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理學院通訊 Newsletter



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Issue 43, December 2011

Season's Greetings

*to you and your loved ones
during this holiday season.*

*With warmest regards,
Faculty of Science*



Alumni and Retired Teachers Return

for Alumni Homecoming 2011



Children viewed sunspots through a telescope, courtesy of the CUHK Physics Alumni Association.

On 4 December 2011, thousands of the University's alumni returned to our campus in celebration of Alumni Homecoming 2011. Alumni, many of whom accompanied by family and friends, enjoyed a full schedule of performances, talks, games, and tours, bringing back many warm memories of their days as a student.

At the Science Faculty, we were pleased to be joined by current and retired teachers in welcoming back our alumni at a tea reception. Many alumni also took the opportunity to visit the three booths affiliated with



the Faculty of Science, set-up at University Mall. We hope to see more and more of our alumni revisit our Faculty at the annual Alumni Homecoming. Below are some highlights of the day's activities:



Antidote to Chronic Illness

- Herbal Medications and Tumours

nature, concentration and absorption by the body. If too much is consumed, slowing down the speed of discharge, they accumulate and become what's known as "toxicity" which is detrimental to health. The best way to detox is to be regular in habit, moderate in eating and drinking, and to consume more natural foods. Processed foods contain more added chemicals and therefore should be avoided.'

Detoxification, which means the removal of toxic substances from the body for better health, is very much in fashion. The number of popular detox agents is overwhelming. Where do toxicities come from? How are they removed? **Prof. John HO Wing-shing** of the School of Life Sciences, explains, 'All foods we consume are chemicals but how toxic they are depends on their chemical

When he joined CUHK in 1994, he continued to study how to strengthen liver function in order to boost the body's detox capabilities. But during the process, he made a new discovery. Professor Ho was looking for natural agents that would enhance the human body's detox function and had thought that he should be able to find a singular active molecule in Chinese medicine, that treasure trove of medical knowledge with a long history. He went through a

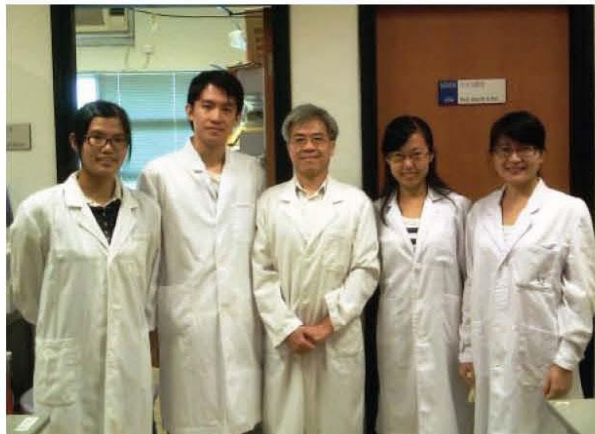




great number of books and documents in Chinese medicine, in particular, those on pharmaceutical formulae focusing on liver function, and found that they all contain the ingredient licorice root or *Radix glycyrrhiza*.

He extracted various active components from the plant, and tested them on different liver cancer cells in the laboratory. He had acquired many liver tumour cells, rats' and humans', those induced by hepatitis B, for use in testing the efficacy of licorice root extracts.

'We extracted and did tests with active ingredients from a selection of 40 Chinese herbs related to liver function, including *Hedyotis diffusa*, *Phyllanthus urinaria* Linn, *Scutellaria barbata* D. Don, and what are commonly known as snow lotus herb and black mustard seed. We did repeated tests, and results accumulated.'



Professor Ho (centre) and his research team.

After preliminary achievements in the Petri dish, Professor Ho and his team began doing tests on rats, and after much hard work, received encouraging results. They found that preparations made from *Agrimonia pilosa* Ledeb, *Andrographis paniculata*, and *Radix gentianae* are very effective in treating liver tumour, while a certain licorice root essence is good for combating prostatic tumour. These are substantiated through repeated tests on rats, and have passed toxicity and mechanism tests. They also observed that another licorice root preparation is effective on liver tumour, but it has yet to be tested on rats.

From studying detoxification to the discovery that hope for removing tumours can be found in licorice root, Professor Ho has put in a lot of hard work; his interest in Chinese medicine research has also grown. Besides tumour research, he discovered that a licorice root preparation is shown to have an effect on stomach ulcers in rats. His greatest wish is to have the financial support to carry out pre-clinical trials. 'To be able to cure patients and do good to society is the most any scientist can ask for,' he says.

Credit: **CUHK Newsletter Issue no. 384**, 04.10.2011.

Biology Student Blogs for SCMP at London International Youth Science Forum



Opening ceremony of the London International Youth Science Forum

Convinced that science was not a boring and nerdy subject, Biology undergraduate student applied to attend a conference to meet youth from

around the world who were also passionate about science. The student wrote an essay on what he thought were the greatest threats to our oceans, which won him one of two opportunities to attend the London International Youth Science Forum (LIYSF), held between 16 - 30 August 2011 from Hong Kong, sponsored by the British Council. Throughout his trip at the Forum in London, U.K., he wrote a series of blogs for the South China Morning Post's Young Post, sharing his experiences with fellow youth.

While at the LIYSF, he attended many lectures given by leading scientists, gained first-hand knowledge from visits to industrial sites and research facilities. Seminars and discussions also challenged participants to think not only about the scientific value of advances and breakthroughs, social, economic, and cultural impact.





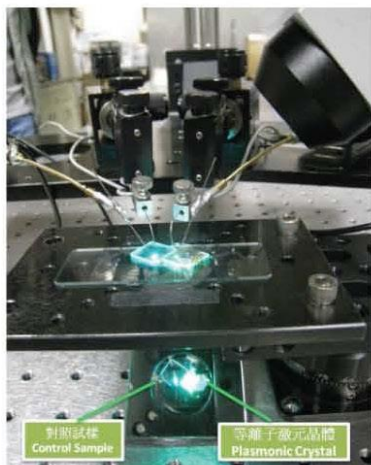
The LIYSF, in fact, was not the first time that he had taken his studies beyond the CUHK campus. During 2010-2011, he took a year of absence to take part in an international internship hosted by AIESEC in India. For his internship, he and fellow young people worked for a social enterprise to develop and run a job placement service via SMS technology. Thanks to his internship, he stepped outside his comfort zone and into an entirely foreign community to address the needs of the people. This experience has humbled and helped him realize that being optimistic and having a vision for how to change the world is meaningless unless there are realistic and concrete plans to make the vision reality.

He feels very fortunate to have been given these opportunities to expand his horizons. His experiences have taught him the importance of

working together with others and the value of interdisciplinary knowledge. Most importantly, he knows that in order to succeed, we must be proactive and seize opportunities we come across in life.

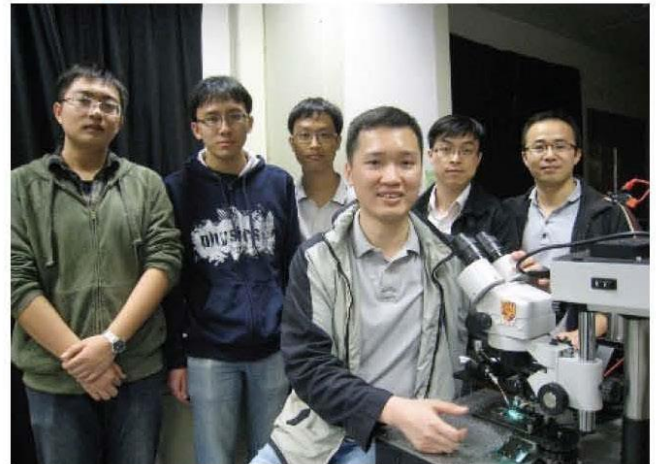
Green Project Boosts LED Efficiency

The green project named 'Rational Design of Plasmonic Crystals to Increase the Efficiency of Light-Emitting Diodes (LEDs)' led by **Prof. Daniel ONG Hock-chun** from the Department of Physics was one of 18 technological innovations showcased at the China Hi-Tech Fair in November 2011. The project has greatly contributed to energy saving and emission reduction, as well as advancing TV and display screen technology.



The comparison of emission efficiency between LED with plasmonic crystals (right) and untreated LED

Though LED lamps are more long lasting, they are also more expensive and not as efficient as fluorescent lamps. Besides, a few problems in LED technology have yet to be solved. One of the major problems is that the refractive index of its semiconductor materials will cause a large proportion of light to be lost due to total internal reflection, thus limiting the efficiency of LED and leading to higher cost, weaker thermal management

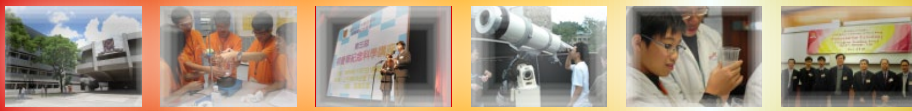


Prof. Daniel ONG Hock-chun (front) and his research team

and shorter lifespan.

Professor Ong and his research team have invented a means to 'attach' plasmonic crystals on LED to increase luminosity. Testing showed the LED capped with plasmonic crystals is four times brighter than those without treatment. The use of plasmonic crystals has very little impact on the cost of LED lamps. Since metal is invariably used as electrode for carrier injection, plasmonic crystals can serve not only as electrode but also as a facilitator to increase light emission efficiency of LED in future. This is a new and promising way to drastically improve the efficiency of LED lamps, contributing to a greener environment and advancement in the LED illumination industry.





Science Kit for Gifted Students

A teaching and learning kit targeted for gifted secondary students has been published by the Centre for Promoting Science Education, Faculty of Science, to encourage self-learning. The *Teaching and Learning Kit: A Science Enrichment Programme for Secondary 3-4 Students* is compiled by CUHK academics whose aim was to share their experience in educating gifted young people, and in designing appropriate curriculum to inspire students to grasp the fundamentals in biology, chemistry, mathematics and physics. The kit has two versions and each is tailored to meet the needs of teachers and students. Both English and Chinese editions are available, with supplementary CD ROMs. The kit has been disseminated to 486 secondary schools and educational institutions free of charge.



Teaching and Learning Kit: A Science Enrichment Programme for Secondary 3-4 Students has been published by the Faculty of Science.

Studying Fish in Troubled Waters Studies on Hong Kong Water Quality Monitoring

You may not know this but Shing Mun River in Shatin is inhabited by a great number of African carp, a river fish that hangs out in large schools and grows and breeds rapidly. As Shing Mun River's water quality is generally considered dubious, anglers are few and far between. The fish were introduced by the government to reservoirs to help get rid of mosquitoes because they have a reputation for eating almost anything and they're also effective at keeping algae in check.

Director of the Environmental Science Programme at CUHK, **Prof. CHAN King-ming** said that what Hong Kong refers to as African carp is not really carp, but is so named because of its resemblance to the said species. African carp is in fact tilapia and comes from the cichlid family of fishes. They live in brackish water and are commonly found in tropical and subtropical regions all over the world.



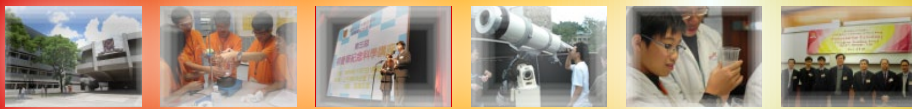
Prof. CHAN King-ming (second from left) and his research team

Professor Chan explained that tolerance for pollution varies among different species. Some such as salmon cannot live in unclean environments, but African carp is highly tolerant and adaptable. In fish, as in humans, the organ responsible for processing and getting rid of pollutants is the liver. Hence fish with stronger liver function - such as the

African carp - are better at dealing with pollutants, in particular, metals. Fish weaker in this department would have trouble surviving in Shing Mun River and made it difficult to collect samples for research. The African carp's high toxicity tolerance makes it an ideal indicator of the presence of metal pollutants in Shing Mun River.

For years, Professor Chan has been using this fish to monitor the river's water quality. He said, 'If we want to understand how contaminants affect the ecological system and how chemicals harm





human health, we can use biomarkers to assess the potential risks of the contaminants. Otherwise those chemical concentrations in water and sediments are just figures with no real meaning.'

Professor Chan said that Hong Kong's water quality is acceptable because the city's industrial and agricultural sectors are far from thriving, and on top of that, the government has the right measures in place. The most uncontrolled pollution comes from urban emissions, in particular, waste water released directly into the sea via roadside rainwater drains by eateries, shops, garages and wet markets.

Protein-rich African carp is tasty braised or steamed. But care must be taken to remove the liver and

other internal organs before cooking — standard procedure for preparing any fish. Popular in China, Taiwan, and Southeast Asia, it's one of the world's main farmed fishes with a production volume of over a million tonnes a year. 'There are many types of African carp. In Hong Kong alone, you see four or five,' Professor Chan pointed out. 'Someone tried to raise African carp using seawater. The result was nice, crunchy flesh and none of the "muddy taste" that Hong Kongers are known to dislike. But it's not easy to change impressions and tastes, so the fish never made it to the dinner table. In any case, it's contributing to scientific research and that's worthwhile.'

Credit: **CUHK Newsletter Issue no. 382**, 04.09.2011.

Homecoming for Life Sciences Students

Pursuing Their Summer DREAM



Returned students of the DREAM programme shared their experiences at a homecoming ceremony

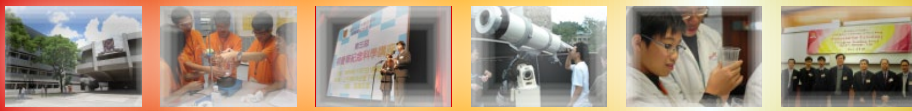
15 undergraduates and postgraduates from the School of Life Sciences who participated in its summer DREAM (Dedicated Research Exchange and Mentorship) internship programme this year were welcomed back at a Homecoming ceremony. The students finished their research projects on various interesting scientific topics such as seafood allergy, cancer-related proteins, and biofuel at top overseas universities and institutions, including Harvard University, University of California at Berkeley, University of Tübingen and Academia Sinica. During the ceremony, they shared their research projects and their eye-opening experiences gained from the DREAM programme with other school members.

The programme aims to provide opportunities for year one and year two students to conduct scientific research projects in laboratories at prestigious institutes overseas, and to increase their exposure to the frontiers of life science research. Before embarking on their research journey, students will be coached by supervisors in the School to learn the basic techniques and background information related to the projects they are going to participate in.

Prof. CHU Ka-hou, Director of the School of Life Sciences, remarked, 'The School of Life Sciences is committed to providing ample training opportunities for our students beyond the classrooms. The DREAM programme is one of such initiatives and has proved to be very successful in promoting research and the pursuit of excellence among our students.'

Since the programme was launched, more than 40 students have been sent to overseas institutes around the world, including reputable universities such as Harvard University, University of California, Mayo Clinic, University of Toronto, and Imperial College London. Many past participants have published papers in highly-cited international journals, while some were offered scholarships to pursue a PhD, or invited to spend a year as exchange students at their host institutions.





Risk Management Science Students Win the 2011 DBS-SMU Quantitative Finance Challenge



Members of the winning team (from 2nd left to 5th left) are WANG Weiyin, TANG Tsz Wang, CHUNG Shing Fung and NGAI Ki Sum of the RMSC Programme

A team of four students from the Risk Management Science (RMSC) programme of the Department of Statistics at The Chinese University of Hong Kong claimed the championship at the 2011 DBS-SMU Quantitative Finance Challenge organized by the Singapore Management University and the Q.E.D. Quantitative Finance Society of Singapore recently.

The DBS-SMU Quantitative Finance Challenge - currently in its fifth-year running - pits students from tertiary institutions against one another in two rounds of mentally grueling contests in the field of financial derivatives and risk management. This is the first year the organizer invited tertiary institutions from Hong Kong to join the challenge.

The preliminary round is an hour test comprising 40 MC questions. The top eight scorers in each region proceeded to the final round, including five RMSC students. The finals consisted of a case study of pricing and hedging of a derivative product. Sixteen finalists, divided into four teams, were given the case one week in advance. The winning team, composed of **CHUNG Shing Fung, NGAI Ki Sum, WANG Weiyin** and **TANG Tsz Wang**, all students of the RMSC Programme at CUHK, made an impressive presentation of the case solution to the panel of judges by applying risk management and finance knowledge and offering recommendations for improving the product. The winning team was awarded a cash price of \$10,000.

Staff News

- Staff Honours

Prof. WEI Juncheng of the Department of Mathematics has been appointed as Wei Lun Professor of Mathematics.

Prof. CHAN Ngai-hang, Professor of Statistics and Chairman of the Department of Statistics, received the Econometric Theory Multa Scripsit Award for his cumulative contributions to advancing econometrics research and his sustained publishing efforts in the Econometric Theory published by the Cambridge University Press.

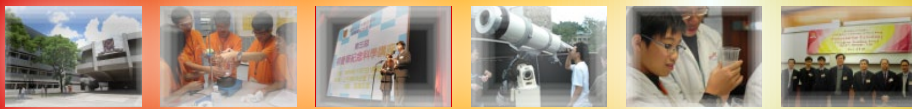
- Staff Appointment

Prof. Thomas AU Kwok-keung of the Mathematics Department has been appointed as Assistant Dean, with effect from 1 November 2011.



~ Hearty Congratulations ~





Popular Science Lectures Explain the Science Behind the 2011 Nobel Prizes

On 25 November 2011, more than 180 students and teachers from secondary schools and the CUHK attended the "Popular Science Special Lecture Series: How to Win a Nobel Prize?". This year, the Faculty was pleased to offer two talks, one on the 2011 Nobel Prize in Medicine or Physiology (given by **Prof. KONG Siu-kai, School of Life Sciences**) and another on the 2011 Nobel Prize in Physics (given by **Prof. CHU Ming-chung, Department of Physics**). Audience members were eager to learn the scientific merit of the award-winning research projects, and asked many questions to fulfill their curiosity. This event was well-received by many students and teachers.



More than 180 audience members attended the popular science lectures, eager to learn about the award-winning research projects.

Teachers and Students Mingle at Sci Fac Trip 2011

More than 30 students and teachers of the Faculty engaged in some barbeque fun at Tai Mei Tuk, Tai Po, as part of the annual Sci Fac Trip on 5 November 2011. During the trip, students and teachers relaxed and socialized over delicious food, and students from different major programmes took the opportunity to get to know one another.



Dean's Honour List 2010/11 cum Faculty Exemplary Teaching Award 2011 Ceremony

The captioned event is scheduled to be held on Saturday, 14 January 2012 between 10:30a.m. - 12:30p.m. in Lecture Theatre 1, Lady Shaw Building.

理學院通信 Faculty of Science Newsletter

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