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FROM THE EDITOR

Dear readers,
Drug discovery and development are extremely important areas of research. In this issue of *Science@HKU*, HKU chemists report their latest findings in medicinal chemistry and how their discoveries could potentially save the lives of patients. In addition, you will find the farewell message from Professor Sun Kwok, who had served as the Dean of Science for the past ten years.

Yours sincerely,
Professor Hoi Fung CHAU
Chief Editor

Novel Medicinal Chemistry Discoveries that could Impact **Treatment of Diseases**

Foreword by Professor Pauline CHIU, Dean of Science

The development of drugs to treat diseases is a very important research area as well as a multi-billion dollar industry. What many do not recognise is that often, the research for new drugs first begins in chemistry or other basic sciences, where researchers are striving to understand fundamental principles, that eventually found applications in medicinal research. Further developing these discoveries for drug development is the field called "medicinal chemistry". In this feature, you will find stories like that of Dr Xuechen LI, who developed a new chemical reaction to synthesise peptides, that eventually enabled him to synthesise the antibiotic daptomycin; or Professor Chi-ming CHE's research in inorganic chemistry which produced metal-containing compounds that turn out to be very potent anti-cancer compounds; plus other research accounts as well. Good science underlies all successful applications, including drug development that will put the next new-generation drug on the shelf in the pharmacy.

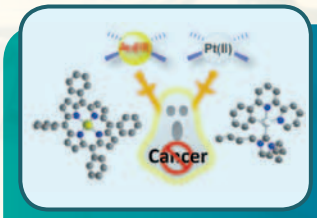
Metal Medicines and The Quest for Non-Toxic Natural Compounds from Traditional Chinese Medicine for ***Cancer Treatment***

Professor Chi-Ming CHE

Cancer remains a life-threatening disease in spite of tremendous advancements in treatment options including conventional chemotherapy and new targeted therapy, and there is an urgent need for more diverse anticancer drugs with new modes of action that can improve current cancer treatments. Built on the strong foundation of the Area of Excellence programme in Drug Discovery and the State Key Laboratory of Synthetic Chemistry, the research team led by Professor Chi-Ming CHE, Dr Hui Wai Haan Chair of Chemistry, has pioneered the research into anticancer metal medicines and gained international reputation for development of original, innovative metal based drug leads. The team has invented a series of patented anticancer metal drug leads, with the most notable being the gold(III) and platinum(II) compounds.

Like many serendipitous drug discoveries, the remarkable anticancer activities of these gold and platinum compounds in both cellular and animal models were initially unexpected, and through further optimisation, the anticancer applications of these metal compounds may now become realistic. To improve the anticancer efficacy, the metal compounds are formulated into nanoparticles of defined sizes, which act like Trojan horses that specifically penetrate the tumor and deliver the killer compounds to battle the cancer cells. To study how the anticancer metal compounds work, novel chemical biology strategies are applied to append a "bait and hook" moiety on the molecules to capture the cellular drug-binding protein targets which are then identified by proteomic techniques.

Furthermore, the team has made a breakthrough in developing luminescent metal compounds as probes that detect aberrant DNA structures for cancer analysis. Practical and efficient green synthesis of drug molecules has been devised with the uses of biocompatible, inexpensive iron catalysts. The team is also working to develop new formulation of cisplatin that preferentially targets to cancer cells without affecting the drug efficacy, which would definitely bring happy news to cancer patients. Emphasis is also paid on the chemistry and biology of natural products from Chinese medicines with discovery of novel bioactive compounds for treatment of cancer and neurodegenerative diseases. The eventual quest is to develop the untapped resources of non-toxic natural products from traditional Chinese medicines for cancer treatment and prevention. This would be the next breakthrough in Medicine after the seminal work of Nobel Laureate Youyou Tu on Artemisinin. An interdisciplinary collaborative programme involving chemistry, biomedical sciences and clinical medicine has been established to put forward the drug discovery to clinical stage. "We regard that HKU has the capability to excel in therapeutic metal medicines and the chemical biology of natural products from traditional Chinese medicines, and to showcase original, innovative inventions in drug discovery," Professor Che said.



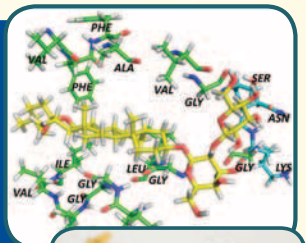
The innovative anticancer metal compounds, which have the gold or platinum ions inserted like a gem into ring-like or pincer-like organic ligands, possess distinct structural features for interactions with the molecular targets of cancer cells to exert the cancer killing effects.

The Papers

"Anticancer Gold(III) Porphyrins Target Mitochondrial Chaperone Hsp60"
in *Angewandte Chemie International Edition* 2016, Volume 55, Issue 4, pages 1387-1391.

"Luminescent platinum(II) complexes with functionalized N-heterocyclic carbene or diphosphine selectively probe mismatched and abasic DNA"
in *Nature Communications* 2016, Volume 7, Article number: 10655.

Natural products from TCM provide unique opportunities for drug discoveries. The right panel shows a model of how a natural saponin molecule (yellow skeleton) from TCM interacts with the amino acid residues of amyloid precursor protein (a drug target of Alzheimer's Disease) by molecular simulations.



The Paper

'Identification of "sarsasapogenin-aglyconed" timosaponins as novel Aß-lowering modulators of amyloid precursor protein processing'
in *Chemical Science* 2016, Advance Article.
DOI: 10.1039/C5SC02377G

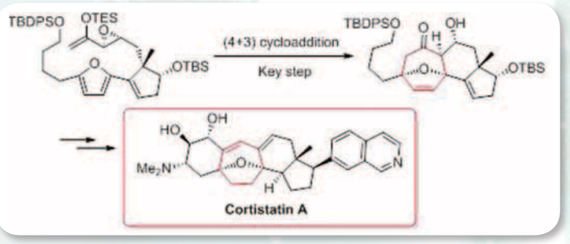
Mitigating Growth of Cancer Tumours with Effective Molecule Synthesis

Professor Pauline CHIU (in the middle) and her research team

Professor Pauline CHIU's research team has successfully achieved a formal total synthesis of cortistatin A, a molecule which could help mitigate the growth of cancer tumours. The findings were published in *Chemistry — A European Journal* recently. This novel strategy of synthesising the molecule was deemed to be "highly important" by the refereeing panel, and usually less than 10% of manuscripts receive such a positive review.

Cancer is a disease characterised by an abnormal and unregulated growth of cells. Nevertheless, cancer tumours cannot grow larger than 2 mm unless it is accompanied by angiogenesis, which is a development of the blood vessel network needed to nourish the tumour and enable it to metastasise. Thus, angiogenesis-inhibiting molecules could help to mitigate the growth of cancer tumours. Currently, Avastin® is an anti-angiogenic drug in clinical use for the treatment of a range of cancers. Cortistatin A is a natural product isolated from an Indonesian marine sponge that has been shown to have potent anti-angiogenic activity at low dosages. Apart from being a lead compound in the development of anti-cancer therapies, a derivative of cortistatin A has also been found to be a powerful anti-HIV agent.

Cortistatin A is difficult to be harvested from natural sources, and thus its laboratory synthesis is a way to obtain quantities of it for further research and drug development. Professor Chiu's strategy to this molecule, implemented together with two PhD students Liping Kuang and Lok Lok Liu, applied a (4+3) cycloaddition reaction which was developed and optimized in her lab to make the central seven membered ring structure.



Key step in the synthetic route to cortistatin A

The invention of new chemistry reactions is an extremely important field of research, because each new reaction is an enabling tool, and can open doors to the synthesis of many important molecules. In this case, the cycloaddition reaction the team developed is the key step in their strategy that enabled their synthesis of cortistatin A to be accomplished efficiently.

The impressive biological properties and complexity of the structure of cortistatin A have motivated many renowned chemists worldwide to synthesise this molecule. The efficient route that Professor Chiu developed affords the highest total synthesis yield of cortistatin A reported in the world so far. The yield exceeds that of a semi-synthetic route developed in the Scripps Research Institute, and is over 7-fold higher than the total synthesis developed at Harvard University. Using this route, cortistatin A and its analogues can be more efficiently synthesised to facilitate further medicinal chemistry research to improve its efficacies toward drug development.

Previously, Professor Chiu and her group also accomplished the first total synthesis of pseudolaric acid A, an anti-angiogenic natural product isolated from a Chinese medicinal herb, *tujingpi*."

The Paper

"Formal total synthesis of (+)-cortistatins A and J"
in *Chemistry — A European* Journal 2015. Volume 21, Issue 41.
DOI: 10.1002/chem.201502890

Dr Xiang LI (in the middle) and his research team and collaborators

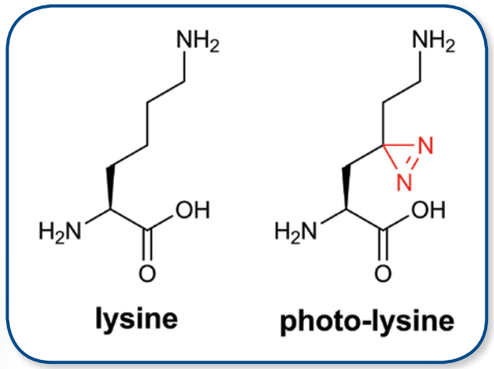
Studying Protein-protein Interactions in Living Cells

The research group led by Dr Xiang David LI has developed a novel chemical tool for deciphering complex protein networks of a cell — the elementary unit of life. The disorder of such cellular networks often leads to severe human diseases such as cancer and Alzheimer's disease. The findings were recently published in a top-class scientific journal — *Nature Chemical Biology*. This is the first time that a study led by Hong Kong researchers was published in this prestigious journal.

The main components of a cell are macromolecules called proteins; they are chief actors of most cellular processes and determine the structure and function of the cell. Like most jobs in human society, the 'jobs' in the cell cannot be done by one single protein, but require a teamwork of thousands of different proteins, which physically interact to form protein-protein interaction networks or protein 'social networks'.

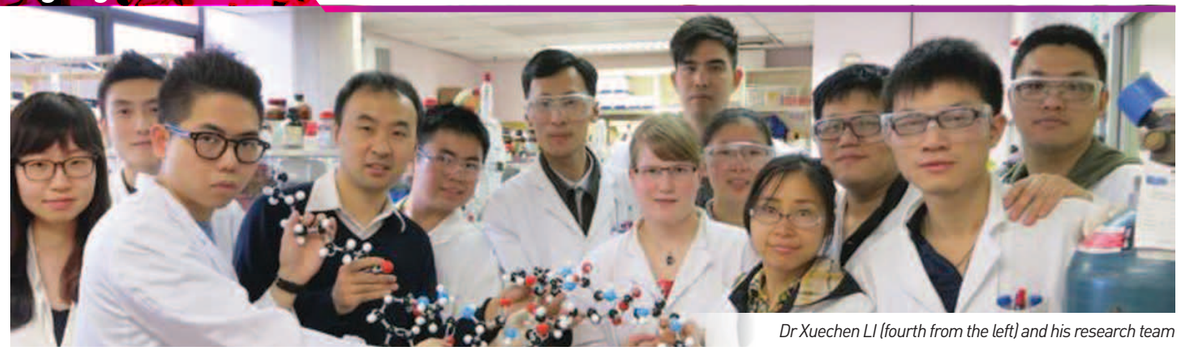
Errors in the regulation of these protein interactions can cause severe human diseases such as cancer. The mapping of proteins and their interactions are thus a fundamental challenge in modern biology with important applications in disease diagnosis and therapy.

Unfortunately, proteins do not use Facebook or Twitter, making it difficult to know proteins' 'social networks'. For many years, researchers have been looking for a reliable method to discover cellular protein-protein interactions. To tackle this challenge, Dr Li's group decided to send a 'spy' into cells for surveillance of cellular protein interactions. They designed and synthesised an unnatural amino acid call photo-lysine. Because of its high similarity with lysine, one of the 20 natural amino acids — the building blocks of proteins, photo-lysine serves as an excellent 'undercover agent' that easily deceives cellular protein synthesis machinery, so as to be incorporated into proteins without disturbing normal cell function. Importantly, photo-lysine also carries a light-activated 'spy camera' — diazirine group, which is able to 'capture' every interacting partners of a protein of interest in the cell when being exposed to ultraviolet (UV) light. With this new chemical tool, scientists can now map mysterious proteins interaction networks in cells, which will help us to gain more comprehensive understanding of human disease and provide direction for therapy development.



The Paper

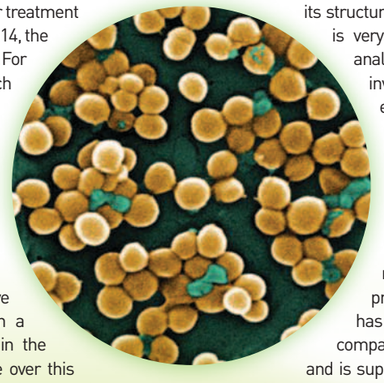
"Photo-lysine captures proteins that bind lysine post-translational modifications"
at *Nature Chemical Biology 2016, Volume 12.*
http://www.nature.com/nchembio/journal/vaop/ncurrent/full/nchembio.1990.html



Dr Xuechen LI (fourth from the left) and his research team

Towards Developing New Antibacterial Drugs

The increasing threat of antibiotic resistance to the public has prompted an urgent need to develop new antimicrobial agents for treatment of bacterial infection. According to the WHO report in 2014, the antibiotic resistance threat is a current and global issue. For example, common community-acquired infections such as pneumonia do not respond to all currently available drugs in clinical settings. To date, a lack of appropriate antibiotic for treatment of bacterial infections has become an imminent clinical and public health issue. However, due to the relatively low profit margin associated with the sale of these antibacterial drugs and the high risk of rapidly losing clinical application value upon the inevitable emergence of resistant organisms, few big pharmaceutical companies have interests in developing new antibiotics, resulting in a lack of new drugs being launched to the market in the past decade despite a rapid surge of resistance rate over this period. This dilemma of the urgent public need but few interests from pharmaceutical companies provides academic research laboratories with both responsibilities and opportunities for the development of new antibacterial drugs.



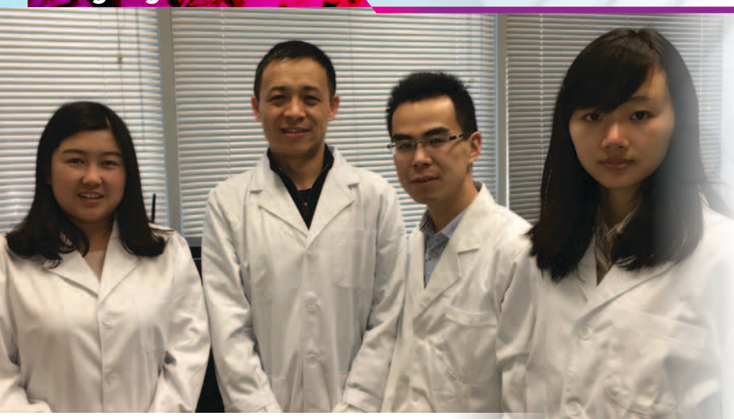
Electronic microscope image of Staphylococcus aureus

Since 2009, Dr Xuechen LI's team has been working on the medicinal chemistry of new antibiotics, by molecularly editing existing antibacterial drugs. Such an approach has been very successfully used to generate several generations (more than 30) of penicillin-based antibiotics in history. Instead, they are working on the development of daptomycin-based next-generation antibiotics. Daptomycin is a newly developed antibiotic with a different mode of action from other types of antibiotics, being very effective against Methicillin-resistant Staphylococcus aureus, vancomycin-resistant enterococci and vancomycin-resistant Staphylococcus aureus. Due to its structural complexity, structural modification on daptomycin is very difficult, limiting the possibility of generating its analogues. To overcome the problem, Dr Li's team has invented necessary and new chemical methods which eventually enabled them to complete the world's first total synthesis of daptomycin in 2013. From there, the team has produced more than 100 daptomycin analogues for antibacterial screening, from which they have identified several analogues with improved potency and broader antibacterial spectrum against both daptomycin-susceptible and resistant pathogens. These candidates are under the preclinical evaluation now. Dr Li's work on daptomycin has attracted interests from several pharmaceutical companies, including Cubist that produced daptomycin, and is supported by RGC GRF, RGC CRF, 973 programme and Shenzhen Peacock programme.

The Papers

"Protein Chemical Synthesis by Serine and Threonine Ligation"
in *Proceedings of the National Academy of Sciences of the United States of America 2013, Volume 13, Issue 16.*
http://www.pnas.org/content/early/2013/04/04/1221012110.full.pdf+html

"Total Synthesis of Daptomycin by Cyclization via a Chemoselective Serine Ligation"
in *Journal of The American Chemical Society* 2013, Volume 135, Issue 16.
http://pubs.acs.org/doi/abs/10.1021/ja4012468



Dr Xiaoyu LI (second from the left) and his research team

Encoding Entity of Chemicals with DNA Barcodes

Developing a new drug typically starts from screening millions of compounds so-called "chemical libraries" against a drug target, often a key protein implicated in a particular disease, aiming to discover "hit compounds" that can inhibit the drug target. After the initial hit discovery, more focused medicinal chemistry optimisation can then be carried out to refine the hit compound, leading to further testing in animals and clinical trials in humans. Recently, a new screening approach called DNA-encoded chemical libraries (DECL) has emerged in drug discovery. In DECL, each compound is connected to a unique DNA tag, serving as a "barcode" encoding the chemical entity of the compound. The whole library can be screened at the same time, and hit compounds can be deconvoluted by PCR-amplification and DNA sequencing to "read" the barcode.

Dr Xiaoyu LI's research group has been working on the methodology development for DECLs. For example, the researchers devised a "universal template" strategy that can synthesise the entire library with just a single DNA, regardless how many compounds in the library. This strategy has greatly streamlined the process of library construction. On the other hand, previously DECLs can only be screened against purified proteins outside their native habitat, e.g. the cells. They have also developed an enabling method that has realised the screening of libraries against drug targets directly in cells or on the surface of live cells. Hit compounds generated from these scenarios are expected to be more biologically relevant and have higher rate of success in the later stages of drug development.

Besides discovering novel drug candidates, they are also interested in identifying previously unknown targets for existing drugs. In collaboration with biologists, they discovered that terazosin, an anti-hypertension drug marked under the name of Hytrin for more than twenty years, has a new target of pgk-1 and thereby they elucidated the underlying mechanism of the novel protective effect of terazosin in sepsis. This type of research could facilitate the repurposing or multi-purposing of known drugs for new diseases.

Launch of HKU Royal Society of Chemistry (RSC) Accredited Chemistry Programme

Facilitates Recognition of Specialised Chemistry-Major Curriculum

Professor Guanhua Chen, Head of Chemistry

The Chemistry Major has long been popular among the 16 Science Majors in the 6901 BSc Programme. While the curriculum* only requires students to take 96 credits of Chemistry courses for the Major, there are always some students who study a significantly greater number of credits in Chemistry to enhance their proficiency in the subject. In order to cater for students who follow the typical curriculum to broaden their education in other areas, as well as students who wish to specialise in chemistry, an intensive version of the Chemistry-Major programme (144 credits) accredited by the Royal Society of Chemistry (RSC) recently is now offered alongside with the regular programme.

The Royal Society of Chemistry in the UK is one of the world's leading chemistry communities and professional associations. The RSC accreditation is a rigorous evaluation process that is respected around the world. "The accreditation of our programme by RSC is a strong recognition of the excellent standards and high quality education that we offer to our students. We are delighted to be the first university in Hong Kong to receive the RSC accreditation for a BSc Chemistry Programme," says Professor Guanhua Chen, Head of Chemistry.

This RSC accredited Chemistry programme is built upon the regular Chemistry-Major curriculum. The comprehensive coverage of different branches of chemistry and solid training in practical and laboratory work in the accredited programme further enhance the chemistry proficiency of students. This programme is open for Chemistry-Major students who are admitted to year 1 studies in 2015-16 and thereafter (but within the period of accreditation validation). Students who have successfully completed the RSC accredited chemistry programme will be awarded a certificate by the Department of Chemistry, with authorisation by RSC, to recognise their achievements. All students in the final year of this accredited programme are qualified to apply for membership to RSC. A graduate with RSC membership will have an advantage, not only when applying for jobs, but also when they are seeking professional qualifications, such as Chartered Chemist (CChem) status. The RSC accreditation will further increase the visibility and recognition of our Chemistry programme and also enhance our students' chances to pursue higher education and obtain employment both locally and overseas.

For further information about this new RSC accredited Chemistry programme, please visit:
http://www.chemistry.hku.hk/download/RSCAccreditedChemistryProgramme_20151211.pdf

**A typical 4-year BSc curriculum comprises 240 credits with the following components: 96 credits of courses for the major; 18 credits of courses for university language requirement; 36 credits of Common Core courses; and 90 credits of elective courses, or courses leading to a minor or a second major.*

Interview with Professor Andy Hor, Vice-President and Pro-Vice-Chancellor (Research)

Treasuring the Core Values of Science

Positioning ourselves as Asia's global university, excel in world-leading research is undoubtedly an established pillar for HKU. As science students we always ponder how scientific research can have impact in society, and what we can do with such knowledge. Admittedly, we seldom think out of the box. The holistic science education, however, requires us to think more about the fundamental values of science. We are grateful to have Professor Andy Hor, Vice-President and Pro-Vice-Chancellor (Research), to talk about the future of science in terms of the core values of research that echoes with the Senior Management Team's proposition of 3+1 Is in their vision, namely 'innovation', 'interdisciplinary', 'internationalisation' and 'impact'.

Fostering Interdisciplinary and International Collaboration

While recognising the importance of basic research in different science disciplines, Professor Hor strongly encourages researchers to cross the border and explore collaboration opportunities. "There are some areas we can definitely consider ourselves as world-leading. This is good, but over time you need to bring them to other communities, say engineering, medicine, architecture and even social sciences." Professor Hor sees great potential for HKU Science to interact with various disciplines and reach out further. "While we are developing our strengths, building the pillars and going for world excellence, we should also grasp collaboration opportunities and make an impact there. The interdisciplinary base has a lot of potential. If we do it well, it will be the future for HKU. And of course, links to international collaboration are exceptionally important too."

Innovation is the Key

Rich opportunities always arise from creative solutions to global challenges. "Don't copy and be innovative!" Professor Hor opined. He believes that how we turn science into impact determines its value. "We must be novel, be original and have our own ideas. Innovation is actually the hallmark of all scientists. I mean it's always good to learn from others, but it is also crucial to think about our uniqueness before turning our strengths into ideas and impact." Professor Hor regarded complacence a great hindrance for progression when society moves along. "We should always look forward to tomorrow, a completely different and highly competitive world. Living in this dynamic world, you got to respond swiftly, or else you will stay or in lag behind. That's why we should keep thinking about the future. There's always room for improvement in research," Professor Hor advised. From his words and wisdom, we see the perseverance of scientists and the spirit of" you can always do it better".

Creating Impact to the Community

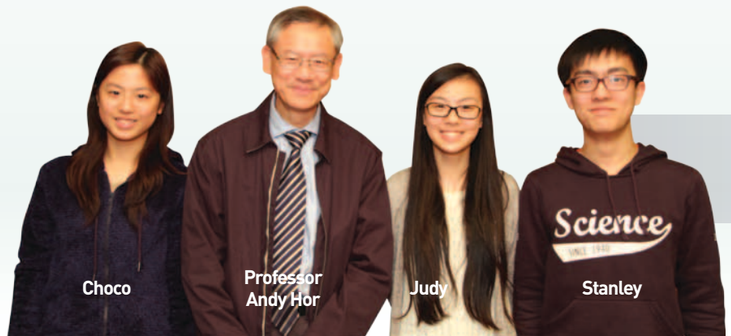
To Professor Hor, amplifying research influence positively in the community is most essential. "Impact is how you make use a body of knowledge to make influence, be it scientific, social, economic or technological impact. For instance, if one discovers new theories which supersede the old ones that everybody bases on, he is making a significant scientific impact. Such impact cannot be underestimated for it could be very influential on others' research." Professor Hor hopes that Faculty members could continue to make positive contribution in people's life in two ways—building basics and striving for innovations simultaneously. He believes, only with these two principles and premises, what scientists do will be well-received by the community. People will think this research work means something to my life, thus its value will be manifested. "So from the researcher's point of view, you have to think about creating values to the community," he added.

Words for Students

When being asked about how to broaden students' horizon, Professor Hor made an insightful remark. Apart from developing one's own subject specialisation, students should be exposed to interdisciplinary culture as, inevitably, new skills have to be picked up and applied when we change jobs. Hence, mono-development of a single skill alone is far from adequate. He foresees the future demand in work force would be challenge-addressing and problem-solving, where students have to deal with novel and dynamic situations. "My advice for students is you should equip yourself with disparate skills. You should develop soft skills, managerial skills and also leadership skills. This is what I meant by "T-bar" development, with both horizontal and vertical developments." Professor Hor said.

Most Science students have a concern on whether we could secure a bright future with a range of opportunities. "If you are good, you won't be short of chances. Opportunities are everywhere and there are plenty even outside Hong Kong." Professor Hor's words hit the mark with a single comment. "HKU is a special name. It does not just produce graduates or scholars, it also nurtures and trains leaders."

Fellow students, your future is in your hand. Seize your chances!



Profiles of Students Reporters:
Stanley Lee (Year 1 BSc student, Chairman of Science Society)
Judy Tso (Year 3 BSc student, Internal Vice-Chairman of Science Society)
Choco Ng (Year 2 BSc student, Former Internal Vice-Chairman of Science Society)

Undergraduate Environmental Science Research Published in Peer-reviewed Journal

An ambitious group of undergraduate students in the Environmental Field and Lab course examined the water quality of Hong Kong's swimming beaches with international standards established by the WHO, and their findings were recently published in a peer-reviewed journal, *Marine Pollution Bulletin*.

The students were trained to utilise essential analytical techniques applied to real-world environmental problems during the course. They learned that Hong Kong's antiquated system of measuring *E. coli* is underestimating health risks to swimmers. Realising the problem, they continued their research for 1 year further on their own time after the course. They investigated whether there was a difference in the outcomes for Hong Kong water quality assessment between using empirical enterococci measurements and using the *E. coli* data from the Hong Kong Environmental Protection Department's monitoring programme. Their data were collected, tested, analysed and the results were recently published in the aforementioned journal.

Their supervisor, Dr David Baker of School of Biological Sciences, The Swire Institute of Marine Science and Department of Earth Sciences, is delighted about their achievements. "I am happy that the University is moving towards a system where teaching and research are not mutually exclusive. To me, undergraduate publication is the ultimate learning outcome," Dr Baker said.

The Paper

Pui Kwan Cheung, Ka Lai Yuen, Ping Fai Li, Wai Hing Lau, Chung Man Chiu, Suet Wai Yuen, David M Baker.
"To swim or not to swim? A disagreement between microbial indicators on beach water quality assessment in Hong Kong."
in *Mar Poll Bull* 2015.
DOI:10.1016/j.marpolbul.2015.11.029

Students collecting beach water sample.

Hear from our Students

Kylie Ka Lai YUEN

2015 BSc graduate (major in Environmental Science)

"Living in an urban city, we tend to forget that we are very much connected to nature and relying on its resources. Hopefully, the new findings can raise public awareness that human health goes hand in hand with environmental protection. From sample collection to experimental design to data analysis, our journey to publishing this article was not smooth though. We encountered unforeseen obstacles and setbacks along the way, but making continuous improvements by trial and error is what makes this a truly fruitful learning experience."

Pui Kwan CHEUNG

2014 BSc graduate (double major in Environmental Science and Geography)
2014 Exchange study at the University of Edinburgh, UK
2013 Founding member, the Society of Environment Science, Faculty of Science, HKU
2011 – 2012 Academic Secretary, Greenwoods, HKUSU

"Publishing the results of an undergraduate research project in a scientific journal was an achievement that I've never thought of! It was indeed a long and difficult journey which would never be completed without the concerted effort by our group members and the support from our supervisor Dr Baker. I believe all the passion that I have in Environmental Science stems from my desire to protect the natural environment. Studying Environmental Science at HKU was the best decision I've ever made in my life. Few things in life are happier than devoting yourself in a subject and a career that you love. Environmental Science didn't make me a fortune, but it made every day of my university life a happy day, and most importantly it made me realise the importance of having the courage to choose a subject that you love, instead of a subject that the society loves."

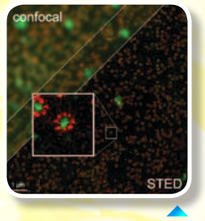
Brainteaser

Prize: $50 book coupon
Deadline: July 31, 2016

Question

Stimulation emission depletion (STED) microscopes were first developed about 10 years ago. They are somewhat modifications of confocal microscopes, yet have significantly higher resolution (between 30 - 80 nm) than the traditional fluorescent and confocal microscopes (see the image below). However, it is still a type of light microscope. According to the resolution calculation equation of light microscopes developed by Ernst Abbe in 1870s: $d = 0.5\lambda/NA$, the resolution limit for a light microscope is ~200nm. Does the STED microscope contradict with the Ernst Abbe's equation? Why?

Please email your answer together with your name and school (for students), to scinews@hku.hk. **FIVE** winners will be drawn randomly from the contestants who give the correct answer.



Comparison of the confocal and STED microscopy.

Question of last issue

Birds are a group of theropod dinosaurs that share their closest common ancestor with deinonychosaurian theropods, a group of animals that include the famous Velociraptor (a type of 'raptor' dinosaur). Some deinonychosaurs have been suggested to have had gliding abilities, but as of yet none of these have been shown to be true powered flyers. How do we know that some deinonychosaurs glided? Is this hypothesis still well supported?

Answer

There are hundreds of exquisitely-preserved Chinese deinonychosaur fossils with feathering that included true flight feathers. The latter feathers have an asymmetrical shape that allows them to generate aerodynamic lift, the principle that is copied less skillfully in aeroplane wings. Yes, this hypothesis is still well-supported and is in fact becoming more robust as more feathered deinonychosaur fossils are being discovered.

Sun Shines in Science

Reminiscences of a Decade as Dean of Science

by Professor Sun Kwok, Former Dean of Science

"It seems like only yesterday that I arrived in Hong Kong on Chinese New Year's Eve in 2006 to start my appointment as HKU's first executive Dean of Science. After being away from Hong Kong for 39 years, I was attracted to this position because of the opportunities for science education reform and the expansion of HKU's research and scholarship.

The Government mandated 3-3-4 system offered me the chance to carry out a comprehensive review of science education at the University. My first priority was to reform the curriculum and ensure that it was relevant to the modern world. I strongly believe that the purpose of university education is to help students develop as thinking intellectuals and prepare them to contribute to humanity and society in a variety of ways not limited to a single vocation.

To achieve these goals, we undertook a series of measures, including the introduction of a flexible major/minor system, Faculty common admission, experiential learning requirements, an academic advising system, creation of the interdisciplinary major Environmental Science, introduction of academic induction, undergraduate Summer Research Fellowship and Overseas Research Fellowship, and science service courses for engineering and medical students. Particularly dear to my heart was our one-year core sequence of new Science Foundation Courses, which our external examiner called "some of the best in the world". Seeing the reforms take root was the greatest satisfaction of my tenure.

Another of my greatest joys was the opportunity to recruit academic staff from every corner of the world. Over the last ten years, we welcomed new colleagues from many different countries. Diversity and commitment to global recruitment are key to our Faculty being recognised as a major player in the international science community.

I am also glad that I had the opportunity to teach a common core course for the last six years. Although my position as Dean did not require me to teach, I believed that it was important for me to engage directly with students. My course allowed me to put my belief in the integration of humanities and science into practice.

Bidding Farewell to Professor Sun Kwok for his Deanship

Professor Sun KWOK, our first appointed Dean has stepped down from his appointment as Dean from this February, after 10 years of dedicated service in the Faculty of Science. He will continue to teach and conduct research in space science and astronomy in the Faculty.

It has been my privilege to work with a group of wonderful people in the Faculty of Science. The selfless dedication of some of our colleagues renews my faith that there is still good in this world. To them, I express my deepest gratitude.

We have many very smart students and talented scholars in this Faculty. I regarded it as my duty to provide an environment that allowed them to develop to the fullest of their potential. To what extent I have succeeded will be seen in the coming years.

Although I am not a graduate of HKU, I now consider myself part of the HKU family. I actually get sentimental every time I see the HKU logo or hear the University anthem. I will do my best to continue to enhance the reputation of this University through research and teaching.

I want to thank the University for giving me the chance to serve in this capacity for the last ten years. I will forever treasure this experience."

Faculty members and friends bidding farewell to Professor Sun Kwok.

Young Scientist Scheme (YSS) –

An Enriching Early Research Experience for Outstanding Students in 6901 BSc Programme

As a strong, research-oriented faculty, the Faculty of Science is committed to providing our students with the best science education and incubating future scientists. To open the window of research frontiers to exceptionally talented students, a **Young Scientist Scheme (YSS)** will be launched from academic year 2016-2017, of which outstanding undergraduate students can have a taste of early research experience during their studies in the 6901 BSc degree curriculum.

Students in YSS are guaranteed with:

- Enrolment in our flagship Summer Research Fellowship (SRF) Scheme to conduct research under the supervision of our professors in the first summer
- A further SRF or Overseas Research Fellowship (ORF) in a foreign institution in subsequent years
- International exchange study
- Attendance in international scientific conference on frontier research
- Guidance from a research mentor individually from the start of the undergraduate study
- Enrolment in our Frontiers of Science Honours Seminar to learn how our award-winning professors solve their research problems
- An entrance scholarship ranging from HKD 20,000 to HKD 40,000#
- Stipends for research programmes

 # Scholarship for Non-JUPAS students are considered on a case-by-case basis.

From academic year 2016-2017 on, JUPAS students admitted to 6901 BSc programme with a total score of 31 or above in their best 5 HKDSE subjects (Category A subjects and M1/M2) are **automatically** accepted to YSS. No interview is needed. Selected Non-JUPAS students (local and overseas) will also be invited to enroll in YSS. Other students who are not admitted to YSS can still compete for SRF, ORF and/or international exchange during their study.

For further information about YSS and our 6901 BSc Programme, please visit http://www.scifac.hku.hk/yss and http://www.scifac.hku.hk/ug/prospective-student respectively.

YSS participants are guaranteed to go on exchange in one of the following universities:

North America
- University of California (Berkeley and Los Angeles)
- University of Chicago
- Columbia University
- Johns Hopkins University
- Stanford University
- Yale University

Europe
- University of Cambridge
- Imperial College London
- University of Oxford

Examples of institutions in which Overseas Research Fellowship has been held in the past years:

North America
- California Institute of Technology
- Columbia University
- Cornell University
- MIT
- Stanford University
- University of California at Berkeley
- University of California at Los Angeles

Europe
- CERN
- University of Cambridge
- University College London

Achievements

External Awards

Professor Ngai-Ming MOK, Edmund and Peggy Tse Professor in Mathematics, Chair of Mathematics, was elected as ***Member of Chinese Academy of Sciences*** (Mathematics and Physics) on December 7, 2015. There were 61 Members and 12 Foreign Members elected in the meeting, and Professor Mok was the only local scholar attaining such achievement in this election.

Professor Vivian Wing-Wah YAM, Philip Wong Wilson Wong Professor in Chemistry and Energy and Chair Professor in the Department of Chemistry, was elected as the ***Foreign Member of Academia Europaea*** (The Academy of Europe) during the meeting held in Darmstadt, Germany in early September 2015. Professor Yam was the only Foreign Member elected in 2015 under the Chemical Sciences Section of the Academy for her distinguished achievements in the discipline. She was also elected as the Leader of the Year Award 2015 (Education/ Professions/ Technology & Innovation) by Sing Tao News Coporation Limited.

Professor Guochun ZHAO, Department of Earth Sciences, received the ***Khwarizmi International Award (KIA) (First Class)*** in The 29th KIA ceremony held by Iranian Ministry of Science and Technology in Tehran on March 7, 2016. There were 9 awardees this year and Professor Zhao was the first geologist who won this award.

Mr Harrison Kin Cheung LI, Year 1 science undergraduate student, won the **Second Runner-up Award** in Famelab Hong Kong 2016 competition organised by by the British Council. HKU also received the **Best Institution Award** for its keen participation in this competition.

Faculty Awards

Dr Wing-Yee LUI, School of Biological Sciences, received the ***Faculty of Science Award for Teaching Excellence 2014-15***, for her outstanding teaching performance and the continuous efforts she has put in arousing students' learning interests.

Dr Timothy WOTHERSPOON, Faculty of Science, received ***Faculty Excellent Teaching Assistant Award 2014-15***, for his contributions in outstanding performance in providing teaching support and interaction with students.

Mr Siu-Wai LAW, PhD student under the supervision of Professor Yvonne Sadovy of School of Biological Sciences, received the *Faculty* ***Excellent Teaching Assistant Award 2014-15***, for his enthusiasm in providing teaching support during classes.

Ms Ada CHOI, Faculty of Science, and **Ms Helen LEUNG**, School of Biological Sciences, received the ***Faculty Award of Outstanding Non-academic Staff 2014-15***, for their excellent performance among non-academic staff.

Ms Ada CHOI

Ms Helen LEUNG

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