香港大學
THE UNIVERSITY OF HONG KONG

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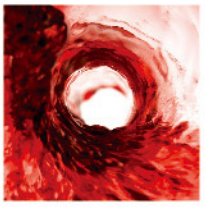
MARVEL AT THE COSMOS

Discovering new secrets of the universe

The Magic of Red Wine
A natural remedy for oral health



Heralding a New Era
A glimpse of the new campus surroundings

Contents

Challenged by Audience

Tony Blair Speaks on Faith and Globalisation at HKU

Rt Hon Mr Blair and Professor Daniel Chua, Head of the School of Humanities

Mr Blair discusses the impact of faith and globalisation on Hong Kong and the wider world.

A strong respect for freedom of speech and a diversity of views was clearly demonstrated when the Rt Hon Tony Blair, former Prime Minister of the United Kingdom, was at HKU on June 14, to deliver a keynote speech called 'Globalisation – its impact on Hong Kong and the wider region'.

The lecture inaugurated the partnership between the Tony Blair Faith Foundation's global network of leading universities, the Faith and Globalisation Initiative and HKU's Faith and Global Engagement Initiative.

In his lecture, Mr Blair told his audience: "This part of the world is one of the fastest areas of growing Christianity as well as many other faiths. HKU has a steadfast commitment to scholarship and freedom. The basis for the Tony Blair Faith Foundation's Faith and Globalisation Initiative is similar. I am delighted and honoured to be partnering with HKU, I could not think of a better partner or a better part of the world."

Mr Tom Grundy, a Briton living in Hong Kong, interrupted the lecture. He walked towards Mr Blair and said: "Mr Blair, under Hong Kong's Power 101 law – the law which allows for citizen's arrest here – I'll be arresting you for crimes against peace."

Mr Grundy accused him of alleged violations of the UN Charter, the Nuremberg principles, and the Geneva and Hague conventions.

After a brief exchange, the former Prime Minister suggested: "You've made your point, so why don't you let me get on with making mine? Thank you very much."

Mr Grundy was prevented from getting close to the speaker, but was not arrested and was allowed to stay on campus.

After his speech, Blair officially signed a Memorandum of Understanding between the Tony Blair Faith Foundation and HKU. ■

Mr Blair signs a Memorandum of Understanding with Pro-Vice-Chancellor Professor Chow Shew-ping.

The New Face of Teaching Excellence
Dr David M Pomfret Takes HKU's Second Consecutive UGC Teaching Award

Mr Edward Cheng, Chairman of the University Grants Committee (second from the left), and Members of the Selection Panel of the 2012 UGC Teaching Award with the three recipients – Dr David M Pomfret (third from the left), Professor Liu Zhiqiang (fourth from the left) and Professor Shekhar Madhukar Kumta (fourth from the right)

For the second year running, an HKU academic has been named for the annual University Grants Committee (UGC) Teaching Award. This year, Dr David M Pomfret, Associate Professor in the Faculty of Arts, was one of three recipients of the prestigious Award. Professor Richard A Glofcheski of the HKU Department of Law was one of the two UGC Teaching Award winners in 2011.

Dr Pomfret was also one of the recipients of HKU's Outstanding Teaching Award in 2010.

In announcing its decision, the UGC noted: "Dr Pomfret's scholarly interest in the changing nature of youth has led to a radical reimagining of the history curriculum, and of the learning process. He has demonstrated a powerfully compelling use of new technologies in education that integrate students and teachers into a real partnership of teachers and learners. Dr Pomfret has a record of sustained contribution through his intellectual leadership at a programme, faculty and institutional level. In his many leadership roles, he has championed, and been a model for, the importance of quality teaching."

Dr Pomfret joined HKU in 2001 and received the University's 2006–2007 Outstanding Young Researcher Award and its 2010 Outstanding Teaching Award.

Vice-Chancellor and President, Professor Lap-Chee Tsui is pleased with the news, saying: "It is truly encouraging to note that our colleagues have been honoured with the Award in two consecutive years since its inception. This is clear evidence of the excellent quality of teaching and learning at the University."

2012 UGC Teaching Awards were selected from 15 outstanding nominees who were selected by their own institutions. The other two recipients of the Award are Professor Shekhar Madhukar Kumta from The Chinese University of Hong Kong and Professor Liu Zhiqiang from City University of Hong Kong. ■

Standing out from 15 nominees, Dr Pomfret receives the UGC Teaching Award.

HKU Dentists Have a New Reason to Smile
A Contemporary Teaching and Learning Space for Dental Students Opens

Interactive white boards can be found in every room in the Problem-based Learning Suite to facilitate synchronous large screen engagement.

Faculty of Dentistry welcomes new students with the re-designed Problem-based Learning Suite.

The new Problem-based Learning Suite that has just been opened at the Faculty of Dentistry incorporates international design trends for learning space, while catering to a generation of tech-savvy students. The project has been two years in the making, has included student and staff consultations throughout the planning stages, and reworks the existing space at the Faculty to better accommodate the scheduling needs for this year's double cohort of students.

The Suite's design integrates technology with architecture, thus complementing the Faculty's 'blended learning' philosophy of moving beyond standard classroom teaching methods. Frosted glass walls make the most of natural light and create a greater feeling of openness, but also provide a sense of privacy.

Small group sessions are facilitated by a range of equipment, including interactive white boards that can be synched to large screen displays, 3D animations, videos and critical-thinking software. As with the rest of the University, there is WiFi support throughout. Two adjacent rooms, with an intervening glass divider, allow real-time observation and two-way discussion, and can be used for staff development. And a new student common room space provides a lounge-like feel for students to relax in and collaborate. ■

Apart from the newly furbished Problem-based Learning Suite, the Virtual Reality (Haptics) Training Unit room is installed with new Virtual Reality Haptics MOOG Simulators too.

HKU Welcomes a New Curriculum, Campus and Century

September has always marked the start of the academic year at HKU, but this year it was also, in many ways, a special historical milestone. In this final chapter in a series about the University's centenary, we take a look at the campus at the start of HKU's second century.

"In its first 100 years, the University has been guided by the spirit of Freedom, Liberty and Diversity. Today, we need to reaffirm these values more than ever."

Vice-Chancellor Professor Lap-Chee Tsui

HKU warmly welcomed incoming international students in the century-old Main Building.

The Chi Wah Learning Commons provides a common space for individual and collaborative learning.

In the University's first semester, in 1912, there were 77 students enrolled in three Faculties: Medicine, Engineering and Arts. HKU has certainly, as they say, come a long way.

This semester saw over 7,000 new undergraduate students enrolling in programmes from 10 Faculties, and marks the official start of the new four-year undergraduate curriculum, which we believe will nurture students who will hold themselves up to the highest standards of intellectual rigour, respond positively to unanticipated problems, respect diverse cultures and strive to make a difference in the world.

The new student-centred curriculum is designed to be both intellectually stimulating and challenging – with its core curriculum classes and the overall principle of offering choices and flexibility to students. And there will continue to be worldwide exchange programmes and service learning opportunities for them to take part in too.

The new campus extension is now open as well, and is home to the Faculties of Arts, Law and Social Sciences. Above and below the three open and welcoming courtyards, there are some 70 new classrooms, restaurants and food kiosks, and the 6,000m^2 Chi Wah Learning Commons, a campus hub for student-centred learning activities.

With more students comes the need for more accommodation as well. The four new Residential Colleges on Lung Wah Street in Kennedy Town will ultimately provide 1,800 new places for local students and students from all around the globe. ■

Two Inauguration Ceremonies for new students

This year, two sessions of Inauguration Ceremony were held to welcome the double cohort of students enrolled in the three-year and four-year undergraduate programmes, both officiated by HKU Vice-Chancellor Professor Lap-Chee Tsui. The Guests of Honour were banker Mrs Margaret Leung and film-maker Ms Mable Cheung, both HKU graduates.

Professor Tsui welcomed the new students in his inauguration address. He introduced HKU as a place having a free, open and diverse learning environment. He encouraged students to take part in activities and enjoy university life, and said learning experience both inside and outside classroom is important.

Marvel at the **Cosmos**

HKU scientists are exploring the secrets of the universe and the origins of life by looking at stardust, the weird asymmetry of matter and anti-matter, and examples of Mars-like life on Earth. They are also pondering the messy impact that humans are having in space.

We Are **Stardust**

Discovery of complex organic matter in stardust may give clue to origins of life.

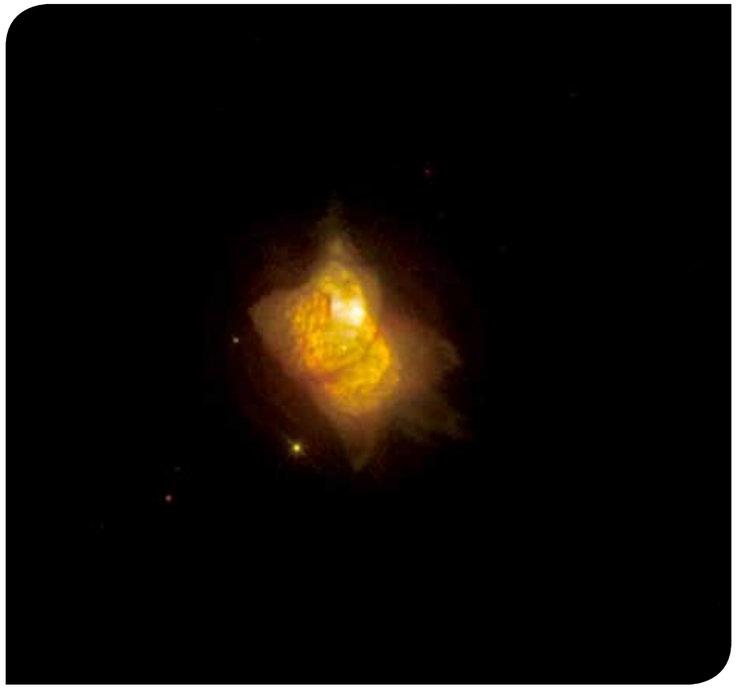
If Professor Sun Kwok had a dollar for each time someone had asked him "Is there life on Mars?", he would probably be a very rich man. It is the burden of every astronomer to be asked this question, usually in a not-too-serious way. However, recently, Professor Kwok, who is Dean of the Faculty of Science, has been giving a very serious answer.

"I am more optimistic than ever before that there is life elsewhere," he says. "Not aliens, but bacteria, micro-organisms."

His conviction springs from his discovery – made together with Dr Zhang Yong, Research Assistant Professor in the Department of Physics – that organic compounds of unexpected complexity exist in the stardust that is strewn across the universe by dying stars.

"So complex are these compounds," says Professor Kwok, "that they're similar to those that make up living organisms." The findings suggest that complex organic compounds can be synthesised in space and may even have seeded life on Earth and other planets.

Professor Kwok has done a great deal of research during his 30-year career into planetary nebulae (dying stars) and has long had a deep interest in stardust – small particles made by stars at the end of their lives and emitted across the universe.



The planetary nebula NGC 7027 is found to be manufacturing and ejecting complex organics at a high rate. This picture of the nebula was taken with the Hubble Space Telescope.

Infrared emissions

The new findings came about when he and Dr Zhang were studying the well-known but mysterious infrared emissions that are found in stars, interstellar space and galaxies. Collectively known as 'Unidentified Infrared Emissions', their existence is nothing new in scientific fields.

"When a star dies it ejects atoms, molecules, solids, we have long known about this," says Professor Kwok. "But in the past we thought it was simple inorganic matter. However, analysis of spectra of stardust – using infrared spectroscopic data – shows that these emissions contain a mixture of aromatic [ring-like] and aliphatic [chain-like] components, with chemical structures resembling those of coal and petroleum."

Understandably, this has sparked huge interest. The highly respected journal *Nature* reported the findings, and many other publications, both scientific and general interest, have picked up the story.

There has also been press coverage around the world, and it has only been fuelled recently by the landing on Mars of the United States' 'Curiosity' rover and the 'where-do-we-come-from?' sci-fi movie *Prometheus*.

"Our work has shown that stars have no problem making complex organic compounds under near vacuum conditions. Theoretically this is impossible, but observationally we can see it happening," says Professor Kwok.

The implications of the discovery are vast. Scientists have believed since the 1950s all things on Earth are derived from simple chemicals. The Miller-Urey Experiment (published in 1953 and considered to be the go-to origin of life experiment) simulated hypothetical conditions thought to be present on early Earth and tested for the occurrence of chemical origins of life – thereby showing that it was possible for life to have formed in this way.

From right to left: Professor Sun Kwok, Drs Scott Sandford and Yvonne Pendleton of NASA, and Dr Catherine Cesarsky, President of the International Astronomical Union (IAU), at the IAU Symposium on Organic Matter in Space, held in Hong Kong in 2008

> **"If stars can make such complex compounds, then the ingredients of life may be more common than we thought."**
>
> *Professor Sun Kwok*

"But if stars can make such complex compounds, then the ingredients of life may be more common than we thought, and that process of creating life may have been easier than we thought because complex compounds were involved, not just simple ones," says Professor Kwok.

"Life elsewhere"

"If stars can make complex compounds, and across the galaxy there are many, many stars ejecting this stuff, so some of it must have spilled into other stellar systems and other planets – so maybe there is life elsewhere."

These 'ifs' give rise to even bigger and increasingly intriguing 'ifs'. Says Professor Kwok: "If we found signs of life elsewhere, it would give us a second example biology – Earth being the first example. And, if so, will these other forms of life be similar to us or very different? If similar, how come? Do we share the same origin?"

"Then there is the whole major question of how did this stardust get into the Solar System and how did it reach Earth?"

One theory is that as the organic dust is similar to compounds found in meteorites it could have been carried in comets and asteroids that bombarded the Earth four billion years ago. Perhaps when Joni Mitchell sang "We are stardust. Billion year old carbon," she was nearer to the truth than she knew.

Professor Kwok, has recently been elected Vice-President of the International Astronomical Union (IAU)'s Bioastronomy Commission 51, which was held this year in Beijing. The IAU, which has 10,000 members worldwide, was founded in 1919 with the aim of promoting and coordinating the science of astronomy through international cooperation.

Professor Kwok was particularly thrilled that a surprise guest attended the event – China's Vice-President Xi Jinping. "None of us knew the Vice-President would be attending – his presence is a strong signal of China's commitment. I'm very excited about what's happening there, they have big plans to spend billions on astronomy – a billion alone on building a telescope in Antarctica. While Europe and the US may be growing more cautious in their spending at the moment, China has the commitment and desire to explore space." ■

The Gemini North Telescope under a starry sky (Courtesy of Gemini Observatory)

A Pilgrimage to **the Stars**

Professor Sun Kwok, Dean of Science, describes a night in the life of an astronomer.

As I step off the plane at Honolulu airport, I am greeted by warm tropical air and the smell of the sea. Sun-seekers give me a puzzled glance, wondering what this crazy guy is doing carrying a heavy winter coat in this tropical paradise. Indeed I am the odd man out as I am not heading to the beach, but to a dormant volcano 4,200m above sea level on the Big Island of Hawaii. I will need all the warm protection I can get in the subzero temperatures of the summit of Mauna Kea.

Mauna Kea, meaning 'white mountain' in Hawaiian for its snow-capped summit, is a sacred site for native Hawaiians. Mauna Kea is also a holy site of modern astronomy. It is the most popular location in the northern hemisphere to place large telescopes for astronomical research. A tropical inversion cloud layer forms around the mountain at about 600m, meaning the summit is almost always above the clouds, resulting in endless clear skies above.

I head up the mountain to Hale Pohaku, a mid-level (2,800m) facility for the observatories where I usually spend my first night trying to acclimatise to the high altitude. My students and I go over the star charts and observing plans, scheduling every detail of the coming nights down to the minute. This is necessary because at the summit of 4,200m, the decreased supply of oxygen can create acute mountain sickness including headaches, drowsiness, nausea, and worst of all for a scientist, impaired judgment. Since the cost of observing time on a telescope is valued at tens of thousands of US dollars per night, one does not want to make any mistakes or waste a single minute.

A steep climb

After a few hours of rest and breakfast around noon, I head up to the summit to check out the conditions of the telescope and the instrument I expect to be using. Too many times, I have found problems with a failed component, requiring me to make new plans. Sometimes, wind and snow on the summit intervene, creating endless anxiety that my precious observing time may go to waste.

The road between Hale Pohaku and the summit is mostly unpaved, steep, and winding, but once we reach the summit, we are greeted with the most spectacular sight of white telescope domes against a background of infinite blue skies. Among the largest are the two 10-metre Keck Telescopes, the 8.3-metre Subaru Telescope, and the 8-metre Gemini Telescope. After checking the equipment, I return to Hale Pohaku for a short dinner, then climb the summit again to start my observation.

I turn on the instruments, fire up the computer, and wait for sundown in the small and cramped operation room. This often is the most anxious moment because we will find out whether the instruments are working up to our expectations. If any problem develops, we put on our boots, gloves, and heavy coats and leave our heated control room for the naturally cold dome above. As the instruments are often hung on the telescope high above the ground, we use a 'cherry picker' to reach the boxes. Trying to fix delicate things in such clumsy clothing (and often in darkness) is not the easiest job.

Close up with the stars

If we are lucky, the problems are not major and observation can start. In the old days, one had to constantly guide the telescope to ensure it was not drifting from the target. Now, much of this tedious work has been automated and the computer does the guiding. Many of us still watch the screen for any signs of instrument malfunctioning or abnormal weather conditions. Will we detect anything? Are we going to discover a new phenomenon? Is my theory going to be confirmed? After the exposures are finished, we take a quick look at the raw, unprocessed data hoping for a glimpse of what we are looking for. Disappointment will mean an adjustment of plans. A new discovery will lead to excited cheers, hugs, and sometimes tears.

One of my favourite activities is to go out to the catwalk around the dome and admire the glory of the stars in the night. After allowing my eyes to adapt to the darkness (and this is total darkness as there is no artificial light anywhere in sight), I can make out faint stars that are hard to see among the light pollution of our civilised world and enjoy the majestic Milky Way. One has the feeling of being as close to God and nature as one can be.

When the dome finally closes with the dawn, I walk out of the building. The shadow of Mauna Kea is projected onto the distant sky by the sun at our back. Despite my tiredness and fatigue, this magnificent sight greatly boosts my spirits. Until I am too frail to undergo the vigour demanded of a night of astronomical observations, Mauna Kea will remain my Mecca and Jerusalem. ■

"Will we detect anything? Are we going to discover a new phenomenon? Is my theory going to be confirmed? Disappointment will mean an adjustment of plans. A new discovery will lead to excited cheers."

Professor Sun Kwok

The magnificent sight of white telescope domes (Courtesy of Canada-France-Hawaii Telescope Corp)

Professor Sun Kwok and his student Rita Boreiko working on an instrument in the dome of the Canada-France-Hawaii Telescope

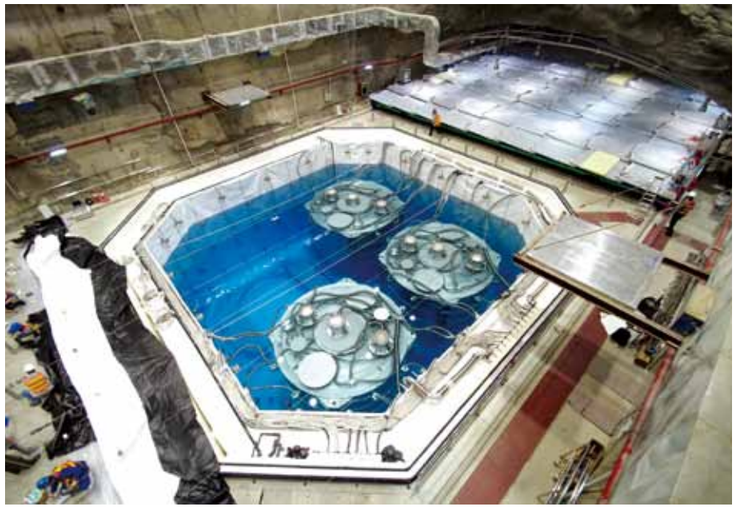
The Unexplained Fallout from **the Big Bang**

The Big Bang theory may explain the beginning of the universe, but it also raises an important question. The explosion should have released the same amount of matter and anti-matter, so what's happened to the anti-matter?

Particle physics is the study of the building blocks of the universe, but an important part of the story has been missing. Anti-matter should, according to Einstein's theory of relativity, be released at the same time in the same amount as matter when there is a burst of energy like the Big Bang. But when physicists look around the universe, the anti-matter doesn't seem to be there.

Now, an experiment at Daya Bay involving HKU and nearly 300 scientists from 39 institutes in China, the US, Taiwan and the Czech Republic, is helping to bring them closer to an answer.

The scientists have been working to detect the anti-matter of the electron neutrino, also known as the 'ghost particle' for its elusiveness. Neutrinos and anti-neutrinos are released in nuclear reactions such as those of the sun and nuclear power plants, and Daya Bay is considered an ideal site because it has one of the largest nuclear power clusters in the world.



The three anti-neutrino detectors, 5m tall by 5m diameter each, submerged in pure water inside the Daya Bay Fall Hall

HKU team member studied the radon concentration of the water pool inside the experimental hall before detector installation.

Early results from their experiments, which started in the summer of 2011, have shown they are on the right path. In fact, they have been able to detect electron anti-neutrinos (the anti-matter form of electron neutrinos) in bigger quantities and in a much shorter period of time than originally planned, showing the eight years of preparation and construction behind the experiment have been well worth the effort.

Elusive neutrinos

"The neutrino is one of the most mysterious kinds of particles," says Dr Jason Pun, Teaching Consultant in the Department of Physics. "It takes a lot of effort to detect even though it's all around us. The sun gives off lots of neutrinos and billions of them pass through us every second without us noticing."

Experimental detector installed inside the Aberdeen Tunnel Laboratory

Dr Jason Pun (third from the left), Dr John Leung (sixth from the left) and students at the entrance to the Aberdeen Laboratory located inside one of the cross-links inside the Aberdeen Tunnel

The scientists have had to screen the electron anti-neutrinos from all other types of particles, harvesting only 200 to 300 electron anti-neutrinos from the trillions of neutrinos that pass through the anti-neutrino detectors every day. A genuine signal is generated when an electron anti-neutrino enters the detector and generates, through nuclear reaction and at a very low rate, a neutron and a positron.

The scientists measured the electron anti-neutrinos at three locations under a nearby hillside, two about 500 metres away from the reactors and one about 1.6 kilometres away. There are three kinds of neutrinos and they can 'oscillate' into each other so the aim was to see if the quantity of electron anti-neutrinos 'disappeared' at a further distance from the nuclear reactors.

The disappearance rate turned out to be six per cent, which was the upper limit of what the scientists had expected. "Our initial plan was to take data for two or three years before we would see something," says Associate Professor Dr John Leung. "But very excitingly, we started to see something after half a year. It had to undergo a lot of verification but we concluded that we had seen what we were looking for."

> **"There must be something, some physics interaction at the energy scale for particular kinds of particles, that breaks that beautiful symmetry."**
>
> *Dr Jason Pun*

HKU as the starting point

Hong Kong's involvement, which includes Dr Leung, Dr Pun, and Professor Chu Ming-chung from The Chinese University of Hong Kong, has entailed designing and building part of the monitoring system for the detectors, and doing background measurements of cosmic rays at Aberdeen Tunnel. HKU was also where the project was first discussed during a workshop here in 2003.

The project has also benefited HKU physics students, who have helped out at both the Daya Bay and Aberdeen Tunnel sites, offering a rare opportunity for them to be involved in a large-scale research project.

Further such opportunities in the field of particle physics are expected after the Faculty of Science signed an Expression of Interest in July with the European Organization for Nuclear Research (CERN) that allows for exchanges and research opportunities for both students and staff.

"Trying to answer the question of why there is more matter than anti-matter in nature is ultimately telling us why we are here," Dr Pun says. "If so much matter and anti-matter existed, they would annihilate each other. There must be something, some physics interaction at the energy scale for particular kinds of particles, that breaks that beautiful symmetry."

The next stage of their investigations will continue to pursue an answer to what that might be. ■

Waking **the Dead**

Near-dead cyanobacteria are providing insights into evolution and the possibility of life on Mars.

Several years ago, Dr Steve Pointing, Associate Professor in the School of Biological Sciences, travelled to the ends of the Earth in search of places that were similar to the environment on Mars. He was working with NASA, the space agency, but an interesting long-term outcome of that work has brought his focus straight back to Earth.

During his field trips, Dr Pointing encountered cyanobacteria, a tiny photosynthetic bug, and collected vast amounts of data on it. His subsequent analysis of its dispersion around the world over time has turned conventional thinking about the evolution of certain life forms on Earth on its head.

Using fossil records and present day samples from 21 deserts, including the polar regions, Dr Pointing and his colleagues have shown that against expectations, the bacteria were not globally dispersed. Instead they were very particular to places over periods stretching deep back into time, to before modern climates were formed.

"We found that the cyanobacteria in every desert had a unique genetic signal. And the estimates of divergence were surprising, suggesting there was no gene flow between the deserts over these really long time scales."

"The mantra on bacteria and distribution on Earth has been that everything is everywhere. But this study shows this is not always the case and I'm guessing we will find more exceptions to the rule," he says.

Implications for climate change, too

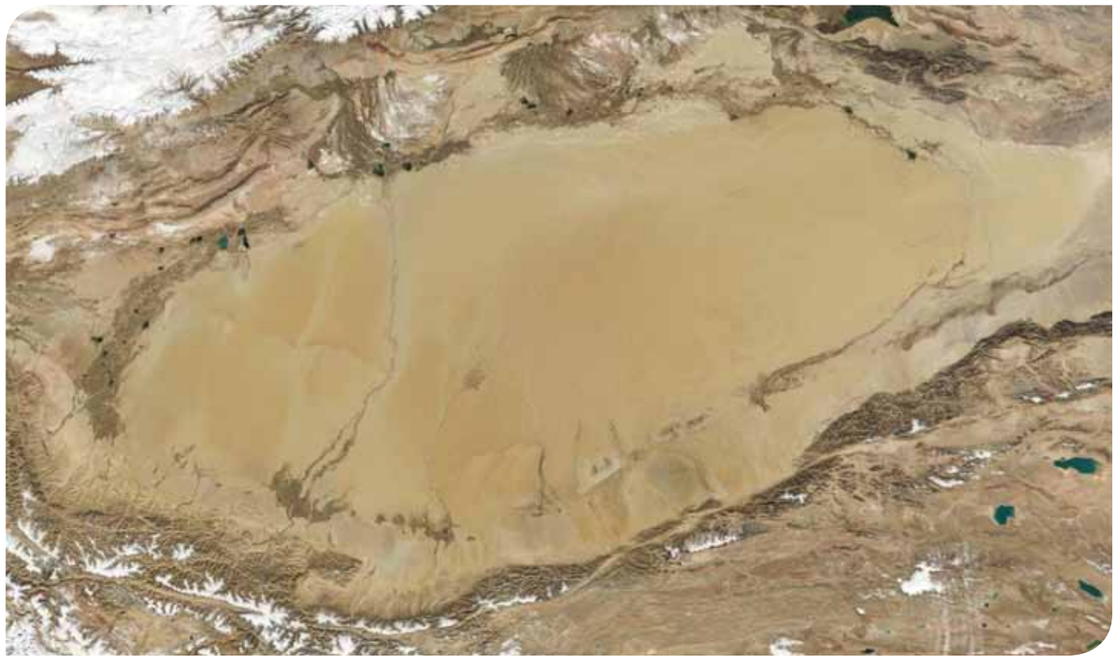
So why don't cyanobacteria behave as expected? The best explanation is biofilms, which act like a glue, holding these bacteria in place even during dust storms. Just as importantly, the biofilms can support the bacteria in a near-dead state.

In some of the deserts studied, the environment is so hostile that there are only 300 to 400 hours a year in which the cyanobacteria can be active. The rest of the time, they revert to a dessicated state in the cocoon of the biofilms and have no detectable metabolism. Some of these 'living' bacteria are hundreds and maybe even thousands of years old.

Dr Pointing says that apart from informing microbiology, the findings also offer a route for understanding the impact of climate change on deserts.

"Deserts are really fragile ecosystems. They're almost the tipping point of what is sustainable. They've got very few plants, and the role of microbes becomes relatively more important, but they are living on the edge of extinction. In terms of biodiversity and functional role, they're highly at risk from climate change. A 1° Celsius change in average temperature in the desert is far more dangerous than a similar change in, say, a temperate woodland," he says.

The findings were based on fossil records, genetic analysis, new pyrosequencing technology that vastly increased the resolution of the data, and old-fashioned microscopic investigations. They were published this year as a commissioned review in the prestigious *Nature Reviews Microbiology* journal.



Deserts such as this one in western China rely on microbes such as cyanobacteria to carry out ecosystem functions.

Submarine used by NASA to investigate microbialites (Courtesy of Donnie Reid)

These unique freshwater corals, called microbialites, may be our best guess at life on Mars during its late wet phase.

> **"The mantra on bacteria and distribution on Earth has been that everything is everywhere. But this study shows this is not always the case."**
>
> *Dr Steve Pointing*

The water-desert link

The research is now evolving to look at organisms in a seemingly opposite environment – fresh water – and this is also of interest to NASA.

Freshwater corals are populated and supported exclusively by microbes, mainly cyanobacteria that share ancestry with desert cyanobacteria. (Unlike marine corals, no animal polyps contribute to freshwater coral building.) Many believe these organisms had a role to play in increasing oxygen levels on ancient Earth so more complex life forms could be supported. Microbialite cyanobacteria are also similar to desert cyanobacteria in that they are both intimately associated with minerals (such as carbonates, sulphates and porous minerals) during their growth.

NASA researchers show a quartz rock from the Namib Desert colonised by cyanobacteria.

"NASA is very interested for the simple reason that about three or four million years ago, when water on Mars' surface was disappearing, the water there was very carbonate rich. Microbialites on Earth are found in high carbonate lakes, so NASA felt these were quite good analogues for the lakes on Mars during its late wet phase and they're interested in what sort of signatures these things leave as they grow and eventually die," Dr Pointing says.

Investigations into Earth's tiniest inhabitants therefore are offering clues about Earth's deep past and its closest neighbour. And hopefully, its future threats. ■

The Final Frontier **Comes down to Earth**

Laws are lacking to govern all the objects and people that we are sending into space.

Liu Wang, Jing Haipeng and first Chinese female astronaut Liu Yang officiated at the opening ceremony of 'Exhibition on China's First Manned Space Docking Mission' at the Hong Kong Science Museum. (Courtesy of Hong Kong Science Museum)

The exhibition showcases the advancement of Chinese Manned Space Engineering. (Courtesy of Hong Kong Science Museum)

If a space tourist visits the International Space Station and something goes wrong, who should pay for their very expensive rescue? And who should be responsible for the tonnes of space debris floating above Earth?

The answer to these questions is unfortunately murky. Space regulation is largely mired in the past, when there were just two superpowers, the US and the Soviet Union, and no commercial operators.

International bodies are trying to set new rules but the proliferation of different interests – developed and developing countries, commercial operators, military agents, scientific researchers and so on – is making it difficult to reach agreement.

Associate Professor of Law Dr Zhao Yun has been studying space-related law for nearly 15 years with a special emphasis on China.

"The first UN international treaty on space was signed in 1967 and at that time, the state was the only entity involved in outer space activities. Now, as more and more private entities are coming in, we should take note of this development and possibly have new treaties," he says.

No one can agree

Unfortunately, no new agreements have been reached since 1979. The lack of progress means important issues are not being addressed.

Space debris, as mentioned, is a worry as more and more satellites and other objects are sent into space. A UN scientific sub-committee has agreed on how the debris should be handled but the legal committee has failed to reach agreement despite years of discussion. A key issue is who should be responsible. Some states are concerned that a binding agreement would be too burdensome for them and thus prefer a non-binding document.

The goal of 'peaceful uses' of outer space also remains undefined. One camp, led by the US and Japan, holds this to mean non-aggressiveness – which would allow for weapons of self-defense. Another camp, led by China and Russia, says peaceful use means non-military – which is difficult to define because some objects, such as communications satellites, have dual military and civil uses.

"Many people say space law is far removed from individuals. But with commercialisation it's much closer to real life. When you use mobile phones or watch digital TV, that's related to space law."

Dr Zhao Yun

Of particular interest to Dr Zhao is commercialisation. The existing treaties confine liability and registration to launching states, so if Country A launches a satellite then sells it to Country B, Country A is still liable. The treaties also don't address intellectual property protection. Satellites collect raw data, which is then processed and analysed, so who has legal rights over it?

"Commercialisation has been the most important development in the last 10 to 20 years," he says, particularly as telecommunications, remote sensing and satellite broadcasting systems have developed, "and most space-faring states think the current agreements are not favourable to them if they invest a lot of money."

Trying to make progress

That is not to say efforts are not being made to address the problem. An international space authority has been proposed, similar to one that rules the seabed. And a protocol on financing space assets has been developed to protect the interests of those who bankroll them. This is of interest to Hong Kong as a finance centre, and also China, which is increasingly getting involved in financing space activities.

China has also been more active in developing its own space laws as it increases its space activities. Dr Zhao is currently conducting research on the subject. "China has administrative regulations on outer space activities, but there are no laws made by the National People's Congress. We need such laws to protect the interests of the state and investors," he says. Hong Kong has an Outer Space Ordinance inherited from the UK that does offer some protection.

All of these issues demonstrate that space, and what we do there, is really an Earthly concern.

"Many people say space law is far removed from individuals. But with commercialisation it's much closer to real life," says Dr Zhao. "When you use mobile phones or watch digital TV, that's related to space law. I hope this subject will be of interest to students in future so more people will pay attention to these issues." ■

The re-entry module of Shenzhou-9 spacecraft and the main parachute (Courtesy of Hong Kong Science Museum)

Dr Chen Zhiwei (middle in the front row) and his research team

Dogged **Determination**

HKU's AIDS Institute marks five years as watchdog against a disease that is still regarded with some indifference in the region.

Fujian province is rarely mentioned in the coverage of AIDS in China, unlike Yunnan, Guanxi and Henan where drug use, sexual transmission and blood transfusions have raised infection rates. But if Fujian is not high profile, it may be a harbinger of things to come.

The province was the subject of a study by HKU's AIDS Institute that showed the number of infections doubled (from 528 to 1,129) between 2006–07 and 2008–09 and the prevalence of infection was increasing (from 0.064 per cent to 0.074 per cent). Most significantly, sexual transmission was a major source of the higher numbers, accounting for 71.4 per cent of cases in 2008–09 against only 53.4 per cent in 2006–07.

All of those factors indicated the virus was gaining a hold in the general population.

"Unprotected heterosexual and homosexual contact is the major mode of HIV transmission in the general population in Fujian," says the Institute's Director, Dr Chen Zhiwei. "The rising infection rate in the general population poses a new challenge to national efforts against HIV/AIDS."

Fighting on many fronts

The Institute has played a major role in raising the alert about HIV's creeping spread in China and Hong Kong since it was founded five years ago to study the problem in the region and develop solutions.

Apart from the Fujian study, which involved three million samples collected over three years and was published in the *Journal of Acquired Immune Deficiency Syndromes*, it has tracked the evolution of the ever-changing HIV virus in China and monitored infections in Yunnan and Hong Kong. It has trained Mainland doctors and other researchers, worked with NGOs who deal with HIV/AIDS victims and led research teams in exploring medical treatments and cures.

> **"Often people don't think AIDS is a big problem anymore. That's not true. We don't have a vaccine. We don't have a therapeutic cure. We still have a problem."**
>
> *Dr Chen Zhiwei*

The progress can be slow, given the hidden nature of HIV infection, the dynamic evolution of the virus and the very large palette of China that the Institute is working with. But recently, there has been promising progress.

The Fujian study, for one, offers an important guiding tool for targeting prevention. The Institute is also making medical advances.

New route to block transmission

It has recently discovered a new molecular mechanism that is effective in blocking transmission of the virus, in conjunction with Shanghai Targetdrug Co Ltd, Nanjing University and City University of Hong Kong.

The mechanism, TD-0680, blocks the ability of a sexually-transmitted form of HIV to bind with CCR5, which is a co-receptor for the virus – in plain language, it reduces the virus' ability to bind to human cells. The findings, which were published in *The Journal of Biological Chemistry*, were tested on human and monkey cells, and found to be several to 10 times more effective than the current main inhibitor on the market using multiple assays.

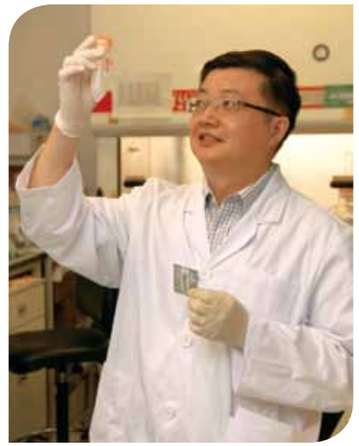
"If there is a way to prevent the virus entering the body, then the chance for preventive efficacy will be much better," Dr Chen says.

An even better weapon would be a vaccine and the Institute is working on this, too, with funding mainly from the Mainland government. Progress has been very good and they hope to make an important announcement on this shortly.

More public attention needed

In the meantime, they will continue to try to get HIV/AIDS placed higher up the public agenda. "Often people don't think AIDS is a big problem anymore. That's not true. We don't have a vaccine. We don't have a therapeutic cure. We still have a problem."

Recipient of 2008 Nobel Prize in Physiology and Medicine, Professor Françoise Barré-Sinoussi (fourth from the left in the second row), visited the AIDS Institute and had a nice discussion with students.



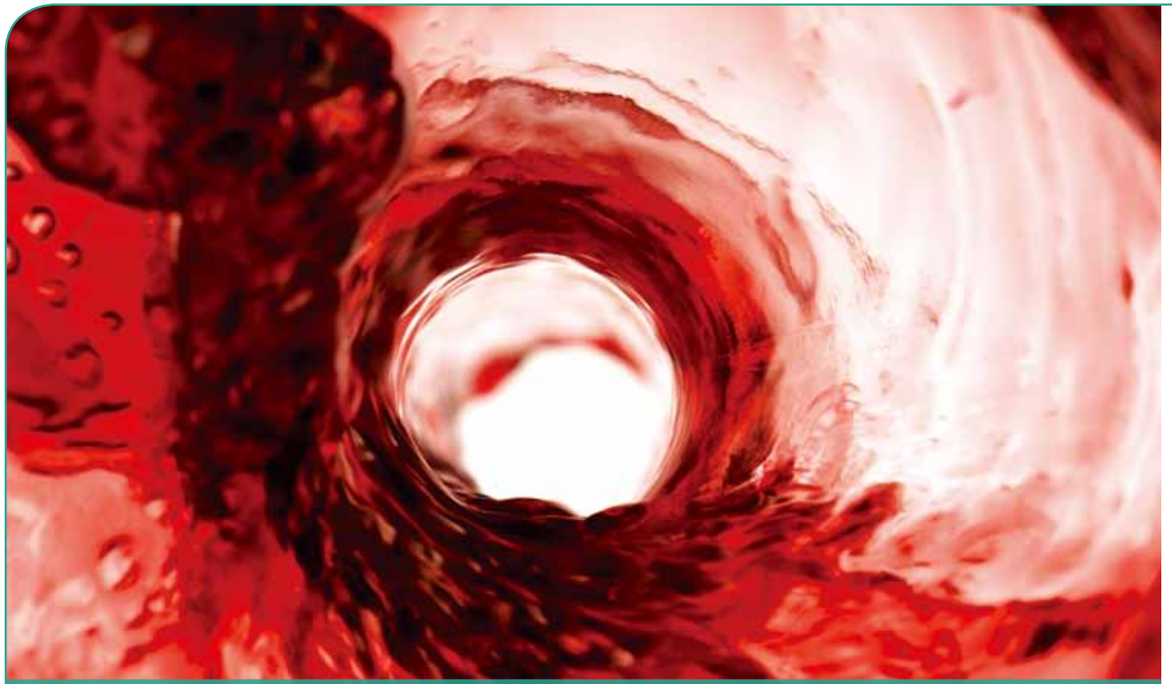
Dr Chen Zhiwei, Director of AIDS Institute, says the novel CCR5 antagonist (TD-0680) may be formulated into microbicide gels to prevent spread of HIV/AIDS through sexual transmission.

"Unfortunately it's mostly poor people who are infected in both Hong Kong and China. In Fujian 20 per cent of previously unidentified cases didn't have a job."

Dr Chen would like to see the Hong Kong government in particular provide more moral and financial support to academic research institutions in the fight against the local AIDS epidemic, especially as the number of new HIV infections hit a record 131 in the second quarter of 2012. The Institute was established entirely with funding from the University.

The issue will get a higher profile in November when the Institute stages a major international conference on HIV/AIDS to celebrate its fifth anniversary. Dr David Ho, Head of the Aaron Diamond AIDS Research Centre in New York, will address the gathering.

The Institute is also working with local and Mainland NGOs to raise awareness. "If we don't pay careful attention, then certainly we will have a serious problem," Dr Chen says. ■



Saving Teeth with **Red Wine and Prunes**

Several chemicals present in plums, grapes and red wine can kill bacteria associated with gum disease – leading researchers to seek more natural remedies for oral health.

Periodontal disease is one of the commonest problems affecting dental health today. More usually known as gum disease or gingivitis, periodontitis is an inflammatory disease of the soft tissue and bones that support the teeth. Main symptoms are bleeding, sore gums, bad breath and later – if left untreated – loosening of the teeth and eventually their loss.

In the US, around 80 per cent of the population will suffer from it during their lives. While the figure is better in Hong Kong, dentists estimate that around 500,000 adults live with gum disease untreated and it is a major cause of general oral health problems.

Tooth loss in old age was once considered a natural eventuality, and one of its greatest accelerants was gum disease. But research has shown that attaining optimal oral health – and particularly staving off gum disease – can lead to healthy teeth for life.

And the really good news is: red wine might actually help. To be more accurate, a chemical found in red wine might help. "I'm afraid that just drinking red wine is not going to cure periodontitis," laughs Dr Ricky Wong Wing-kit, Clinical Associate Professor of Orthodontics in Faculty of Dentistry. It is the resveratrol, found in the grapes, that is the key.

Through laboratory studies, Dr Wong and his research team tested resveratrol for in vitro activity against 12 bacteria and three fungi found in the mouth. The compound inhibited liquid cultures of the bacteria Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis, completely killing both within six hours. It is hoped that after more research has been done on the killing mechanism and on bacteria living in the mouth, resveratrol could be developed into an alternative to antibiotics for gum disease.

Natural sources

Dr Wong and several research teams have for some time been looking into the possibility of finding agents from natural sources to prevent, or cure dental problems in vitro. Three in particular have proved effective: resveratrol, that is present in such fruits as berries, red grapes and red wine; naringin which is in citrus fruits such as grapefruit and has a bitter taste and quercetin which is also found in red grapes – and their product red wine – apples, black and green tea, onions, broccoli and other green vegetables, cherries and berries.

Dr Ricky Wong (second from the left) receives funding for the 'prune mouthwash project', with (from left to right) Professor Hagg, the then-Chair of Orthodontics, Dr Michelle Yuen, an MOrth student for part of the prune project, and Professor Samaranayake, Dean of the Faculty of Dentistry.

> **"What we want to do is to utilise something that we drink every day that would be good for your health and oral hygiene."**
>
> *Dr Ricky Wong*

"This research came about as an extension of our work on Traditional Chinese Medicine (TCM) because we were interested in different natural products," says Dr Wong. "Over the years we have discovered there are many different applications of TCM in dentistry, including bone induction, anti-microbial effect, anti-cancer effect, anti-inflammatory effect, orthodontic tooth movement, and pain control."

At first, the possibilities of TCM for the treatment of periodontal diseases did not come into their research area. "When we started the TCM studies about 10 years ago we weren't actually interested in the anti-bacterial properties," says Dr Wong. "We were studying tissue engineering – enhancing bone-growth after surgery to repair cleft palates. During bone tissue experiments – in which we did animal tests to see if these chemical helped bones grow research – we discovered these natural products had other beneficial effects. Specifically periodontal disease came back to the bacteria. Further, because of SARS there was a lot of interest at the time in anti-microbial research."

Dr Wong and the team have pinned down that they can kill some – though not all – bacteria specific to periodontitis. They are awaiting clinical trials now which they hope these will confirm that resveratrol kills pathogens.

Dr Wong and his team made further discoveries about another natural flavonoid naringin, commonly found in citrus fruits such as grapefruit, as well as Chinese plums or prunes. They found that a traditional Chinese medicine that comes from a dried prune – specifically from the Asian plum, or Japanese apricot – is even more effective than the resveratrol at killing mouth bacteria.

Safer alternative

Their aim was to find safer alternatives to many of the brand name mouth rinses available over the counter today, which may actually be harmful if swallowed. What they were seeking was a new way to kill oral bacteria that was both safe and natural.

The extract from the plum, called *yu wei* in Chinese, proved to be effective against all four bacterial species it was tested on. And against two of them it proved more effective than a chemical commonly found in commercial mouth rinses.

"As a result of our findings, we got a grant from GSK (GlaxoSmithKline) for US$75,000 to develop a mouth rinse using natural extracts," says Dr Wong.

"What we've come up with is similar to brand name mouthwash, but not as concentrated. It is quite sour though. At the moment, if you gargle with it then rinse with baking powder it takes away the rather bitter taste. From Chinese medicine we are hoping to prepare a recipe – hopefully for commercial use. What we want to do is to utilise something that we drink every day that would be good for your health and oral hygiene."

Dr Wong graduated from HKU with Bachelor of Dental Surgery, then became a government dentist for a few years before getting his Master in Orthodontics. He returned to working for the government while also doing a part-time PhD. When the government introduced an early retirement scheme, he took it and entered into research within the Faculty's Orthodontics Discipline in 1995. Soon started to supervise research students – one of his PhD students is currently working on mouth rinse project, while another is busy on the commercial development. ■

Turning down **the Volume**

Passenger aircraft are one of the top focuses of China's '973' development project, and while the planes will be big the noise they emit will be small thanks to advances in aeronautic acoustics.

The main sources of noise are found in the turbofan engine, fuselage, high-lift wing devices, and landing gears.

Six years ago, China identified large passenger aircraft as one of its 16 priority endeavours – that is, an area where it wanted to gain expertise and manufacturing excellence. Large-scale nuclear power plant and the moon exploration are some of the others in the 16. For passenger aircraft, China aims, in the long term, to have its own company in the ranks of Boeing and Airbus.

For Dr Huang Lixi, Associate Professor in the Department of Mechanical Engineering, this represented an opportunity to do advanced research in two of his areas of expertise, namely aeronautics and acoustics, as well as "to be part of a project that aims to build the expertise of a national team and to nurture new talents in this area who will contribute in future."

"Aerodynamics is not a big problem, there is plenty of expertise [in China]. But acoustic know-how is lacking."

Dr Huang Lixi

Working together with Professor Sun Xiaofeng of the Beijing University of Aeronautics and Astronautics (BUAA) and a team of other experts, Dr Huang applied for funding from China's '973' Programme, a massive enterprise launched in 1997 to organise, implement and fund basic research to meet the nation's strategic needs.

Since funding for 973 is only available to Mainland entities, the team applied for funding as a member of HKU's Shenzhen Institute of Research and Innovation (SIRI). Their project, 'Aeroacoustics and Advanced Noise Control for Large Passenger Aircraft' is a five-year endeavour and gained RMB40 million in funding.

The project is divided into five groups covering various different aspects of aircraft noise. "I am working on three of them," says Dr Huang, "Group 2, fuselage noise, that is noise generated by the exterior body of the plane, including landing gears etc; Group 3, engine noise; and Group 4, cabin noise." Since the funding stays in Shenzhen, Dr Huang is dividing his time between HKU main campus and SIRI. "The theoretical stuff we can do anywhere, but experiments must be done in Shenzhen. And when it comes to the Group 3 testing, we will use the national facilities with our Xi'an partners."

Noise Certification is a vital part of airworthiness testing for commercial airlines. International acoustics standards have to be met at take-off, flyover and landing measurement points before they are allowed to enter commercial service.

For the development teams in China already working on large passenger aircraft, noise reduction is a weak point. "Aerodynamics is not a big problem," says Dr Huang, "there is plenty of expertise in the country. But acoustic know-how is lacking."

So much so that it was identified in 2010 as an area which '973' efforts needed to prioritise. Worldwide airplane acoustics are reaching a plateau [of low noise] where they can't actually get much better, but not in China.

Happy passengers

"If you want to sell airplanes a prerequisite is satisfying noise regulations so that the plane is acceptable to people who live near airports or below flight paths," says Dr Huang. "Interestingly, while noise levels within the plane should also be low enough to be comfortable to passengers, this is not actually a standard requirement – although of course it makes commercial sense to keep your passengers happy!"

The main sources of noise in aircraft emanate from the engine (mainly the fan, compressor, jet turbulence), fuselage, high-lift wing devices and landing gears. In modern aircraft the engines are already much quieter than they used to be but it's the auxiliary sources of noise that need attention.

Dr Huang's main areas of expertise are aeronautics and aeroacoustics – sound generated by fast air flow. He was educated at the Beijing University of Aeronautics and Astronautics, where he studied aerospace engineering (jet propulsion) and at Cambridge, where he diversified into theoretical acoustics and biomechanics.

Noise control in humans

While much of his career has concentrated on noise control in inanimate objects ranging from fans and ducts to buildings and aircraft, he has also ventured into the area of noise control in humans – in the form of snoring.

"It's the same principle," he explains, "the vibrational soft palate works in the same way as air flowing over an airplane wing. In science things are often related that don't seem to be in normal life. In the early 1990s, I worked on the mechanism of snoring and helped surgeons to devise a successful laser surgery procedure. It attracted a lot of publicity at the time – the BBC came and filmed us for a day – then did a 5-minute piece!"

The 973 aeroacoustics project has funding until 2016, and Dr Huang expects it to continue beyond that. "For China, this is the first major project to really concentrate on aircraft noise and it will need to be ongoing," he says.

And there are more aspects to pursue: "Within the project we are also concerned with vibration as a safety issue – making sure it is safe as well as being quiet," he says, but is quick to point out that most noise from aircraft is made by airflow (aeroacoustics) – "It's the air vibrating, not the wing!" ■

Hope **Springs**

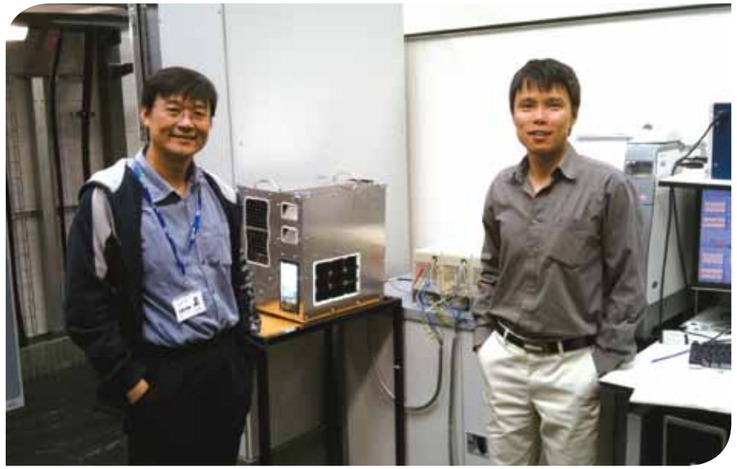
A new technology that uses electric springs to store and transmit energy overcomes a key barrier to the widespread use of renewable energy.

The promise of renewable energies, be they wind, solar or other sources, has excited governments around the world. Some have set targets to have up to 40 per cent of electricity provided by renewables (Hong Kong's is one to two per cent). But these ambitions ignore a major obstacle: it is still very difficult to integrate unstable renewable energy into the power grid.

The 'smart grid' is meant to solve the problem of instability by using modern technology to manage the different inputs to the grid. But it is not yet a reality and scientists from around the world, including HKU, have been trying to figure out how to make it work.

"The challenge," says Professor Ron Hui, Philip KH Wong Wilson KL Wong Professor in Electrical Engineering, "is that in the existing system, power companies can fully control power generation and flow. They can control the voltage according to how much electricity power a city requires, and transmit that power in a centralised, reliable manner."

"In the future the system will change drastically. With renewable energy, you and I can put up solar panels, a farmer could set up a wind farm, and the power company won't know how much power is being generated. Having all these sources with dynamically changing natures means power companies lose control. When the supply and demand can't match up, you have instability."



Professor Ron Hui (left) and Dr Lee Chi-kwan (right) working together on the Smart Energy Lab at Imperial College London

> **"Having all these sources with dynamically changing natures means power companies lose control. When the supply and demand can't match up, you have instability."**
>
> *Professor Ron Hui*

The consumers' end

Many researchers are trying to figure out how to stabilise the system at the power generation end, by considering how to manage distributed and unknown generators. But Professor Hui asks, what if we look at it from the consumers' end?

What if stability could be managed through attachments to appliances, so that they received input from renewable energies (say, a solar panel on the roof) and stored that energy until there was sufficient space on the grid for it to be released?

Professor Hui was pondering that question one night as he laid on his bed. "I thought the most suitable structure is the mattress with its array of springs. If you have an array of springs spread over the city, the support becomes large. Even if some fail, there will still be support."

With springs in mind, he turned to Hooke's law, which was devised 300 years ago and explained the physics of mechanical springs. Professor Hui, together with his research partner Dr Lee Chi-kwan, adapted that law and came up with the concept of 'electric springs' – which, as their name suggests, store electrical power in their coils and adjust up and down to stabilise the power supply, just as a mattress adjusts its shape to accommodate a person's weight. The springs, he says, could be contained in the attachment to appliances.

The idea has been simulated on a street with three households and the measurements have been promising. Two patents have been filed, including a joint one with Imperial College in London. The research results appeared in the September issue of the *IEEE Transactions on Smart Grid*.

"Electric springs could offer a solution to stabilise the power sector," says Professor Hui. "And we also believe they are a new research area. There's a lot to be explored."

Wireless connection

Professor Hui's work on electric springs follows on from his earlier achievements in simplifying power transmission. He invented a wireless charger that can charge several different devices, such as smartphones and tablets, at the same time without requiring individual plugs. More than 100 companies have signed up to incorporate the technology, dubbed 'qi', in their products, thus helping to reduce waste and save space from having multiple chargers for different products.

Following on from that, he recently developed a system of wireless power transmission and demonstrated that it can transmit energy from one room to another – without any cable connection. The technology uses a domino effect to transfer the power, and three patents have been filed.

With several major projects showing great promise, it is interesting to ponder the secret to Professor Hui's success. "I like this quote," he says, pointing to a poster on his wall with words from jazz musician Charles Mingus: "Making the simple complicated is commonplace; making something simple, awesomely simple, that's creativity." ■

Standing in the **Shadows**

Is mainstream education failing? That's one of the big questions raised by the explosion of private tutoring for school-age children – a phenomenon that is spreading across the world.

HKU is at the forefront of research on this topic, thanks largely to Professor Mark Bray, UNESCO Chair Professor in Comparative Education and Director of HKU's Comparative Education Research Centre. His work on private tutoring – or shadow education as it is called, because it mimics the mainstream – began in the 1990s when UNICEF asked him to investigate household costs on education in nine Southeast Asian countries. He noticed that money spent on tutoring was very high, and in 1999 wrote the first international study on the subject.

That study raised particular interest in Asia, but the reaction elsewhere was "interesting, but that's over there". Ten years on, shadow education was recognised much more widely. By then Professor Bray was in Paris, having taken four years unpaid leave from HKU to work as Director of UNESCO's International Institute for Educational Planning (IIEP).

A global phenomenon

In 2009, while at IIEP, Professor Bray published a sequel, *Confronting the Shadow Education System: What Government Policies for What*

> **"Current reforms in Hong Kong's education system say nothing about shadow education, despite its obvious spread and role."**
>
> *Professor Mark Bray*

Private Tutoring?. It tasked governments everywhere to assess and perhaps regulate this growing business. The book has been translated into 15 languages – Arabic, Armenian, Azeri, Bangla, Chinese, French, Georgian, Hindi, Korean, Mongolian, Nepali, Polish, Spanish, Sinhala and Urdu. The number of languages is a measure of the spread of countries where extra tutoring has become an issue.

In 2011, the European Commission asked Professor Bray to prepare a regional study. His report was entitled *The Challenge of Shadow Education: Private Tutoring and its Implications for Policy Makers in Europe*. The extent of the phenomenon there raised many eyebrows and attracted much press attention. It has been followed by a 2012 report for the Asian Development Bank.

This work has brought extraordinary recognition for HKU and for its comparative education studies. The bestowing of the UNESCO Chair in Comparative Education in May this year is part of that recognition. It is also a prime example of knowledge exchange between the research, government and policy-making worlds.

Large numbers

What is behind all the excitement? It is a subject that just keeps expanding, not only as shadow education spreads to more countries, but also as it becomes more widely accepted. The implications and the question marks are growing in equal measure. Extra tutoring has become a fact of life for huge numbers of children across the globe.

South Korea leads the way with nearly 90 per cent of elementary school children receiving some kind of shadow education. Numbers are almost as high in Hong Kong, where 72 per cent of senior secondary students are tutored. "And that's across the board," says Professor Bray. "People tend to assume we're talking about local schools, but our research shows there's just as much tutoring for students in international schools."

From left: Professor Mark Bray was with Armoogum Parsuramen, Mauritius' longest-serving Minister of Education, Tang Qian, Assistant Director-General for Education in UNESCO and Steven Obeegadoo, a Mauritian Member of Parliament and former Minister. The policies of the Mauritian ministers concerning shadow education, which has a long history in Mauritius, are analysed in Professor Bray's book.

The same goes for relatively low-income countries – in India's West Bengal state, 64 per cent of primary school children are tutored; and Sri Lanka 92 per cent of Grade 10 students receive tutoring.

The phenomenon of 'star tutors' is especially obvious in Hong Kong. These are stylish-looking teachers whose faces are featured in ads on buses and in newspapers. They attract huge numbers of Hong Kong teenagers to attend tutorial schools, often claiming to guarantee that the teenagers will get 'A's in exams. But as Bray's research shows, many students chiefly go simply because their peers do.

He believes that Mainland China is ripe for a similar trend. "China has rising incomes, single-child families, increasing labour mobility, and growing competition for university places. Tutoring centres will play on all these factors to attract pupils."

The challenges

The main problems lie in the quality of tutoring in this largely unregulated sector; the advantages it can give children from wealthy families while those from low-income families fall behind; the inequalities it can create in the classroom for teachers who are trying to serve students with different knowledge levels; and of course the question of whether children are being over-tutored and not given time to play, do sports and develop social skills.

"Some school teachers are offended by the notion of shadow education," says Bray, "while others offer to do the extra tutoring themselves for a fee – which raises ethical questions."

Professor Bray has a football stadium analogy for shadow education. "If everyone in the stadium is sitting down, then everyone can see the game. But if the front row stands up, then the people behind them have to stand up. Soon almost everyone is standing up – and those who do not are severely disadvantaged."

Yet it is not that tutoring in itself is a bad thing, especially when used to help a child having difficulties keeping up with a particular subject in class. "We can pontificate on a macro level that it's problematic, but on an individual level it can be a good thing," laughs Bray, readily admitting that some of his own family members have received tutoring in some subjects, and that it helped.

Spreading the word

Professor Bray's agenda is to focus more attention on the subject and on its implications for mainstream education. At the time of this interview, he was about to fly to Mauritius for the triennial meeting of Commonwealth Ministers of Education. "I'm reporting on the Education for All agenda, which was part of the Millennium Development Goals," he says. "It harks back to the 1948 UN Declaration of Human Rights which called for free and compulsory education for all. In many countries education is officially free of charge, but parents still have to pay for tutoring. Does this mean that free education is failing?"

He would like to see more focus on the backwash effects of shadow education on mainstream. "For example current reforms in Hong Kong's education system say nothing about shadow education, despite its obvious spread and role."

"We also need guidelines for parents. It is a competitive world, and it's natural to want your children to get ahead. But parents should receive guidance about excessive and/or inappropriate tutoring."

The subject is getting all the attention it deserves at the Faculty of Education, where it is a Faculty Research Theme. Professor Bray's team recently won funding from the Research Grants Council to examine the relationship between mainstream schooling and private tutoring in local secondary schools. More dramatically perhaps, one team member is investigating tutoring at kindergarten level in Hong Kong. Other team members are focusing on Bangladesh, Cambodia, Georgia, and Mainland China.

Hong Kong educators may feel ambivalent about the scale of tutoring, but focus on the theme can be part of the solution. Through the work of Professor Bray and his team, HKU is taking the lead in both local and international research on topic which increasingly touches the lives of students and their families around the globe. ■

A Learning **Curve**

Hong Kong Pakistani Riz Ullah champions the cause of the ethnic minority, and in his thesis questions the education non-Chinese speaking students receive.

Riz Ullah is a perfect example of someone who practises what he preaches. The 31-year-old son of Pakistani immigrants, his upbringing and education are a case history in how to address the problems of being an ethnic minority student in Hong Kong.

It is a story of much achievement – in August, Ullah was honoured by the Pakistan Association of Hong Kong for becoming the first among its ranks to get a PhD. The thesis – which he completed in just 31 months – has attracted attention from the government.

It is a critical review on the provision of Chinese Language education for non-Chinese speaking students in secondary schools in the city and has led to him being invited to sit on government bodies. He has had meetings with Chief Secretary Carrie Lam Cheng Yuet-ngor and Education Minister Eddie Ng Hak-kim, as well as discussions with Unison (an advocate for ethnic minorities in Hong Kong) about the Chinese language problems such people face.

Ullah wants to see ethnic minorities in Hong Kong being given the chance to increase their currency through better education opportunities. It is all about making the most out of your opportunities, something he has certainly done.

Born a British subject of Pakistani parents – his father came here in the 1960s "for bread and butter". Pakistan was a new country with a poor education system and few jobs, while Hong Kong's economy was just taking off and needed all the foreign labour it could get. His father worked all hours. His mother came to Hong Kong in 1980, they married and had five children of whom Ullah is the eldest and only boy.

Educated at Delia Memorial School (Hip Wo) in Kwun Tong, he was taught English and French, but not Cantonese, at least not properly. He learnt to speak Cantonese through living in Hong Kong, but not to read or write the language.

Lack of role models

He worked hard, but often felt isolated: "When we were growing up there were no role models – no ethnic minority students went beyond form five and definitely not to university," says Ullah.

He broke the mould with his first degree, a BSc from Upper Iowa University with second class honours, by correspondence course, then leveraged that to get on the Postgraduate Diploma in Education course at HKU in 2006, followed by an MEd (HKBU) and then his PhD.

This academic prowess seems to run in the family: one of his sisters Arfeen BiBi graduated in the HKU's first batch of BA&BEd students on the Dean's honours list, first in the faculty, while his youngest sister Nasirah BiBi is an A-plus student in her third year of BEd.

Riz has nothing but praise for the support he has been given by HKU and in particular by Dr Winnie Lai…"as well as a top supervisor she also became something of a mother figure to me", and Dr Stephen Andrews, now Professor Andrews, Dean of Education. "The day I turned up at the Graduate School to apply to do my PhD, they asked me who my supervisor would be. I had no idea so they gave me a list and I chose 'Dr Stephen Andrews' at random. It was a Saturday morning and I just knocked on his door. But he welcomed me in, spared time to talk to me and patiently listened to my ideas. Through him I met Dr Lai."

In his turn, Ullah believes in giving back. He is now a teacher and also responsible for multicultural affairs at his former school Delia (Hip Wo) which has a student population made up 55 per cent ethnic minorities and 45 per cent Cantonese.

He comes to the interview straight from the airport, having just dropped off five students heading to Taiwan to pursue degrees at I-Shou University, a private university specialising in international students.

> **"I'm not a radical – if you like, I'm a rational! I want change but we can achieve that change by working towards it."**
>
> *Riz Ullah*

He discovered I-Shou while searching for opportunities for his students – a subject that occupies much of his thoughts. "At first I was sceptical, but after I visited I was really impressed. They're going to do Bachelor of International Business Administration. I have high expectations of these kids – our first cohort there."

It's another example of Ullah's credo of 'finding a way'. The problem in Hong Kong is a shortage of university places. "But I tell my students if you go overseas to do your initial degree, then you can use that to do your masters and PhD in Hong Kong. Once you have a recognised degree under your belt you can progress," says Ullah.

"My main objective directive is articulation; find multiple pathways; make sure they have multiple options and plans. Taiwan is good for ethnic minorities from Hong Kong as they can learn Mandarin – that means they have their own language, Mandarin, and Cantonese, which offers more opportunities for work."

He is also a founder member of the Pakistani Students Association HK, a voluntary organisation that advises on the education plight of ethnic minorities. It is mainly made up of Pakistanis but also has Indian and Nepalese members. Activities include speech festivals, where members give speeches in English, Chinese or Urdu. "It gives them a taste of success and enhances their self-esteem," says Ullah. "It also gets their parents involved – come and see what your kids are capable of."

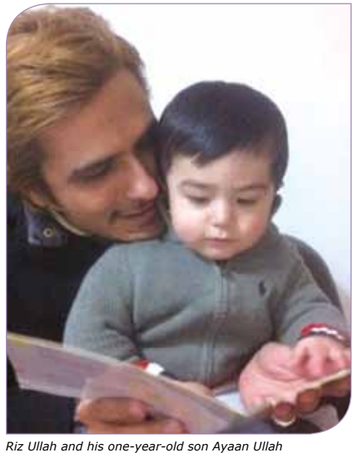
Ullah hopes the government will consider the reforms presented in his thesis as a way to ensure ethnic minorities get a fair chance to fulfil all they are capable of too.

"Immediate need – survival"

"Educationalists talk about life-long learning but for ethnic minorities there is a more immediate need – survival. Being able to get a job – a good job. When the British retreated in 1997 there were no voices talking about this. I was not the first but I was in the first tier. I've been looking into this issue since 2005 – that's seven years – that's why I was able to finish my thesis so quickly!"

"The government needs to make an alternative Chinese assessment of ethnic minority students studying in what is their second language, so that they can get a qualification that will allow them to apply for better work such as government jobs. If this doesn't happen there will be a social cost as they become more disaffected."

"Let me be clear here," he adds, "I'm not a radical – if you like, I'm a rational! I want change but we can reach that change by working towards it. I hope, with the support of HKU and the government, to continue to write journals and papers on the subject." ■



Riz Ullah and his one-year-old son Ayaan Ullah

A Vision between **Concrete and Mud**

John Lin in the Department of Architecture has won a major international award for his prototype of a self-sufficient home in China's rapidly evolving countryside, which he developed with his students.

An award-winning prototype for a Chinese village house in Shijia village, Shaanxi province by John Lin and his students

> **"This project is a reflection on what role architecture and architects can play. The point is to provide alternatives."**
>
> *John Lin*

The architectural impact of China's economic development has largely been reported as an urban phenomenon in which money and people flow into cities and the cities undergo sometimes spectacular physical transformation. But what of the villages?

Villages, after all, hold a special place in China, representing the tie to the land and the ancestral home. Money has therefore flowed back to them, but with far less impressive results architecturally.

"Over the last 30 years, there's been incredible pressure to build and a lot of construction has been going on. It eclipses the development in cities in floor area and scale," says Assistant Professor of Architecture John Lin.

The illustrated model

"But no architects are working in this area. What has happened is that there has been only one type of generic building which is not informed by architecture and has nothing to do with traditional forms of building."

"I'm not saying the old types of buildings are always better, but vernacular architecture has its own way of adapting to the economic, material, social, technological changes around it. Here, when the change has happened so fast, it's like a sudden break with the past."

Sustainable architecture

Against this background, Mr Lin was approached in 2006 by the Luke Him San Charitable Trust to look at sustainability and architecture in rural China. They provided full support as he and his students developed a new prototype for a Chinese village house.

Working in Shijia village in Shaanxi province, they started out with an open mind about what they would do. They spoke with donors, local government officials, and the villagers who favoured infrastructure such as new water pipes or a biogas project. And they looked at how the space in the village was used.

"What we decided was, why not do a single house as a prototype, put all these great ideas in a small house and showcase it as an example," he says. "Architecture can be part of the effort to change people's perceptions about how things are done. That for me is the most important goal."

Students were sent into the field to document the buildings – how many old ones, how many new ones, the features of each building, how space was used, who was using it. This information was used to form the prototype.

The house, which is made of concrete columns for earthquake resistance and mud brick for insulation, contains four courtyards that connect the indoor living spaces with the livestock areas. Biogas from the livestock waste is used in a methane cooker, flue gases warm the bed area, the roof is used to collect water, and there is a stepped area outside for drying crops.

The rhythm of life

Arthas Qian, who worked on the project during his final year of BA(ArchStud) in 2010–11, says the house is attuned to the seasonal rhythm of village life. "This house operates like an organic body. People want to stay inside in the cold of winter so there's a well-heated bed – their way of living is to basically stay in one room. When spring comes, their activities expand."

The house was completed this year and, while the process of selecting the occupants is still underway, it has attracted international acclaim for its innovative design.

It was declared the winner of this year's Architectural Review House Award, ahead of entries that more typically feature private wealthy homes. "It was peer-reviewed, essentially," Mr Lin says – and for him, this meant validation not only for the project, but the process, including the involvement of students and engagement with the community.

"This project is a reflection on what role architecture and architects can play. The point is to provide alternatives," he says. "Architecture is about choice and we're offering something that evolves the traditional house into an alternative for a contemporary village house."

His next project will look at the whole village itself. Mr Lin, who also won an HKU Knowledge Exchange Award this year for his work with students in rebuilding a bridge in a Guizhou village and creating public space there, is considering how to reconstruct an entire village to resolve the conflicts of past and present, and diversity and conformity, that are pulling at China as it continues to develop. ■

Terraces for planting crops fertilised with leftover slurry

Making **an Impact**

The Faculty of Social Sciences is ready to stand up and be counted.

"Medicine saves lives, engineers build bridges… what do social scientists do?" It's a question that Dean of Social Sciences Professor John Burns is tired of hearing – and one he's ready to answer.

"In the past we've tended to wring our hands and say – well, people don't really understand what we do…" he says, "but in fact the public, alumni and fellow academics need to know what we're doing and the impact that it has. At HKU we spend a lot of time analysing our academic impact – which as a research university is of course important – but relatively little looking at our impact on the community." To this end the Faculty newsletter *Socientist* is going to contain regular updates on the subject. "We'll drill home to people what we have been doing through articles and by backward mapping our contract research – which government departments value our contract research, and how it has changed public policy."

Professor Burns came to Hong Kong back in the 1970s, after studying politics at St Olaf's and then Oxford. He was fascinated by the Cultural Revolution and enrolled on a PhD programme on Chinese politics at Columbia, which sent him to Hong Kong. The touch-base policy – by which Mainland Chinese could stay in Hong Kong if they could get here – was in place at the time and he found himself interviewing new 'refugees' from the Mainland at a research centre [the University Service Centre, now at The Chinese University of Hong Kong] – "some good books came out of that."

His first contact with HKU came when he was writing his dissertation and took a part-time teaching assistant job to make ends meet. The pay was a princely $1,600, which failed to make ends even come close. "So in 1979 when I got a lectureship at HKU with a decent wage, it changed my outlook on life," he laughs.

Focus on China Studies

He became Dean of Social Sciences last year and retains his position as Chair Professor of Politics and Public Administration. One of his prime reasons for competing for the deanship was to push China Studies, as he felt that Social Sciences had not engaged in a focused effort to drive it forward.

While it has been a focus of HKU for some time – and Professor Burns is quick to point out that some faculties, notably Arts with China West, have made progress – he wants to make a name for the Faculty and HKU in China Studies. "Hence, the first thing I have brought to the deanship is a recognition of this fact in writing – it is now one of our three strategic areas in Faculty development, and we are now re-energising one of HKU's strategic themes called Contemporary China."

"We have tremendous resources in this area, it's just that they have not been recognised, and they're not well organised nor well funded. I want to provide structure, financial support and leadership to this group. We are working with the Arts Faculty and with Angela Leung's Hong Kong Institute for the Humanities and Social Sciences, and I hope that the three of us working together can have a huge impact."

The Faculty's two other strategic priority areas are NGOs and Civil Society and Social and Cognitive Neuroscience. For the former, Social Sciences recently launched ExCEL3, a massive project, backed by a generous grant from the Hong Kong Jockey Club, which seeks to empower the third sector.

"ExCEL3 was only launched in June," says Professor Burns, "but we've already built a huge network of groups encompassing philanthropy, charity, institutional investors, social enterprises, NGOs and social venture capitalist groups. It crosses faculties – we're working on this with Law, Business, Arts and Medicine – and we're partnering with the Rockefeller Foundation as well as the Jockey Club. It's a huge, multi-year project, and within the sector it has sparked recognition that HKU is a player."

The third strategic area, Neuroscience, is another speciality in which the Faculty has a great deal of research capacity. "It's about trying to understand cognition, emotion and is primarily in the area of Psychology, though we work with Medicine too on this," says Professor Burns. "We have been strong in Neuroscience for a long time, and the Psychology Department brings research expertise and a cosmopolitan outlook. We are cutting edge in this area so it should be pushed."

> **"ExCEL3 was only launched in June, but we've already built a huge network of groups. It's a huge, multi-year project, and within the sector it has sparked recognition that HKU is a player."**
>
> *Professor John Burns*

Inter-disciplinary evolution

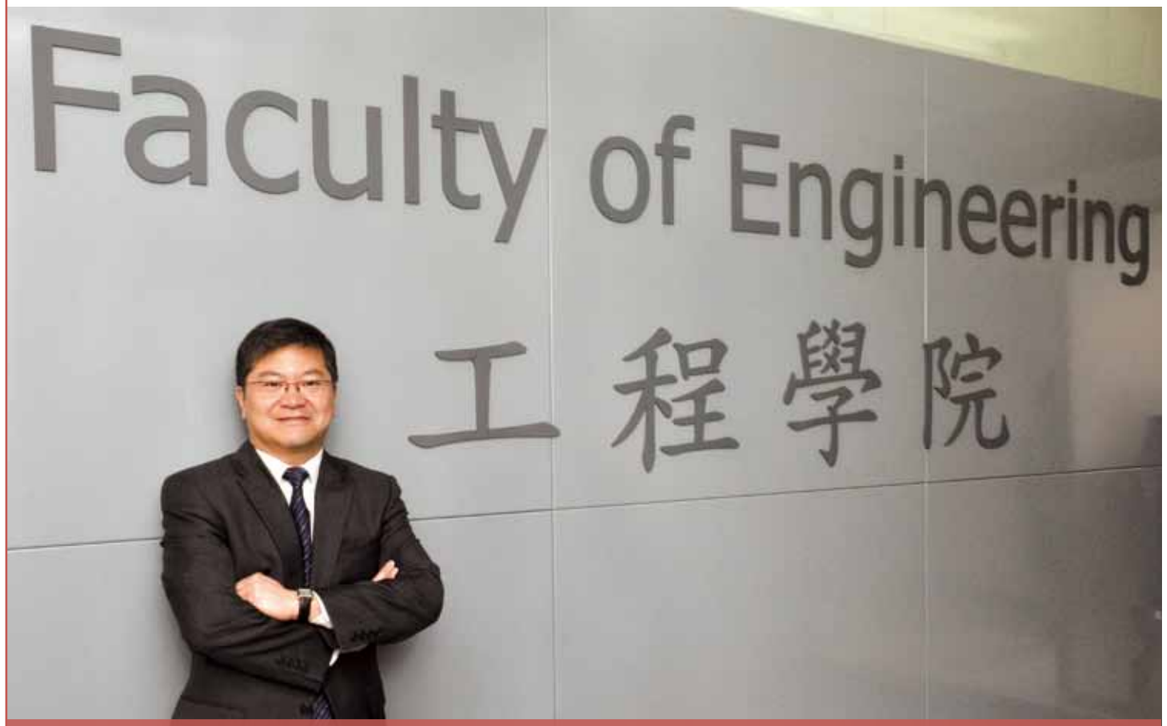
His aim is to promote all three areas, and further Social Sciences' reputation in research. "That we are a research university trumps everything," he says. "These areas are inter-disciplinary – they have evolved that way. Our departments work well together. But then a dean would say that wouldn't he?" he laughs.

Professor Burns also aims to encourage research achievement via incentives such as a Faculty awards scheme, which he plans will begin next year. "We propose four awards – two for lab-based research, one for basic and the other for applied, and two for humanities, again one each for basic and applied."

Asked about the four-year curriculum, Professor Burns welcomes it as a tremendous opportunity. "It encouraged Social Sciences to introduce experiential learning for every student – you can't get a bachelor degree from this Faculty without, one, doing an internship and, two, leaving Hong Kong for an academic activity. We're the only Faculty that requires this and we're proud of it."

"We're also proud of our contribution to the Common Core, not only in terms of leadership through, for example, Professor Joseph Chan, but also in terms of the number of courses we teach. I strongly support the Common Core – it is a splendid idea well implemented." ■

With the grant from the Hong Kong Jockey Club, the Faculty of Social Sciences launched ExCEL3 in June.



Thrill of **the Challenge**

The new Dean of Engineering at HKU hopes to inspire innovation not only among researchers, but also students.

Professor Norman Tien spoke in the Engineering Summer Camp 2012.

The Blue Angels are incredibly fit US fighter pilots who use their muscle power to constrict their veins and keep the blood from rushing out of their heads when they perform loops, barrel rolls and other intense manoeuvres. That strength – and the thrill of the ride – has left a lingering impression on the new Dean of Engineering, Professor Norman Tien, who was invited to be a passenger a few years ago.

Professor Tien worked hard to keep his blood in place and survived the 45-minute ride mostly intact (his stomach did suffer). But he relished the chance to push himself to the limit.

Now, in a much less physically challenging environment, he is taking up another ambitious task: to help the Faculty of Engineering reach new heights as it navigates the incredible changes underway, economically and technologically, around the region and the world.

"I think coming here satisfies the Blue Angels desire that I have where you get a thrill from the excitement," he says. "It's a wonderful opportunity with tremendous potential."

"HKU Engineering has this incredible legacy that has completely intertwined it with the development of Hong Kong. You can see that infrastructure has been a big theme for the past 100 years. But the future in my opinion, and it is shared by others, is that Hong Kong needs to have more innovation and knowledge-based industry. It needs to have a more comprehensive economy."

Pushing to greater heights

That was a view shared by his father, the late Professor Tien Chang-lin, a former Chancellor at UC-Berkeley who was invited by Hong Kong's then-Chief Executive Tung Chee-hwa to head the Innovation and Technology Commission in 1998. The recommendations included ASTRI and the Innovation and Technology Fund.

> **"There's no reason for HKU not to be one of the top universities in the world such as Cambridge, Stanford, MIT. And if we're looking at top universities, they can't do that without a stellar engineering programme."**
>
> *Professor Norman Tien*

Professor Norman Tien was invited to be a passenger of the Blue Angels some years ago.

"The blueprint was excellent, the vision on the mark," says Professor Tien who, like his father, has spent almost all his working life in academia including being Dean of Case Western Reserve University immediately before coming to HKU.

While he was at Case Western Reserve, he instigated new vehicles for research in energy innovation and health technology. He sees potential for the Faculty to make a mark in these areas, too, especially given the opportunities being presented as China develops.

"The centre of gravity of the world is coming to this region – it's dynamic, it's moving quickly, it's rising rapidly. So it's an exciting place to be."

"I would also love to be part of pushing both Engineering and this University to greater heights. There's no reason for HKU not to be one of the top universities in the world such as Cambridge, Stanford, MIT. And if we're looking at top universities, they can't do that without a stellar engineering programme because technology is such a major part of the global economy. To be a really top university, you have to have a strong engineering programme," Professor Tien says.

Igniting the engine of change

Strong not only in research but also education: he sees the Faculty as an 'ignitor' of innovation among students.

"We should enable students to see opportunities to do things that are not only available in their specialities. There are thousands of possibilities. They can turn ideas into thriving businesses, like Google and Facebook, and transform their technical know-how into technological entrepreneurship. It's all about re-imagining what's possible. We here at HKU should not only be a fertile training ground but a beacon, igniting students to stretch their limits for what can be accomplished."

Such opportunities could arise from more collaborative work. He is nudging both staff and students in this direction by encouraging them to participate in an international robotics grand challenge, which will require them to cross departments and disciplines.

"It's an exercise in doing something in a different way – that's important for the Faculty, for any organisation," he says.

"We have the strongest students in Hong Kong compared to other faculties of engineering. There is strength among the teachers and professors. We definitely need to build on these things. A lot of that will be helping students and staff to see new and higher paths" – maybe not quite from the perspective of a fighter jet, but certainly with eyes fixed on the new horizons ahead. ■

When the Personal Is **Professional**

Dr Petula Ho's friendship with singer Anthony Wong Yiu-ming of the Tat Ming Pair was a catalyst to her career-long focus on sexuality and identity.

Thirty years ago Dr Petula Ho Sik-ying, Associate Professor of Social Work, met the young and handsome Anthony Wong while volunteering for a Christian organisation. They quickly became friends and a few years later he confided his deepest secret to her: he was gay.

"After he told me, I came to understand that in this world there is such a thing [as being gay]. This strange, new, unfamiliar thing was very much around me all the time but I just wasn't aware of it," she says.

"In the 1980s 'gay' wasn't a popular word and there wasn't much discourse on homosexuality. It was still illegal and although there was some discussion about decriminalising it, it wasn't on the agenda."

Dr Ho was curious to find out more and decided to make homosexuality the focus of her master's and PhD theses, against the advice of many others. Being gay was largely regarded as a mental illness or aberration at the time and Dr Ho saw an opening to look at the issue in terms of how people under such pressure create a sense of personhood.

The small things in life

The result has been a body of work that is focused on sexuality – in particular the sexual and erotic attitudes and practices of gay men and middle-aged women in Hong Kong – in the context of identity.

"Sex is a small thing you do in your life, it's a pleasure of being human. You could live without it, but in other ways it's also a big deal. You can use it as an entry point to look at family institutions, marriage, the legal system, politics, and how these make certain people do certain things," she says.

The small things in life are important here because they enable people to establish their identities. They can be anything from painting, dancing to having sex – things she says others might regard as 'useless' but which a person can take pride in.

> **"The underlying theme of my studies has been to open up space for people to choose their relationships and be able to be honest about them."**
>
> *Dr Petula Ho*

"People can use their erotic energy to express themselves as human beings," she says.

"Gay men also have to manage with prejudice and stigma. I look at how people transgress boundaries in civil, social, political and personal ways, and how those who are not in privileged positions regain a sense of identity. If you are homosexual, you have to repackage your identity, you have to find people to identify with."

This applies to heterosexuals too, as another focus of Dr Ho's research has been middle-aged women. "I call it the queer art of normal heterosexuals. We're all queer in some way because we have our own personal histories and ways of expressing ourselves," she says.

Space to choose

Dr Ho recently released a collection of 13 previously published articles that she wrote with Dr Tsang Ka-tat of the University of Toronto, called *Sex and Desire in Hong Kong*. The articles have been translated into Chinese for the first time and she hopes they will encourage a wider audience to think more deeply about sexuality, identity and relationships.

She identifies Wong as her inspiration in the book, after securing his permission. Wong publicly came out as gay this year at an anniversary concert for the Tat Ming Pair.

"I told him, if I can put a name there, I can document my 30 years of friendship with him and how it facilitated the development of gay studies in Hong Kong," she says.

"My whole academic career has a personal story behind it which is something I had wanted to share but was not able to share [when he was in the closet]. The underlying theme of my studies has been to open up space for people to choose their relationships and be able to be honest about them."


Dr Petula Ho was awarded the University Teaching Fellowship 2000–2001.


Dr Petula Ho and singer Anthony Wong Yiu-ming

Dr Ho has no qualms about baring her heart in an academic sphere which is typically stringent about cool objectivity. She has a complex relationship with gay men, from her friendship with Wong to having a former boyfriend come out as gay. This was the most traumatic experience for her and heightened her interest in devoting her career to sexuality studies.

"The implication is that the personal is theoretical and the theoretical is personal," she says. "I feel my work is telling people my story. You may think it's self-indulgent but it can be helpful. It encourages people to work out issues through academic endeavours."

Sex and Desire in Hong Kong, by Dr Petula Ho and Dr Tsang Ka-tat, is published by the Hong Kong University Press. ■

Out of Africa **into China**

Africa-China relations have taken on new import since the turn of the century, with new migration both ways. Dr Adams Bodomo's book looks at the diasporan African communities growing in China's trading cities and the bridges being built between the two cultures.

HKU boasts an international community, but when it comes to African students we have only a handful – around 20. Africans in Hong Kong are also a relatively rare sight, which is perhaps why Dr Adams Bodomo's book *Africans in China* has been greeted with some surprise – it's a phenomenon about which most are simply unaware.

"That's because it is a relatively new phenomenon," says Dr Bodomo, Associate Professor of Linguistics and African Studies in the School of Humanities. "While there has been a small African presence in China for a long time, it is only since the turn of the millennium – when China intensified government-to-government relations with Africa – that significant numbers of Africans have been living in there and forming diasporan communities. It started back in the 1990s, when China's economy began to take off and the country needed oil. The Gulf was controversial, so they looked to Africa instead and started making connections."

As those connections were forged, the flow started going the other way – Africans to China. There were already a lot of Africans, mainly traders, in Southeast Asia, particularly Thailand, but it wasn't until the 1997 Asian financial crisis hit and currencies collapsed that they began to move in significant numbers to China and Hong Kong, which had not been so badly affected. China's admission to WTO in 2001 also increased the trend.

"These factors all led to the beginnings of new communities – diasporan communities," says Dr Bodomo. "They are also very transient communities. Currently, hardly any African comes to China to seek employment, the vast majority come to buy goods and go back. But some stay and start businesses."

'Chocolate City'

Africans are found in most major Chinese cities now, including Hong Kong, Macau, Yiwu, Shanghai, and of course Beijing, but by far the largest concentration is in Guangzhou, home to many of the factories that produce the kinds of goods they want for the African market. Indeed, a part of the city has been nicknamed 'Chocolate City' in reference to the many black Africans living there.

> **"I love the cross-cultural aspect of it all, what is being formed. It's part of our globalisation – in terms of trade, mixed music, mixed language, fusion food, mixed genres of literature and art."**
>
> *Dr Adams Bodomo*

There are several factors that particularly interest him about this community. Initially, it was a simple question of what prompts voluntary migration, the answer to which, his research shows – "inevitably, it's the pursuit of a beautiful dream – to better yourself."

Second, it was how these communities form: "While they are concentrated in certain provinces, such as Guangdong where trade is strong, African don't tend to form the equivalent of Chinatowns. There are Africatowns in terms of trade not living. It's a transient situation for most – totally based on trade – but some stay. It's also transient because of China's draconian visa laws. The Chinese authorities are not used to it being an in-migration country, only an out-migration country."

Another development the book covers is the common language, or contact language, that is evolving between Africans and Chinese in the markets of Guangzhou. "Neither speaks the other's language, but you will see them bargaining in markets," says Dr Bodomo. "It's simple stuff – I call it Calculator Communication.

Dr Adams Bodomo and his Chinese Research Assistants met with African leaders in Guangzhou, China.

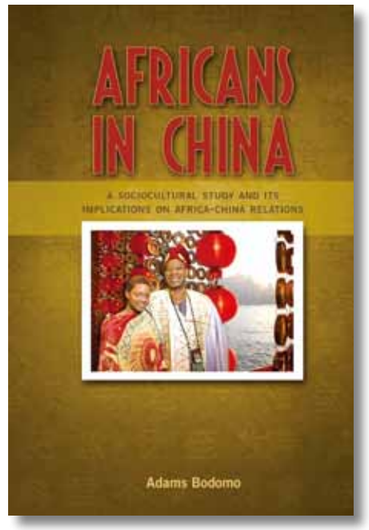
The stallholder names a price for an item, the African says no. Out comes the calculator – and after much gesticulation somehow a price is agreed. I'm encouraging one of my students to pursue this in her thesis research."

And finally, "I love the cross-cultural aspect of it all, what is being formed. It's part of our globalisation, a cross-cultural co-production – in terms of trade, mixed music, mixed language, fusion food, mixed genres of literature and art. It's been 15 years since this migration began, so some have married in China, they have mixed race children. As soon as that happens the presence becomes more permanent."

Students welcome

The new African presence also goes beyond trade, since at Beijing's invitation there about 6,000 African students a year studying in Mainland China. "China is actively seeking to attract African students, offering them scholarships etc – they are building 'soft power'. I applaud that they're giving young Africans the chance to study in China and to learn Mandarin. But, of course, it's not just philanthropic, they're building links. Some students will go back to Africa, others will work in China, or they may work for Chinese companies in Africa – one way or another they will be ambassadors for Africa and China."

Where there is large-scale migration, there is almost inevitably racial tension, and Dr Bodomo's largely optimistic theories have sparked controversy. After he was published in *China Quarterly* there was a big response from people citing the many clashes between Chinese and Africans and indeed between Africans and Africans [from different countries within the continent] in China.



Clashes and bridges

"Yes, there are still culture clashes and some conflict – we still misunderstand one another," acknowledges Dr Bodomo. "But it is during clashes that leaders emerge from both sides, people who want to solve the problems. In this way, more bridges are built. I believe that we need to look beyond occasional clashes – and consider what role this migrant community is playing as a bridge between Chinese and African cultures."

The book is a pioneering effort in the area of Africa-China relations, which is now becoming a hot research topic. Dr Bodomo's next area of interest is the opposite flow – Chinese in Africa of whom there are two million compared with half a million Africans in China. He is currently applying for research funds to go to Ghana, Kenya and Angola for a while to study how Chinese are doing there.

Dr Adams Bodomo has been in Hong Kong since 1997 after stints at the University of Ghana, Norwegian University of Science and Technology, and Stanford University. ■

Awardees and finalists of the 3MT Competition with Pro-Vice-Chancellor Professor Paul Tam (middle in the front row) and members of the adjudicating panel

Learning the Secrets of **Effective Knowledge Exchange**

Training for young researchers has equipped them to convey their ideas to the public and get their innovations to market.

Take three years of research, condense it down to three minutes and present it to a room of strangers, some of whom are there to judge you. That's the tension-inducing premise of 3MT – the Three Minute Thesis Competition.

3MT was introduced to HKU from Australia last year as part of the University's efforts to improve students' abilities in knowledge exchange.

Twenty-eight research postgraduate students put themselves to the test this year, offering concise and at times entertaining summaries on complex topics such as sexual selection, robotics, stem cells, visual perception, etc.

"Researchers need to engage people outside academia, through the process of knowledge exchange, in order to maximise the impact of their research," says Pro-Vice-Chancellor Professor Paul Tam.

"Think about the moment you saw a natural disaster on TV; read about a controversial legal or public policy issue; or heard the news of a potential infectious disease outbreak involving an unknown virus. What the media, or most people, want to know almost immediately is likely the views of an expert from a top university like HKU."

> **"As researchers, we really have the responsibility to make our knowledge accessible and readily understandable to the general public."**
>
> *Professor Paul Tam*

"As researchers, we really have the responsibility to make our knowledge accessible and readily understandable to the general public. This conviction is shared by researchers around the world, although frankly, it is not an easy task to explain our research findings in straightforward, layman language. Even experienced researchers are often at a loss for words."

Useful practice

Exercises like the 3MT give them practice to develop their skills.

The champion this year, Terence Ng Pun-tung, a PhD candidate in Science, gave an amusing argument against Charles Darwin's contention that sexual selection of the best mates applied only to large animals. He looked at snails and showed that they can also be both competitive and choosy in deciding on a mate.

"I often told my friends that I filmed 'Category III' movies of snails in the laboratory. It made them laugh. But then they would ask me about the contributions of this work to science or society. At the beginning of my PhD study, I could not give a simple and neat answer to this and I felt really ashamed. I knew I was working on an interesting and important subject, but I couldn't find a good way to explain this," Terence says.

"It is likely that most research students may encounter a similar situation and hence having a well-prepared 'three-minute' thesis description in 'your pocket' would be useful."

Zhang Yingying, a PhD candidate in Medicine, presented on her stem cell research, which forced her to avoid the technical jargon she typically used to describe her work.

"If I hadn't participated in this competition, I would never have realised that I had difficulty in describing my research project in layman language," she says. She clearly overcame that hurdle as she won the competition's Online People's Choice Award.

Entrepreneurship Academy

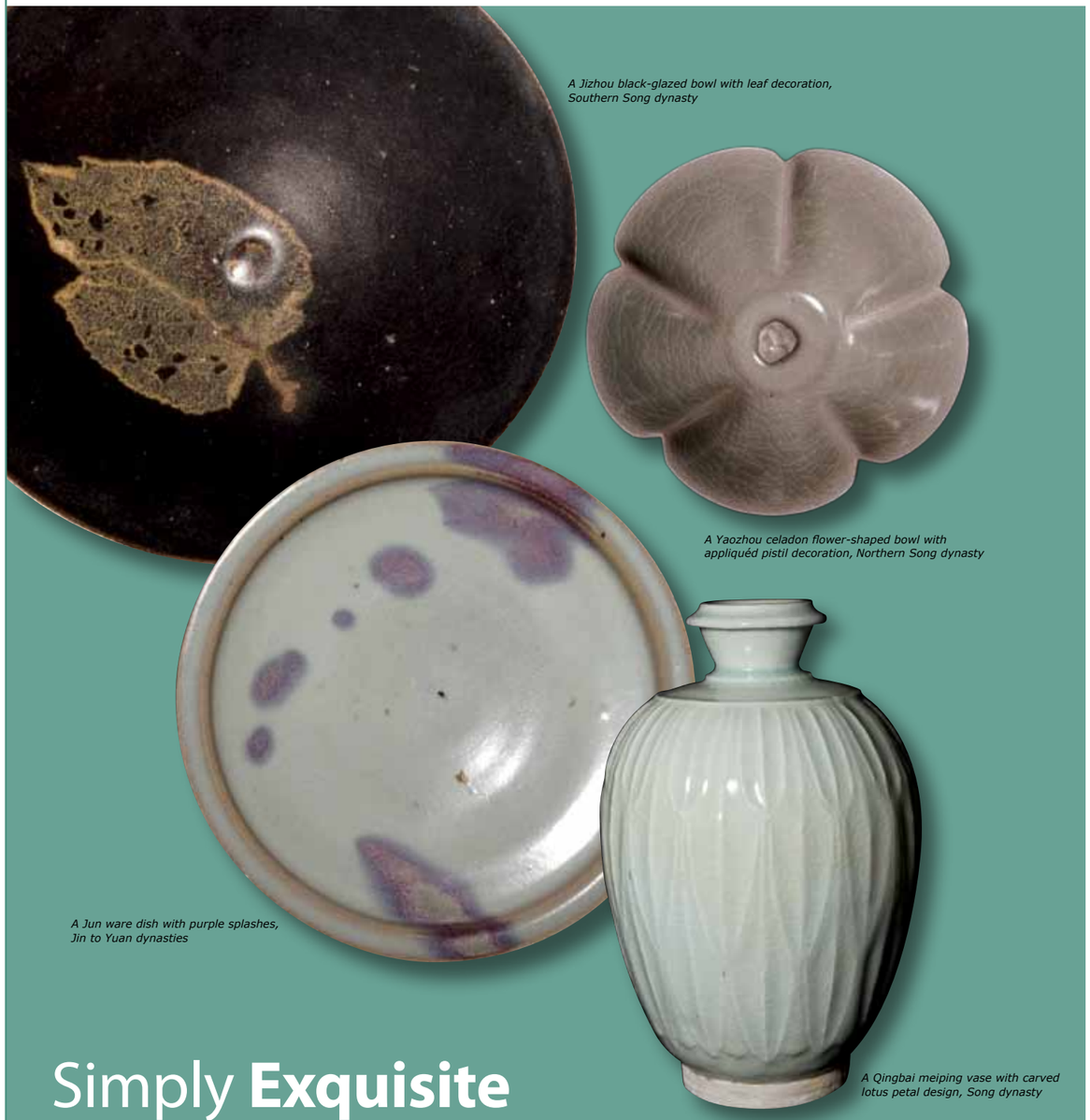
3MT was organised by the Knowledge Exchange Office in cooperation with the Graduate School. The University also runs a programme to develop students' abilities in another area of knowledge exchange – getting ideas to market.

The Entrepreneurship Academy, offered by the Technology Transfer Office, provides training to young researchers on designing a business model, launching a start-up, accounting and other practical skills related to entrepreneurship. It features tailored workshops led by academics of the Faculty of Business and Economics and seasoned practitioners from the corporate world.

The Academy is offered early in the calendar year and open to research staff, research postgraduate students and alumni of related postgraduate programmes.

Professor Tam says the goal in both the Entrepreneurship Academy and 3MT is similar. "We want to sow the seeds of knowledge exchange among students and we want them to see the value of developing skill sets that will help them communicate and advance their ideas." ■

Terence Ng Pun-tung, PhD candidate in the Faculty of Science, Champion and the winner of the People's Choice Award of 3MT Competition 2012



A Jizhou black-glazed bowl with leaf decoration, Southern Song dynasty

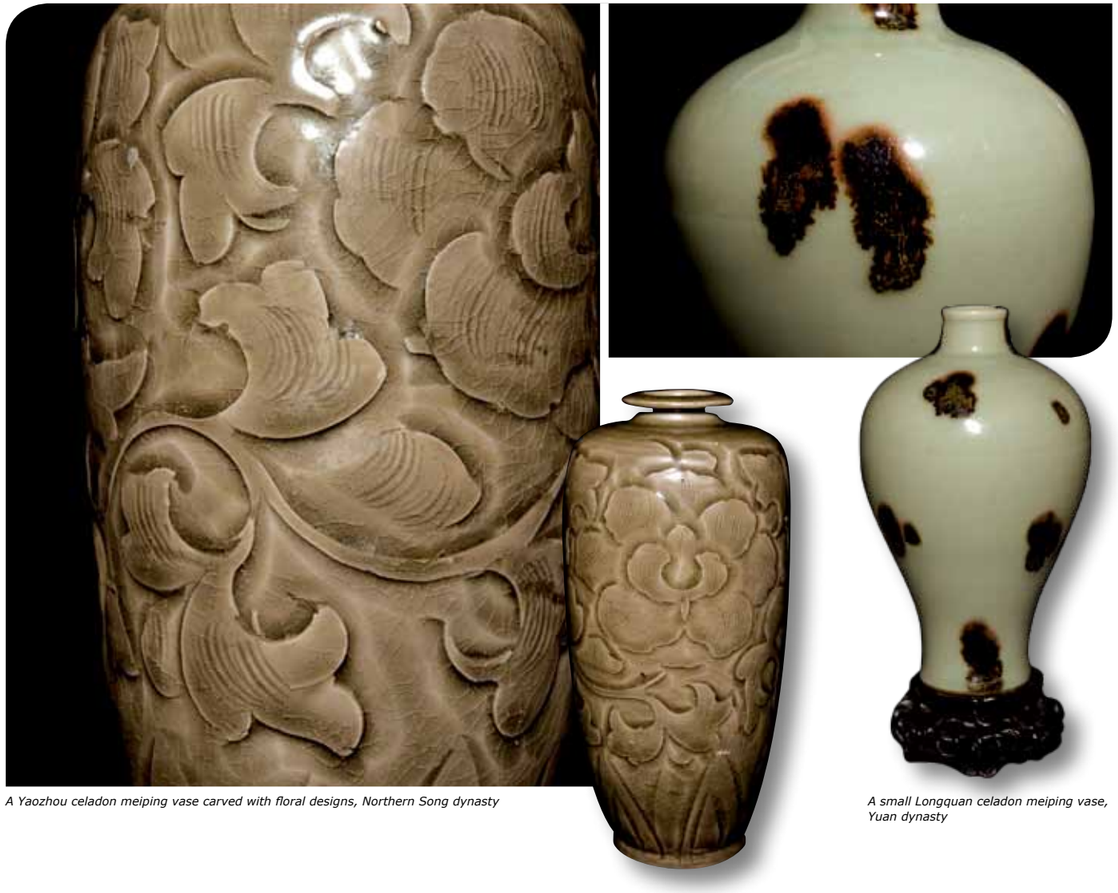
A Yaozhou celadon flower-shaped bowl with appliquéd pistil decoration, Northern Song dynasty

A Jun ware dish with purple splashes, Jin to Yuan dynasties

A Qingbai meiping vase with carved lotus petal design, Song dynasty

Simply **Exquisite**

An exhibition at the University Museum and Art Gallery offers a rare opportunity to view wares from the most exciting periods in Chinese ceramics.



A Yaozhou celadon meiping vase carved with floral designs, Northern Song dynasty

A small Longquan celadon meiping vase, Yuan dynasty

The Song (960–1279) and Yuan (1279–1368) dynasties were important times for the development of ceramics in China, with refinements in glazing and new demand for decorative items enabling potters to inject new finesse and imagination into their wares.

Fine examples of these refinements are on view now until November 25, in an exhibition running at the University Museum and Art Gallery, entitled *The Multiplicity of Simplicity: Monochrome wares from the Song to the Yuan dynasties*. The exhibition comprises 118 ceramic pieces on loan from eight private collectors, with some pieces from the Museum's own collection. The wares range from delicate, subtly decorated bowls and dishes to larger vases and garden jars, many of them in the classic white or green (celadon) colours popular at the time.

The aim of the exhibition, according to the former Museum Director Yeung Chun-tong is "to bring out the role made by the monochrome porcelain of the Song and Yuan dynasties and to establish the status they deserve in the cultural history of China."

Tina Pang Yee-wan, Curator of the Museum, says: "Song is the classic period for ceramics – it's a period that comes up again and again through the subsequent dynasties as having been the ideal in terms of Chinese classicism for ceramics. That wasn't necessarily true at the time, but as we look at it with a contemporary eye, the really noticeable development about the period is that it was a turning point – a transformation in terms of technology and aesthetics."

Progress had begun in the preceding Tang dynasty (618–907), and two Tang stoneware jars are included in the exhibition. While appearing rather crude next to the fine Song and Yuan pieces, they signal later developments in the bold experimentation with abstract decorative effects in the glaze.

A large Ding bowl incised with peony, Northern Song dynasty

A small Longquan celadon bowl, Southern Song dynasty

Coveted at court

Several decorative techniques come to the fore in the exhibition – including the famous carved and moulded white Ding ware of northern China, coveted both at court and among the aristocracy, as well as subtle developments in glaze tones being introduced to monochrome wares such as the blue and lavender-hued Jun wares and the celadons of the Longquan and Yaozhou kilns. Growing wealth meant that more people wanted and could afford to buy ceramics while changes in taste increased demand for decorated items. This market extended across East and Southeast Asia, especially in celadon wares.

The exhibition, which is sponsored by the University of Hong Kong Museum Society and the Songde Tang, offers a rare chance to see classic monochrome pieces produced by some of the most well-known kilns of the Song period in Hebei, Henan, Shaanxi, Zhejiang, Fujian and Jiangxi provinces.

Many of the pieces have never been seen in public before. Commenting on the pieces from private collections, Ms Pang explains that, like most university museums, the budget is "pretty modest," adding: "Happily, we are able to mount exhibitions like this in Hong Kong thanks to the generosity of private collectors who are willing to share their personal treasures with the public." ■

The exhibition runs at the University Museum and Art Gallery until November 25, 2012.

Opening hours 9:30am–6pm, Monday to Saturday and 1pm–6pm on Sunday. The museum is closed on University and public holidays. Admission is free.

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