polytechnic. The welcome address was made by Mr. Adrian Yeo, Deputy Director, School of Chemical & Life Sciences. The Guest-of-Honour was Dr. Andre Wan, Deputy Executive Director, Biomedical Research Council, and Agency for Science, Technology and Research.



After the inspirational keynote address by Dr.Wan, three projects which won the SMP-3M Young Scientist awards were presented at the plenary session: :

### USABILITY STUDY: WEB-BASED SPEAKER VERIFICATION SYSTEM FOR SECOND FACTOR AUTHENTICATION

*Lim Wancai Daryl, Chiam Zhijie Jonathan, Tan Tu Guang and Tan Yeow Kee*  
Raffles Institution, I2R-MP

### RFLP MARKERS FOR AUTHENTICITY TESTING

*Koh Su Min Vanessa, Teo Min Hui, Ch'ng Cheng Yi Samantha, Ye Song and Koh Siok Im*  
Anderson Secondary School, ASP

### UNDERSTANDING THE EFFECT OF FLOCKING WITH GAME OF LIFE SIMULATION

*Diao Wangdi, Koh Li Chen and Tay Seng Chuan*  
NUS High School of Mathematics and Science, NUS-SMP

The following NUS-SMP Mentors were given the Outstanding SMP Mentor Award:

- Associate Professor Chua Seng Kee, Mathematics
- Associate Professor Lu Jinhua, Microbiology
- Dr Roger Poh Kheng Siong, Mathematics
- Dr Tay Seng Chuan, Physics
- Dr Toh Chee Seng, Chemistry
- Associate Professor Manoor Prakash Hande, Physiology

All SMP project posters were judged the day before and exhibited outside the convention hall. The project poster exhibition provided an excellent opportunity for all SMP participants to explain their research projects to their peers and the audiences.

# From Poly to Uni — Polytechnics and Their Students

Dr Phil Chan, Senior Lecturer  
Department of Physics

Mark Twain, the late 19th century doyen of the American literature scene, is often remembered for his wit, best exemplified in one instance by his observation - to “never let formal education get in the way of your learning”.

Around the world, education systems in various countries have shaped the intellectual growth of students in different ways. It seems apt that Twain's observation should hold; itself being iconoclastic as a description of the approach to education which should be adopted in his opinion. It must be recognised that the traditional examination-based education *modus operandi* implemented in much of Southeast Asia (including Singapore) may not necessarily be expedient in facilitating the learning inclinations of students who are less suited for this approach.

Let's understand the rationale behind examinations - at its very essence, it aims to test students' conceptual understanding (in relation to science subjects) in the theoretical and practical realms against presumably “objective” criteria. The education system in Singapore is structured according to a framework which up to high school/pre-tertiary level direct students into different paths according to their academic achievements, ascertained by examination-based testing. Traditionally, the students who fare the best in examinations move on to pre-tertiary junior colleges, and the others to polytechnics and the Institutes of Technical Education (ITE). Society has it ingrained that students from polytechnics and ITE are weaker with a sizeable number of students who fail to make it to the junior college route feeling inferior to their compatriots.

One has to realise the inherent shortcomings of the system. While it is very much in sync with the meritocracy-based ethos of society of rewarding those who excel and achieve, it fails to give additional scope for helping “late bloomers” in life, and students who may not be suited to the classroom-examination system but may thrive in the tertiary environment. I have had the opportunity to teach and mentor students from polytechnics, junior colleges, and in my current capacity, university students alike. Through several years of teaching experience, I have seen the society-deemed “weaker” students from polytechnics progress to the tertiary and post-tertiary levels of education. It is my conviction that they are in no way inferior to their more academically-inclined compatriots in junior colleges. They are just as capable of doing well in life.

Polytechnics were first conceived as educational institutions in the 1960s to augment the post-independence industrial development of Singapore. Right from the outset, the objective

outlined was to train highly-skilled workers capable of supporting the technical and infrastructural aspects of Singapore's economic engine. Over the past decades, this trend has been modified to suit the industry's requirements in a global knowledge-based economy. While their education pedagogy is different, let us not make judgments on their abilities based on their academic grades per se.

Their curriculum infuses aspects of hands-on practical work with rigorous theory. In the mathematics and engineering courses, students have the opportunity to learn advanced mathematical operations in various modules in the run-up to their achieving diplomas in the three-year programme. Structurally rigorous, their programme is in fact, in some aspects, more advanced than the junior college programme. Second-year polytechnic engineering students typically master Laplace and Fourier transformations in mathematics courses; and several local polytechnics now offer advanced engineering mathematics for third-year students. Polytechnic students are emplaced in a better position for tertiary education - their blend of hands-on know-how, streetwise mindsets and informed, clear approaches to engineering, for instance stand them in good stead to face the challenges of the future.

*What we learn to do, we learn by doing.*

Thomas Jefferson

*Nothing ever becomes real till it is experienced ...*

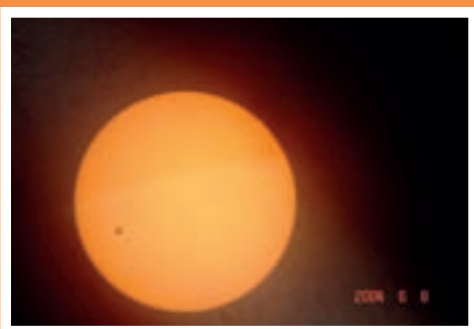
John Keats

I have had the opportunity to work with two students from polytechnics who have successfully made a mark for themselves at the tertiary level. Law Zhi Yang is the deserving recipient of the 2007 National University of Singapore (NUS) Outstanding Undergraduate Research Award. His research is also published recently in a top European physics journal, *Physics Letters B*. Formerly an engineering student of Nanyang Polytechnic, Zhi Yang has come a long way. An Honours physics major at NUS, he started without a compatible physics background at pre-tertiary level and with less-than-spectacular “O” level results. Undeterred, Zhi Yang picked up physics later through astronomy as a hobby cum co-curricular activity well beyond the classroom setting. With his characteristic verve and his flexibility in thought, Zhi Yang's capabilities in mathematical abstraction



have served him well with distinction. While he began as a student unsuited for the examination mode of assessment, his polytechnic background, coupled with his determination and innate abilities have helped him to excel at the tertiary level.

Another student is Lai Wei Chang, a physics honours-year student at NUS, also formerly a student at the Polytechnic. In his second year of university education, he was diagnosed with cancer and put his studies on hold. What is remarkable is his never-say-die attitude amidst several chemotherapy treatments and surgeries; never once did he give up. While recovering, he set up a private business venture, Sky Tutor and profited a handsome sum of money. Today, Wei Chang's cancer is in remission and he has bright prospects before him. He is the 2007 recipient of the outstanding NUS Student Achievement Award (Enterprise and other competition). The NUS umbrella vending machines which are set up by him are a feather in his cap.



Picture of 2004 Venus Transit



From left: Zhi Yang, Wei Chang and friend.

The polytechnics have been instrumental in providing students who have not been able to succeed in the academic arena initially with many opportunities to develop their potential. High quality vocational education has always been a hallmark of polytechnic education; the tutors and lecturers are highly qualified and most hold higher degrees in their respective fields of expertise. Together with their "mentor-student" style of approach, the lecturers have played pivotal roles in inspiring students to scale greater heights. It has been shown that polytechnic students are just as capable and are able to succeed in life. The difference between them and other students may be that they are less academically inclined but the polytechnics have provided these students with what it takes, the confidence and know-how, for a future iridescent with hope ahead.

*I never teach my pupils; I only attempt to provide the conditions in which they can learn.*

Albert Einstein

It is heartening to see polytechnics students learn physics and applied mathematical skills through amateur astronomy. In fact, Polytechnic astronomy groups are the most active group by far. These students may not learn a lot of academic knowledge and methods but they do have a good understanding of basic concepts, after all good mind devises its own method. This certainly is in line with the slogan ... teach less learn more.

*As there are no astronomy modules in polytechnics for them to learn ... education for these students are not about filling of a pail but indeed lighting of a fire in them ... echoing the sentiments of another poet,*

William Yeats.

Good polytechnic students are like sponges ... flexible and full of holes ... it is precisely these gaps that cause them to soak up knowledge at will with renewed fervour and rigor. Exam smart students are likened to solid good wood that lack flexibility. Perhaps the whole purpose of education is to turn mirrors into windows.



# You Can Help to make a difference

*Gifts to the Faculty of Science open doors for our students. You can make a difference on the Faculty's future with your gift.*

Donations to the Faculty result in student awards, bursaries and scholarships. It also increases our ability to hire quality faculty and create professorships.

Our current efforts concentrate on helping needy students to realise a dream. Students from the Faculty of Science benefit through the following funds:

- ◆ *NUS Bursaries for Science Students.*
- ◆ *The recently established Science Student Fund provides emergency cash for students in immediate dire need.*
- ◆ *The Science Student Overseas Exposure Fund opens doors to a world outside of Singapore. The SSOEF supports students who need funds for exchange programmes, overseas competitions, conference participation, and the ever popular Science Club's Project Angel.*

*For more information, please contact Karen Wong (65168198, [karenwong@nus.edu.sg](mailto:karenwong@nus.edu.sg)).*

## NUSBSS

*Announcing the NUS Bursary for Science Students ...Make a Difference for OUR Science Students!*

Each year, 1,800 students apply for bursaries which total more than \$2 million. These students come to NUS in pursuit of a dream. Their success is determined by loyal supporters who, year after year, provide the financial basis for a quality educational experience through gifts that support students in financial need.

The NUS Bursary for Science Students is designed to lessen the financial burden for Science students and their families. Supporters of the Faculty of Science may contribute towards this bursary through Annual Giving. The website is [www.SayYes.nus.edu.sg/sci/](http://www.SayYes.nus.edu.sg/sci/).

Every single donor, no matter the size of gift, helps determine the consistent presence of NUS among the world's top ranking universities.

We wish to thank our loyal alumni in advance for making such student experiences possible.

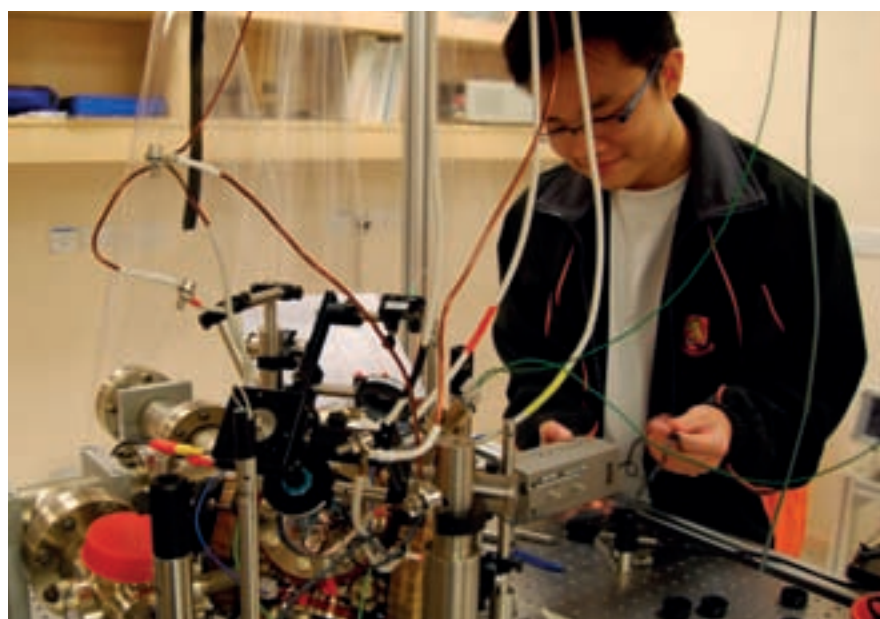


# PUSHING THE FRONTIERS OF INFORMATION PROCESSING

The National University of Singapore's (NUS) proposal for a Research Centre of Excellence (RCE) in Quantum Information Science and Technology (QIST) was approved by the Research, Innovation and Enterprise Council (RIEC) in March 2007\* as the first of several RCEs to be set up with co-funding from the National Research Foundation (NRF) and the Ministry of Education (MOE). This will be the first research institute in Southeast Asia dedicated to QIST. The RCE is now operational, and aims to become one of the world's top centres in this area within five years.

A five-year budget of S\$750 million (S\$500 million from NRF and S\$250 million from MOE) has been set aside to fund RCEs. Of this, about S\$150 million

NRF recognises that there is a need to enhance Singapore's research capacity by growing a pool of top research talent and developing the platforms through which they can create research breakthroughs. One way is to strengthen the capabilities of our local universities by establishing RCEs within them. NRF and MOE's investment in the RCE in QIST highlights the Government's continued drive for excellence in the learning of basic sciences. The RCE in QIST will conduct outreach activities and provide attachment opportunities to enthuse and inspire our students in the learning of basic sciences, in particular Quantum Information Science. MOE sees the RCE in QIST as a significant milestone in the development of NUS as a research-intensive university.



will go into the funding of the RCE in QIST. Hosted at NUS, the RCE in QIST will conduct interdisciplinary theoretical and experimental research aimed at overcoming the fundamental limits to information processing. Singaporeans will benefit from the investment in RCEs in the long term, because RCEs will conduct world-class investigator-led research aligned with the economic and strategic interests of Singapore.

## A New Science

QIST – a new field of science and technology combining and drawing on the disciplines of physical science, mathematics, computer science and engineering – has attracted significant attention from industry and government agencies. The quest

for the ultimate limits of information processing leads to the microworld of individual atoms and photons. Quantum theory allows atoms, photons and other quantum objects to store information in an inherently new way. Controlling and manipulating individual photons, atoms and ions in a coherent manner could exploit properties of these quantum objects for a wide array of applications.

The potential economic impact of QIST is enormous – its applications hold promise to revolutionary advances in fields of science and engineering involving computation, communication, precision measurement and fundamental quantum science. For instance, quantum cryptography can create unbreakable codes and guarantee perfectly secure communication; and quantum computers, if they can be built in the future, will be capable of efficiently solving some problems for which there is believed to be no efficient classical algorithm. Other commercial applications include quantum frequency standards (for atomic clocks) as well as quantum-enhanced positioning (for new generation of GPS) and clock synchronisation (for a number of metrology applications).

## RCE : Well-Structured, Coordinated Effort in Quantum Information Research

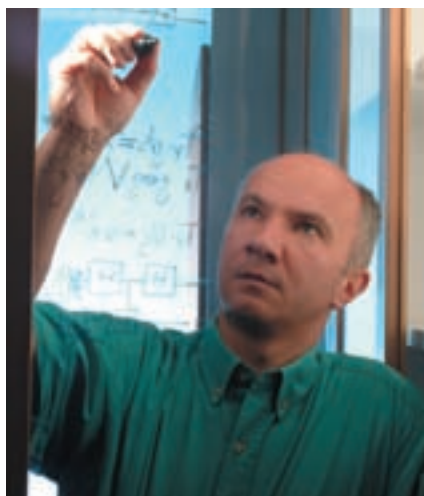
Over the last decade, centres and research institutes in QIST have been established in most of the US top universities, in many countries in Europe (including the United Kingdom, Germany, France and Austria), Canada, Australia, Japan and China. Singapore, with a good track record in mathematics of coding and cryptography, and a good engineering base for the development of cutting-edge technologies, has both

## First Research Centre of Excellence in Quantum Information Science and Technology Aspires to be among World Leaders in Five Years

Source: NUS press release 3 May 2007

the potential and the opportunity to be among the world leaders in information science and technology. The RCE in QIST, therefore, brings together teams of experts from the relevant contributing fields into a well structured and coordinated research effort, providing a significant focused interdisciplinary effort for Singapore to remain competitive in this field in the future.

Building upon an existing NUS research programme in quantum information, the RCE in QIST will develop quantum technologies and explore both the theory and practical possibilities of constructing quantum devices for the purposes of cryptography and computation. With the establishment of the RCE in QIST, the 30-member Quantum Information Technology Group will expand significantly to become a research centre comprising 210 researchers. There will be about 16 Principal Investigators (PIs), each leading a research team of post-doctoral fellows, postgraduate research students and support staff.



*Prof Ekert - Director of the RCE*

Prof Ekert is currently a Lee Kong Chian Centennial Professor at NUS and Professor of Quantum Physics at Mathematical Institute, University of Oxford. As the Director of the RCE, Prof Ekert has a proven track record in managing research centres of a similar nature. He founded and directed the first centre in quantum information technologies at the University of Oxford, an institution which is very prominent in setting the agenda and

research trends in the field. He has advised government agencies and research institutes in the EU, US and Japan on setting

up international and national projects in quantum information technology.

On his decision to take up the appointment, Professor Artur Ekert said, "I like challenges and setting up this new research centre for quantum information science and technology is indeed a challenge. After five years of on and off visits to Singapore, I know the place, I know its potential, I have good friends and colleagues and I am happy to be given the opportunity to spend more time in Singapore to run the first RCE."



Temporary laboratories and research facilities have been operational since December 2007. The RCE expects to move into a dedicated location and be in full operation by June 2008.

### Research Focus

In its first five years, the RCE in QIST will focus on the development of reliable quantum components and their interoperability, such as trapped ions and atoms. The subsequent five years will be devoted to integrating the quantum components and scaling them up – for instance constructing quantum structures on chips and using them to run quantum algorithms and quantum simulations.

Some examples of research projects that will be undertaken include developing advanced technologies to store atoms, ions and photons on micro-chips, creating light sources for electronic transfer of atoms and photons that store information for secure communication, and implementation of quantum computers.

The RCE in QIST will also collaborate with NUS research institutes, the Agency for Science, Technology and Research (A\*STAR), Defence Science & Technology Agency (DSTA) and DSO National Laboratories on both theoretical and experimental research on QIST.

\*The RIEC is chaired by Prime Minister Lee Hsien Loong, comprising several Cabinet Ministers and distinguished local and foreign members from the business, science and technology community. Dr Tony Tan is Deputy Chairman of the RIEC.



NUS President Professor Shih Choon Fong said, "NUS' proposal for an RCE in QIST was selected after stringent peer scientific review. It gives a boost to our continuing efforts to build global research excellence. Professor Artur Ekert is a pioneer in quantum information science and co-inventor of quantum cryptography. Under his leadership, this RCE promises to break new ground in this exciting field as well as attract other top-rate researchers in quantum information science and technology to NUS and Singapore."

# Students Then & Now

*I* studied biology more than 30 years ago at the former Nanyang University before pursuing higher degrees in the United States of America. My decision to study biology stemmed from my interest in understanding how living things live their lives.

My student life was spent mainly on campus. We stayed in hostels and would spend most of our time attending lectures, practicals and participating in club activities. My class was very close-knit as there were only 12 of us and we all went through all three years of undergraduate studies together, under one roof.

When not studying, the most significant activities that I can remember were movie nights and sports. Movies were played almost every night during the beginning of a semester. We played basketball almost every day.

During those days, the Faculty of Science at Nanyang University had only a few hundred students. Together with the University of Singapore, only 1% of primary school students could go to university. Polytechnic graduates were not admitted as they had already been given government subsidy for tertiary

education once. It was truly a privilege to be admitted into university. Parents felt very proud if their children entered university.

At that time, the curriculum was rather rigid and learning was based on text books and professors' notes. Some professors could use the same set of notes for years and could even memorise the page numbers of the text book they quoted from. There was a final exam that determined if you could go on to the next academic level, were repeated or expelled. Nowadays, the curriculum is more flexible and timely. It goes beyond text books. This is a great improvement.

Today, there are also more university places and polytechnic graduates are allowed to enter university. Students today have also changed. They are encouraged to challenge professors.

I have a few words for parents and future students: "To parents, let your children pursue their interests and passions. To future students, chase after your own dream. University days are the best time of your life. Believe me!"

\* Nanyang University was founded in 1955 and was merged with the University of Singapore to form the National University of Singapore in 1980.

*"To parents, let your children pursue their interests and passions. To future students, chase after your own dream. University days are the best time of your life."*



*Wong Sek Man, BSc '80 (Biology), Professor of Biological Sciences, is also Vice Dean (Special Duties) at the Faculty of Science Dean's Office. He is currently covering duties of Vice Dean in charge of undergraduate studies. Editor, Karen Wong caught up with Professor Wong at his office recently to discuss how life as a student has changed over the years.*



# Off The Benten Path

## Civil Service Student Internship Programme



*During the Special Term internship period of May to August 2007, year 3 Applied Mathematics major Tan Wei Ting decided to take the road less travelled. She applied for the*

*Public Service Department's Student Internship Programme (SIP). Her intention was to find out what the civil service is like as she felt that this might be a potential career path when she graduates in 2008. Suitable students are invited to apply online to the SIP. After a couple of rounds, Wei Ting was given an assignment at the Singapore Police Force, Operations Department, Licensing Division. This is what Wei Ting has to say about her internship.*

I did a report on the review of zoning policy for public entertainment and liquor licenses. For this report, I first had to understand the current zoning policy and its impacts. I was taken on a three-night tour of nightspots so that I could have a better understanding of the current situation. After that tour, I started reading through old files and did research on the relevant policies set by jurisdictions in other countries such as the United Kingdom.

During the internship, I attended a consultation session with major pub operators such as Mr Dennis Foo (owner of St James Power Station) and managers of Zouk, Café Del Mar and Ministry of Sound.

Overall, I had a great time at the licensing department. My supervisor was always available for consultation and he ensured that I enjoyed myself while doing the report. Other colleagues were just as supportive. The assistant director made sure that I had a memorable experience by arranging the night tours and consultation sessions.



*ASP Fadzil Rahman (Operations Officer - my supervisor), ASP Sim Wei Chung (OC of Public Entertainment and Liquor Licences) and DSP Marc E (Assistant Director of Licensing Unit)*

The three-night tour was definitely the most exciting part of my internship experience because I had never been to any pub before. Within three days, I visited at least 30 nightspots. On the first night, I followed the police raid to at least 15 pubs in Joo Chiat and Geylang. On the two other nights, I

was taken on guided tours around the major clubs. That was certainly a once in a lifetime experience.

The SIP experience helped me to gain an insight into policy making. I now understand the predicament which a policy maker is in. It is most definitely a challenging task to formulate a policy. Any decision

has to be weighed carefully as it involves achieving an outcome that seeks to balance differing needs between the residents and the entrepreneurs.

Another learning point from this internship is that cooperation between different government agencies is vital to ensure efficiency. For the licensing department, agencies such as Urban Redevelopment Authority and Singapore Tourism Board are often involved in the decision-making process. In order to

create a more vibrant city, different agencies must work hand in hand. Even though each agency has its own unique mission, the ultimate aim for all is to shape Singapore into a prosperous and safe country.

# Another **Good** Year

## Edwin Yang

President, NUS Students' Science Club  
28th Management Committee



The holiday period from June to August every year in Science is known affectionately to seniors as FOP Season. FOP stands for Freshmen Orientation Projects. The theme this year was the same as the last – “US! (United Science) Never Ending Passion, Concerted Efforts”. I believe that this year, as with all other years we have stayed true to this FOP motto. This year we successfully brought the vibrant NUS Science culture to freshmen

and seniors alike. Freshmen who came in looking all dazed and confused took these memorable and life-changing experiences acquired during FOP with them, gaining many friends along the way. This is extremely important to an undergraduate because life in university is one of independence. Gone are the days where people belong to small classes of 20 students where everybody knows everybody. In NUS, due to the modular system, everybody has to make friends on their own. However, in NUS Students' Science Club, we create these opportunities for Year 1s to interact with their seniors and Orientation Group mates.



## Jonathan Yew

Vice-President (Freshman Orientation Projects), NUS  
Students' Science Club  
28th Management Committee

## Freshmen Orientation Projects 07/08

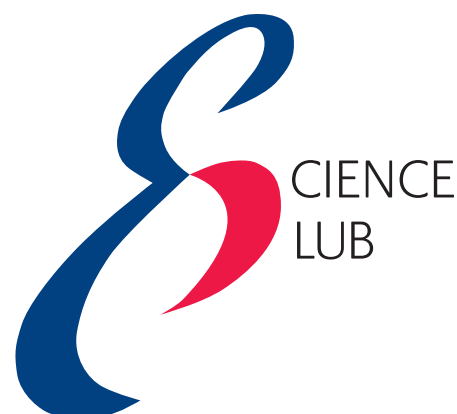
Can you recall how it like was to be a freshman? Can you recall the anxiety and nervousness of being in a new realm without knowing what to expect of a varsity life? Every year the NUS Students' Science Club will organise Freshmen Orientation Projects (FOP) with the objectives of welcoming, orientating and integrating new students into our dynamic Faculty of Science family.



On top of making our year 1s know the school better, FOP is a time where we help to infuse in them a love for the faculty. Faculty of Science is indeed a large but strong faculty that many other students from other faculties are envious of. All this does not come easy. Science Club together with the help of her members and seniors through our activities, help freshmen learn our culture and spirit. We are a faculty that is proud of our accomplishments and achievements. When we suffer a defeat we do not take it lying down but instead fight harder to emerge victorious again. This, I think, is what epitomizes what we call the "Science Spirit". All of us believe firmly in the pa buay toh saying which

means that we will never be beaten. This is what motivates us to excel and create this sense of belonging in all freshmen, who will be the next generation of leaders to pass this Science flame on, keeping it burning strong and bright.

I would like to thank all members of Science Club who helped make FOP Season 07 a resounding success as this would not have happened without their dedication and sacrifice. Science Club will continue fighting and improving to make FOP 08 even better and more memorable. Here's to another good year!



SCAMP (Science Camp) 2007 was a 4-day 3-night camp organized by the NUS Student's Science Club with the objectives of welcoming the incoming freshmen, providing them with a platform to familiarize themselves with the University's topography and also to develop bonds with their fellow friends and seniors through this fun-filled camp.

The theme for this year's SCAMP was "SCAMPsation" as we wanted the freshmen to have a sensational orientation camp experience. We had icebreakers to "melt the ice" between SCAMPers (a term we use for SCAMP goers) to allow them to interact and mingle with their new found friends. Other games such as "Fruity Night" were planned in for the camp to really inject the element of fun to SCAMP. "Pirates of the Curry Bean" was our very own version of a hunt for treasures and forge new bonds among participants.

A series of clues were provided to SCAMPers to get to places around the campus to hunt down treasure. Somehow amidst the fun the SCAMPers got to know the university campus' landscape better. If you were to ask an undergraduate what's the best part of university life, he/she would tell you it's



## SCAMP ScienceCamp



residential life. Having that in mind, we have planned a chance for SCAMPers to experience residential hall life by allocating them rooms at Raffles Hall during the period of the camp. "The Hunt", our own version of the Amazing Race was very well received by the freshmen. Teams competed in completing assigned missions to reach their final destinations. Teams went through a series of fun and interesting tasks such as face threading, photo-taking with Sam Sui woman at Chinatown, etc.

The Sun, the sea and the sand. Who doesn't love them? The beach! It seems like camps are not really fun without them. From "Body painting" till "War Game" we had them all in an action-packed day under the blazing sun. Although we were scorched, we truly enjoyed ourselves to the max. Every SCAMPer

### Alan Kwek

Director (SCAMP), NUS Students' Science Club  
28th Management Committee

was assigned a "Secret Pal" to spend their nights chatting with. The identities of the "Secret Pals" were kept a secret by having participants blindfolded and only revealed on the last day of the camp. After the revelation, the "Secret Pals" went through a once in a life time experience of "Dinning with the Sharks" at Sentosa's Underwater World. It was a truly romantic experience to have dinner with your "Secret Pal" on the traveller through tunnels with a myriad of marine creatures swimming above you! At that point in time you would really feel as if you were Ariel the little mermaid, oops!, or her boyfriend if you were a guy. SCAMP ended with a bash at Butter Factory where SCAMPers partied till they dropped.

Though SCAMP was over, the bonds forged and the memories still linger within everyone's heart. We do not know what the future holds but at least we know that we have made an impact in the lives of our science faculty's freshmen by welcoming them, orientating them and infusing in them the passion and the sense of belonging to NUS' Science Faculty – a place that would be their second home for the years to come.



**Pow Tian Si Zoe**

Director (SOW), NUS Students' Science Club  
28th Management Committee

# ScienceOrientationWeek

Science Orientation Week (SOW) 2007, which was held from 1 to 11 August 2007. It is an annual programme specially catered for Faculty of Science's freshmen. SOW is one avenue through which freshmen find out more about what to expect of varsity life and, most importantly, the familiarization to the Centralised Online Registration System (CORS). On top of that, there are numerous opportunities for them to get to meet new friends of their own so as to better prepare themselves for a new lifestyle in NUS.

This year's theme was "Tempus Revelat" which means "Time will reveal" in Latin. The theme was related to "time" as we hope that the incoming 07/08 batch of Science freshmen would be able to

overcome their initial awkwardness and unfamiliarity with the new environment over time and bond as one unified science faculty. Therefore, in line with the theme, this year's orientation houses were named according to the different time periods.

Tutorial rooms and lecture theatres became our only option for overnight accommodation as all halls of residence are not available for booking 2 weeks before the beginning of semester. Bed was sleeping bag on the cool tutorial room floor and shower was cold water in red pails. Many took a step out of their comfort zone. This would probably be the only time the students would experience such things in their entire NUS life.

We had amazing races, both in and out of NUS, where the freshmen not only got to know our campus' landscape better, but also forged stronger bonds within the OG (orientation group) through the various missions assigned to them at the stations located in different parts of Singapore. Of course, there were beach games in Sentosa. Ever tried playing heart-attack and snake-and-ladder in the water? A camp would certainly not be a camp without getting wet, sandy and burnt at the beach.

We had our "Secret Pal" too. Asking your "Secret Pal" out for a date? We had made it possible by having our "Secret Pal" finale as a trip to the cinema to catch the preview of "Rush Hour 3". It was certainly an experience that many would remember.

## Flag

A miracle. That would be two words that are most apt to describe Flag 2007. The hard work that had been put into preparations paid off when Faculty of Science was announced the winner of two awards: Best Total Coin Collection for Faculty Clubs and Gold Award.

Flag Day started off with a blast on 7 August. The event lasted from 7am till late into the night. Despite the long hours in the sun, the enthusiasm level was still kept high among our students. They were all flagging for a common goal – to help the 20 beneficiaries. While the Science Flaggers were out flagging, the Flag Committee was preparing welfare for them (mineral water and light refreshments) and to welcome them back.

The Faculty of Science had indeed united on this special event. Together, we will scale greater heights!

## Rag

Rag day is an annual event where the students take to the stage and perform with all their hearts to thank the public for their generous donations for Flag. Planning and coordinating a public performance is by no means an easy feat. It is through determination and passion as displayed by the students of the science faculty that makes every Rag a successful and memorable one. In the Faculty of Science, Rag is one of the most highly anticipated freshmen orientation programme.



# Rag&NUS

displayed at this year's Rag and Flag. It was held at the Padang for the first time on 11 August, in conjunction with the National Day celebrations. Riding on the theme Discover our Passion, Witness our Spirit, the science Rag team displayed a sterling performance of a Romeo and Juliet story with a dash of Bollywood.

It is with great pride and honour to a science student that the Faculty of Science won the following awards:

- Best Float Design for Faculty Clubs,
- Best Float presentation for Faculty Clubs,
- OSA Most Creative Float Award for Faculty Clubs.

Dinner & Dance (D&D) is the finale of the Freshman Orientation Project (FOP). Dinner and Dance is a time where we show our appreciation to the deanery, NUS administration, the seniors and freshmen who have helped NUS Students' Science Club in any way and contributed to the successful running of our organised activities and programmes. It was held in two parts – a Science Pageant and Manhunt Preview Bash and the D&D itself.

The Science Pageant and Manhunt Preview Bash was held on the 25 August at DXO. The theme for the bash this year was Façade, which is a

French word, which meant “Black”. This theme was chosen because we wanted our guests for D&D to come dressed in black.

Our contestants paraded in various outfits, one of which was formal wear. They wore dresses and suits of various colours and stood out from the crowd. D&D was the time when we crowned our very own Science King and Science Queen! They are chosen through voting via SMS – like Singapore Idol. Thus, we can say for sure that our Science King and Queen not only have brains, brawn and looks, but are also popular with their friends!

Please do not be mistaken that our other contestants weren't popular, because competition was really stiff. Mr. Moses Khoo and Miss Valene Chai were the most popular amongst the contestants, and walked off as our Science King and Science Queen.

The D&D is neither about looks nor competition. It was a time for everyone, especially students from the Faculty of Science to dress up and have a glamorous evening together, enjoying good ambience, good food and definitely good company!

It was a time for us to celebrate the friendships forged through the FOP, and to have one more event to remember our days spent together by.

D&D, being the finale of the FOP, was a time for everyone, especially our freshmen to really let their hair down and enjoy themselves before starting on studies proper. Pageant Contestants



## Dinner&Dance

**Jasmine Tay**

Director (D&D), NUS Students' Science Club  
28th Management Committee



French word meaning “a superficial appearance”. This theme was chosen to show the different facets of each contestant, from the various types of clothes they paraded in.

Everyone kept their eyes peeled and were eager to find out who would walk away being NUM Ambassador and NUM Girlfriend. At that night, Mr. Desmond Lim was crowned NUM Ambassador while Miss Vivian Ong was crowned NUM Girlfriend.

The D&D was a more glamorous affair and was themed “Noir”. It was held on the 1st of September at Carlton Hotel. “Noir” is again a

## Rag&FlagDay



**Ong Ting Li**

Director (Rag),  
**Fiona Teo**

Director (Flag), NUS Students' Science Club  
28th Management Committee



“Welcome to the Faculty’s Annual Awards Ceremony!” And so the Faculty Awards Ceremony began. This year, the Faculty of Science gave out 191 awards for teaching, research and service in a ceremony at LT31 on 11 January 2008.

The Awards aim to recognise and celebrate the achievements of faculty and support staff in teaching, research and service in their respective fields. This ceremony also paid tribute to a group of long serving and dedicated individuals in appreciation of their good and loyal services stretching 10 years and more.

Professor Tan Thiam Soon, Vice Provost (Education), graced the occasion as guest of honour, and handed out the Faculty Teaching Awards.

### *Faculty Teaching Awards*

◆ *The Teaching Excellence Awards* honoured 24 faculty members – the top 10% of teaching staff whose outstanding abilities and efforts in teaching are recognized and endorsed by the Faculty. Award winners are staff members, selected based on peer review, and student feedback.

*The Honour Roll* recipients have a proven track record of teaching excellence by being a Teaching Excellence Award recipient for the past 3 consecutive years. This year there were 4 superlative faculty members placed on the Honour Roll.

*The Excellent Young Teacher Awards* recognise outstanding young staff, under 35, who are nominated for Teaching Excellence Award. The two outstanding young teachers this year were Karthik Natarajan Balkrishnan and Wong Yean Ling.

*The Teaching Assistant Awards* recognise teaching assistants for their dedication and commitment by their departments. Twenty-nine teaching assistants – full-time and part-time – were recognised with this award.

# *Faculty of Science Academic Year*

*The Teaching Support Awards* honour dedicated technologists and laboratory officers for their dedication, service and support in their respective departments. They ensure smooth flow of operations in teaching and laboratory work. 19 Teaching Support Awards were given out.

*The Dean’s Meritorious Teaching Award* candidates must be teaching a module with an enrolment of more than 50 and obtain a score greater than the university average score in the annual student feedback exercise. Our first Meritorious Teaching



Award recipient was Adjunct Associate Professor Stella Tan Wei Ling, an alumna in Life Sciences who is a deputy public prosecutor in the Attorney General’s Chambers. She is the main lecturer in the General Education Module “Forensic Science”.



# Service Awards for 2006/2007

## ◆ Faculty Research Awards

**Outstanding Scientist Awards** are presented to 15 faculty members who undertake research based on their impact and strong research track record in their areas of expertise. The successful researcher must have consistently achieved peaks of research excellence over a period of time and should be recognised by the academic community as having achieved significant breakthroughs or outstanding accomplishments in his or her field. In addition, 5 young researchers were selected for the Young Scientist Award.

**The Outstanding Science Entrepreneur Award** went to Chemistry Professor Sam Li Fong Yau who started a 3-year collaborative project with the Singapore Institute of Manufacturing Technology (SIMTech) and the Institute of High Performance Computing (IHPC) to develop polymer microfluidic BioMEMS



devices. The aim of the project is to develop broad-based competency in various advanced technologies in the design, prototype and mass fabrication of polymeric microfluidic MEMS devices, with applications in the fields of life sciences and medical diagnostics.

## ◆ Faculty Service Awards

**Outstanding Service Awards** recognised 27 administrative and professional as well as management support staff who have performed or delivered service in an outstanding and exemplary manner, reflecting superior commitment to their work and their peers.

Long service and loyalty were also rewarded as 64 staff members who spent the better part of their adult lives received applause for spending 10 to 40 years working at NUS.



# Meet Our NEW Professors

# Academia

Promotions and Tenure

## Assistant Professor WU Zhengxiao

(Statistics & Applied Probability)

Mathematics modelling, Bayesian statistics, statistical filtering theory, nonparametric statistics, statistical computing, Hidden Markov Chains, stochastic processes with applications in engineering, biology and finance, probability theory

## Assistant Professor LEE Yu-Chia Joyce

(Pharmacy)

- Chronic disease management
- Patient care and education
- Setting up, maintaining and improving pharmacist-run clinics

## Associate Professor CHANG Young-Tae

(Chemistry)

- Chemical genetics using tagged small molecule library

## Assistant Professor LIU Ruchuan

(Physics)

Protein folding/refolding and protein-protein interactions at molecular level using bio- and nano-technologies and ultrasensitive analytical methodologies

## Assistant Professor HUANG Kuo-Wei

(Chemistry)

- Catalysis
- Synthetic and Mechanistic Organometallic Chemistry
- Functional Polymers
- Physical Inorganic Chemistry

## Assistant Professor WEE Hwee Lin

(Pharmacy)

- Cross-cultural adaptation of health related quality of life instruments for Asian populations
- Factors influencing health-related quality of life among Asians
- Computerised administration of health-related quality of life instruments
- Pharmacoeconomic evaluation of pharmaceuticals

## Assistant Professor Lin Qingsong

(Biological Sciences)

- Proteomics and Mass Spectrometry
- Protein Science
- Molecular Biology
- Cancer Biology

## Assistant Professor David Patrick Bickford

(Biological Sciences)

- Biodiversity (Herpetology)
- Conservation
- Evolutionary Ecology
- Biogeography and Systematics

## • PROMOTED

### Professor CHEN Yu Zong

(Pharmacy)

### Professor LIU Xiang Yang

(Physics)

### Professor GONG Zhiyuan

(Biological Sciences)

### Professor XU Xingwang

(Mathematics)

### Associate Professor Markus WENK

(Biochemistry and Biological Sciences)

## • PROMOTED & AWARDED TENURE

### Associate Professor FAN Wai Yip

(Chemistry)

## • AWARDED TENURE

### Associate Professor ZHOU Weibiao

(Chemistry)



# A\*Star Awards

# In the Forefront



*"I am delighted to announce that the Faculty of Science has once again done NUS proud at the National Science & Technology Awards 2007 last night."*

Professor Andrew Wee  
Dean, Faculty of Science

## NATIONAL SCIENCE AWARD

The Award recognises research scientists and engineers in Singapore who have made outstanding contributions in basic research leading to the discovery of new knowledge or the pioneering development of scientific or engineering techniques and methods.

### Assistant Professor Ng Huck Hui

(Biological Sciences)

*"For his outstanding research in gene regulation in stem cell biology"*

### Professor A.J. (Jon) Berrick

Associate Professor Wu Jie

(Mathematics)

*"For their fundamental work on the deep connections between algebraic topology and the theory of braids"*

## YOUNG SCIENTIST AWARDS

This Award recognises young researchers who are actively engaged in R&D in Singapore, and who have shown great potential to be world-class researchers in their fields of expertise.

### Dr Yu Fengwei

(Biological Sciences)

*"For his research on neural development and neurological disorders"*

*Retired Associate Professor of Chemistry, Lawrence Chia*, was awarded the Friend of Alumni Award by the Alumni Association of the King Edward the VII College of Medicine and the Faculties of Medicine, Universities of Malaya & Singapore. Dr Chia has, for many years, been closely associated with alumni relations. Since retiring, he has concentrated efforts on alumni relations and development in the Faculty of Science. "This special award is in recognition of Alumni friends who had contributed to the success of the Alumni Association Southern Branch over the years."

*Associate Professor of Statistics and Applied Probability, Chen Zehua*, was appointed to the Board of Directors of the International Chinese Statistical Association for three years from 2008 to 2010.

*Associate Professor of Chemistry, Koh Kian Ping*, has been invited to join the programme committee of the European International Diamond Conference. The 14 members of the programme committee are recognised as the top diamond researchers in the world. Prof Koh, who is deputy head of the chemistry department, also sits on the organising committees or international advisory panel of Materials Research Society's MRS Symposium (USA), the New Diamond and Nanocarbon Conference (Asia), and the Hasselt Diamond Workshop, organised by the Hasselt University in Belgium.

*Professor Anthony Kuk, Head of the Department of Statistics and Applied Probability* has been appointed as an external academic advisor for the Bachelor of Business Administration Honours Programme in Management Statistics offered by the Department of Management Sciences, City University of Hong Kong. This appointment is for four years from 2007 to 2011.



## The Inter- Faculty Games 2007-2008 Swimming Meet

The Inter- Faculty Games 2007-2008 Swimming Meet was held at the Sports and Recreation Centre Olympic Pool on a warm Saturday afternoon, 15 September 2007.

The following staff represented Faculty of Science at the swimming meet.

### Men

*Prof Andrew Wee (Team Coordinator)*

*A/Prof David James Young*

*Dr Lin Qingsong*

*Dr Li Mo*

*Dr Tan Heok Hui*

*Dr Wang Xingang*

*Mr Andreas Dewanto*

*Mr See Sin Hon*

### Women

*Ms Teo Chwee Hoon*

### Our Achievements

Leader of the Faculty of Science swim team was the Dean, Andrew Wee who set a new record for the 100m Breaststroke, clocking a time of 1:23.01. Prof Wee also claimed the top spot in the 50m Breaststroke.

In the 50m Freestyle event, Dr Tan Heok Hui from Biological Sciences and Prof Wee claimed the top two placements. Dr Tan edged out Prof Wee by 0.72 sec!

Chemistry's Professor David James Young and Dr Wang Xingang from Physics were placed second and third respectively, for the 100m Freestyle.

For the 50m Backstroke event, Dr. Lin Qingsong from Biological Sciences came in first.

The Faculty of Science Men's Teams 1 and 2 also won the Gold and Silver medals respectively in the 4 x 50m Freestyle Relay.

In the women's events, debutant, Ms Teo Chwee Hoon from the Dean's Office, faced stiff competition and won the second spot for both the 50m and 100m Breaststroke.

The swimming meet provided the staff with excellent opportunities to keep healthy and have fun at the same time.



*The of 4x50m Freestyle Relay Teams 1 and 2*



*Photo of Dr Tan Heok Hui receiving the Gold Medal for the 50m freestyle event*



*A delighted Ms Teo Chwee Hoon*

## In the News

- ◆ Professor Andrew Wee, Dean of Science, comments on science studies being excellent preparation for knowledge economy (TODAY, 23 Jul)

***"Top banks and finance firms prefer to hire grads from the hard sciences. They have strong analytical and quantitative skills – much needed in finance."***

- ◆ [Physicsworld.com](http://Physicsworld.com) (27 Sep and 3 Oct) highlighted two works by our physics Professors.
  - **Professor Li Baowen** and Material Science student **Wang Lei**, previously published in Applied Physics Letters and Physics Review Letters on the importance of phonon heat impulses that can be used to carry information.
  - **Professor Feng Yuan Ping's** article in Physics Review Letters introduced Singapore's creation of a carbon-doped magnetic semiconductor.
- ◆ Chemistry **Professor Andy Hor** has put Singapore on the cover of prestigious journal **Chemical Communications** (November 2007). Previously, his effort put Jurong Island on the cover of the same journal.

# FoS Calendar of Events

(Jan 2008 - May 2008)

## January 6-9

- 5th Asian Conference on Ultrafast Phenomena

## January 6-9

- 1st Japan-Singapore Bilateral Symposium on Catalysis

## January 10

- Drug Delivery Symposium on the occasion of Prof Hans Junginger's 65th Birthday

## January 11

- Faculty Meeting and Awards Ceremony

## January 14 – May 11

- AY 2007/08 Semester 2

## January 30

- Lunch Time Talk: Effects of Surface in Nanostructures by A/Prof Wang YueSen

## February

- Science Mentorship Programmes launch
- CHIP 2 Symposium
- Department of Statistics & Applied Probability 10th Anniversary Celebrations
- Graduate Safety Orientation Training

## February 1

- National Undergraduate Research Opportunities Programme Congress

## February 13

- Lunch Time Talk by Prof Lee Baowen

## March

- CHAOS Competition
- Science Research Programme 08 begin
- Singapore Chemical Science Fair

## March 2-3

- Symposium on Pharmacovigilance of Converging Technologies

## March 5-7

- 2nd Singapore Lipid Symposium

## March 15-16

- NUS Open House

## March 27

- Lunch Time Talk by Prof Mohan K Balasubramanian

## April

- Chemistry Honours Symposium 2008
- CRISP Award
- SP2171 Congress

## April – May

- Undergraduate Discretionary Admissions Interview Exercise
- Outstanding Undergrad Research

## April – August

- JC/School Outreach Roadshows

## April 4

- Pharmacy FYP Poster Competition

## April 24

- Science Lunchtime Talk by Prof Kuok Meng Hau

## May

- Science Open House
- Chemistry China Immersion Program 2008
- SRP Congress
- Registration of Science Focus
- Scholarship and Award Interviews
- Safety Seminar
- PharmSc @ Asia Symposium in Nanjing
- Statistics Enrichment Camp

## May 10 – July 31

- Summer Internship Programme for Indian Students (SIPIs) 08

## May 26 – 29

- Physics Enrichment Camp

## May 29

- Lunch Time Talk by A/Prof Koh Hwee Ling





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