

Summer/Autumn 2014 ISSUE 10 第十期

umagazine

澳大新語



探索新領域 澳大研究潛力無限

Exploring New Possibilities
For Research

諾貝爾獎得主專訪
Interview with Nobel
Prize Winner Chen Ning Yang

學生志願者走出象牙塔
The World outside
the Ivory Tower

編者的話 Editor's Words

今年上半年，對澳門大學來說，可說是碩果纍纍，同時機會與挑戰並存。

經過多年發展，澳大的學術研究漸在國際舞台上嶄露頭角，例如，在微電子研究，澳大躋身世界排名前10強；課程方面，科技學院和工商管理學院課程獲得國際認可。另外，也邀請到兩位諾貝爾獎得主楊振寧教授和斯蒂格利茨教授，以及著名詩人余光中教授分享寶貴的經驗和知識。

各領域取得的佳績，一直激勵和推動著澳大不斷向前邁進。澳大在今年八月全面遷入新校園，全新的科研基地、教學設備和住宿式書院無不令人期待，但也因為新的校園而為大學在管理上帶來不少的挑戰。

成就、機會和挑戰的背後，牽涉的是許多人的努力和辛勞。《澳大新語》希望和讀者分享這些背後故事。本期不僅全面報導澳大科研成果和未來目標，更探討新校園如何提供優質學習環境，以幫助提升教學質量。

葛偉教授在專訪裡說到健康科學學院未來前行的「道路是曲折的，但前途是光明的」，這句話不僅可以用在這所新的學院身上，也正好用來描述澳大新的發展前景。儘管前進的道路並不平坦，但澳大人都有信心克服挑戰，共同推動大學取得更卓越的成就。

新的校園，新的希望，我們翹首以盼！

The first half of the year 2014 has been very fruitful for the University of Macau (UM).

Research in microelectronics has entered the world's top ten. Some of the academic programmes offered by the Faculty of Science and Technology and Faculty of Business Administration have received international recognition. Apart from making progress in teaching and research, the university has also successfully invited many leaders in different fields to share experience and insights with the students, including Nobel laureates Prof. Chen Ning Yang and Prof. Joseph E. Stiglitz, and one of the Chinese-speaking world's best known poets, Prof. Yu Kwang Chung.

These achievements become more encouraging when viewed in the context of the new campus. In August 2014, relocation to the new campus, which had been carried out in stages, was fully completed. The imminent prospect of having a new campus with its own scientific research base, advanced facilities for teaching, learning and research, as well as Asia's largest residential college system, is exciting. The new campus will undoubtedly bring new opportunities, but with new opportunities come new challenges.

Behind every achievement the university has attained is years of tireless team effort. This issue of *umagazine* tells those behind-the-scenes stories. Besides comprehensive reporting of the university's research achievements and future goals, this issue also features in-depth discussions on the various strategies for further improving the university's teaching and learning.

Prof. Ge Wei cited an old Chinese saying, "The road is tortuous, but the future is bright," when talking about the future of the newly established Faculty of Health Sciences. Perhaps this saying is also a fitting description of the future of the university. The road to achieving our goals is not always smooth and straight, but with confidence and joint effort, it is entirely possible to elevate the university to new heights of success.

And that begins with exploring the new possibilities offered by the new campus.

張惠琴 Katrina Cheong

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探索新領域 澳大研究潛力無限

Exploring New Possibilities for Research

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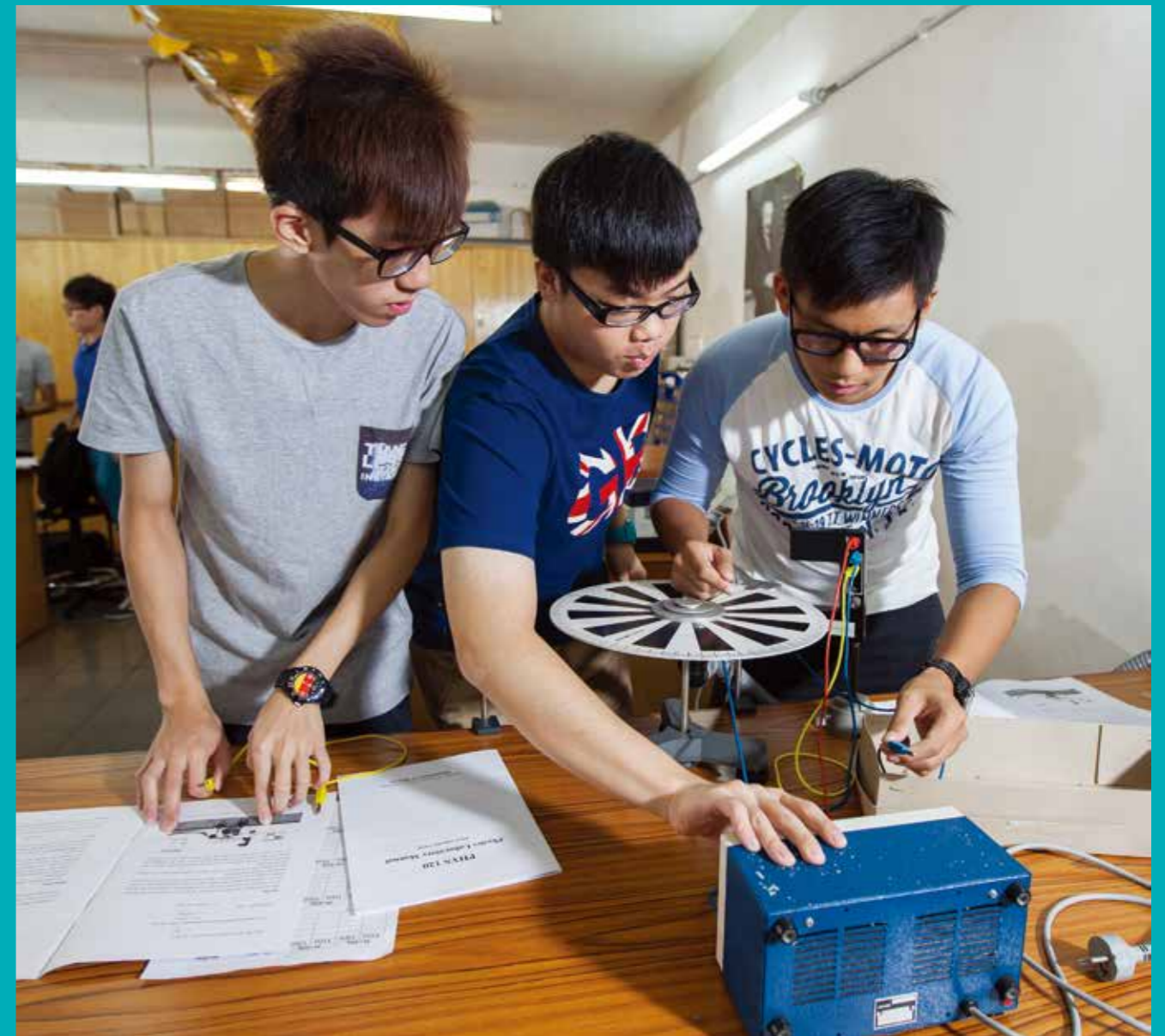


作為本地區備受公認的公立大學，澳門大學一直致力追求學術卓越，以高水平研究和教學品質爭取國際認同。在過去五年，澳大迅速發展，在研究和課程認可方面均取得了重要的成果：高端 SCI 索引期刊論文數量年增長 40%，師生每年發表 500 篇以上的高水平論文，每年論文獲引用超過 3,500 次；根據國際電機電子工程師學會（IEEE）2014 年國際固態電路會議關於第一作者論文的標準，澳大目前在微電子研究方面排名前 10 強大學，以及科技學院和工商管理學院課程獲得國際認可，證明澳大的學術研究和教學達到國際水平。

在過去累積的成果之下，澳大未來將繼續擴大研究投資並制定新的研究策略，以推動能配合澳門社會發展

As a recognised leading public university in the region, the University of Macau (UM) is committed to excellence in teaching and research. Over the past five years, it has made great progress in both areas. Some of the academic programmes offered by the Faculty of Science and Technology (FST) and the Faculty of Business Administration (FBA) have gained international recognition. The number of papers published in high-level SCI-indexed journals has seen an annual increase of 40 per cent. Every year, UM staff and students publish more than 500 high-quality papers, with a citation frequency of over 3,500. UM now ranks among the top ten universities in the world in terms of research in microelectronics, according to the 2014 IEEE international Solid-State Circuits Conference standards for first-author papers. These achievements show that UM has reached international standards in some aspects of teaching and research.

In the future, UM will increase investment in research and formulate new research strategies, in order to develop frontier disciplines with



且具國際影響力的前沿學科，如新成立的健康科學學院，在生物醫學和傳染病領域將嘗試新的探索和創新，並培養高質素的研究型人才，冀能以新的研究成果造福人類。科技學院也將招收更多高質素、具研究精神的研究生來推動大學的研究發展。

澳大新校園設有科研基地，除了微電子和中醫藥兩大領域的國家重點實驗室外，還將藉新校園更廣闊的硬件空間，全力推動醫藥、能源環境與電子信息領域的發展。澳大已與北京大學、香港大學和台灣大學合作創建聯合研究中心，將繼續進一步深化與鄰近地區的學術和研究合作。在新校園帶來的契機下，澳大未來的研究發展潛力無限，也將開創一個嶄新的局面。

international impact that meet the needs of the Macao society. For instance, the newly established Faculty of Health Sciences will train high-calibre research specialists and make new explorations and innovations in the areas of biomedical sciences and infectious diseases. FST will recruit more high-quality, research-minded postgraduate students to promote research development at the university.

The scientific research base on the new campus will house the two state key laboratories in microelectronics and Chinese medicine; it will also promote research in such areas as medical sciences, energy and environment, as well as information and electronics. UM has established a joint research centre with Peking University, the University of Hong Kong, and Taiwan University. In the future, it will continue to deepen academic and research collaborations with institutions in neighbouring regions. The new campus has ushered in a new era, and with the opportunities it brings, the university is faced with expanding research possibilities.



馬許願副校長指新校園設備完善的科研基地，為推動研究發展創造條件。
Vice Rector (Research) Prof. Rui Martins says the Scientific Research Base provides good conditions for research development

馬許願副校長： 新校園為研究發展帶來新機遇

Vice Rector Rui Martins: New campus brings new opportunities for research

於 2008 年 9 月被任命為副校長（研究）的馬許願講座教授，專責澳大研究發展。他也是一位國際知名的微電子研究專家，與其研究團隊致力開發高科技微電子研究項目，並在超大規模集成電路晶片領域取得重大成果，為澳門取得了首個該領域的專利。

《澳大新語》就澳大未來研究藍圖專訪馬副校長，以下為訪問全文：

Prof. Rui Martins was appointed UM's vice rector for research in September 2008. Prof. Martins is a world-renowned expert on microelectronics, and is currently chair professor at UM. Prof. Martins and his research team are dedicated to high-tech microelectronics research, and they have been granted Macao's first-ever patent in the field.

In this interview, Prof. Martins talks about his vision for UM's research development.

馬：副校長（研究）馬許願講座教授 |

澳：《澳大新語》

澳：澳門大學近年有何策略推動研究發展？

馬：澳大在 20 年前已開始支持研究工作。當時我們希望在澳大各領域啟動研究，所以鼓勵所有教學人員向澳大的研究委員會提交研究建議書。隨著 2006 年《澳門大學章程》的修訂，以及 2008 年通過公開招聘新校長，我們發現研究數量和質量方面均需加強。因此，我們在研究管理方面著手進行改革，包括成立研究及發展事務辦公室，專門與研究委員會合作監察研究工作。此外，我們亦推出「多年研究資助計劃（Multi-Year Research Grant）」，通過外部評審擇優進行撥款。

澳：澳大批出研究資助計劃時有甚麼標準？

馬：澳大崇尚學術自由，教學人員無須通過學院或院長提交研究計劃書，只要是助理教授或以上級別的教學人員便可直接將計劃書提交予研究委員會。研究項目由申請者自行決定，凡屬研究範圍以內皆可以提出。

澳：經過多年的發展，澳大的學術和研究水平有否顯著上升？

馬：澳大近年致力改善教學質素，大部分教師擁有博士學位，其中許多教師在世界著名的大學取得博士學位，具有豐富的國際教學經驗和卓越的學術背景，未來會繼續增聘擁有博士學位的教師。

師生發表的論文獲重要科學期刊引用的次數也持續上升，由美國 Thomson Reuters 建立的網際網路版引用文獻索引資料庫系統 Web of Science (WOS) 顯示，2013 年澳大論文獲引用 3,500 次，與 2008 年或 2009 年相比，當時每年只獲引用 100 次左右。發表論文的數量亦都逐年上升。2009 年發表的論文數量大概為 120 篇左右，2013 年超過 500 篇（平均每位教員能夠產出一篇論文），論文發表數量在過去五年上升了四倍。

M: Vice Rector (Research) and Chair Professor Rui Martins |

U: *umagazine*

U: What strategies has UM adopted in recent years to promote research development?

M: We began to support research at UM 20 years ago. Aiming to initiate research in all the areas that were covered by UM, we encouraged our colleagues to present proposals to UM's Research Committee. Basically everybody could present proposals to the committee. With the revision of the University Charter in 2006 and the appointment of a new rector through open recruitment in 2008, we found that we should try to improve both the quantity and the quality of research. For this reason, we carried out reform on research management. For example, we established the Research & Development Administration Office, which works together with the university's Research Committee to supervise research. We also initiated a project to provide Multi-Year Research Grant on a competitive basis, with external vetting.

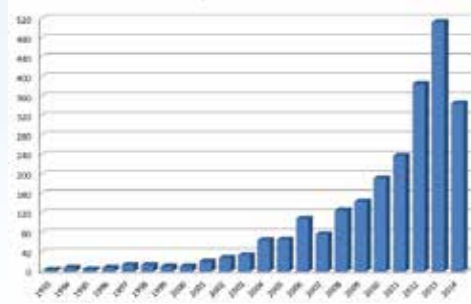
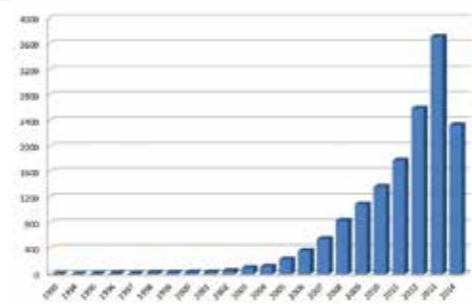
U: Are there any internal criteria for the approval of research proposals?

M: UM upholds academic freedom. In the case of our research support, we don't have any rule that says our faculty members must go to the department and its dean to present their proposals. No. All faculty members at the level of assistant professor or above can present their proposals directly to the Research Committee. It is totally free and they can present whatever they want to do in their areas of research.

U: How much has UM progressed in teaching and research in recent years?

M: In recent years, UM is committed to improving the quality of teaching. The majority of our faculty members hold PhD degrees, many of which are granted by renowned universities. Our faculty members also have rich international teaching experience and impressive academic backgrounds. UM will continue to recruit more faculty members with PhD degrees in the future.

Both the number and citation frequency of published papers by UM members are on steady increase. Approximately 120 papers were published in 2009. The number rose to 500 (which is one paper per faculty member) in 2013, which is more than four times the number in 2009. According to Thomson Reuters Web of Science, in 2008 and 2009, the citation frequency of UM papers was only 100, but in 2013, it surged to 3,500.

澳大每年發表的期刊論文數量 *
Yearly Number of Published Journal Papers (UM)*澳大發表期刊論文每年引用次數 *
Yearly Citation Frequency of Journal Papers (UM)*

As at August 2014 資料截至 2014 年 8 月

*包括:科學引文索引擴展版 (SCI-E)、社會科學引文索引 (SSCI)、藝術與人文科學引文索引 (A&HCI)
* including: Science Citation Index Expanded (SCI-E), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI)

澳: 在學術研究方面, 澳大面對的最大挑戰是甚麼?

U: What is the greatest challenge faced by UM in research?

馬: 研究資助對發展中的大學十分重要。澳大有能力資助 50% 以上的研究申請, 香港通常是 20%, 我們資助比例遠高於香港, 所以研究資助方面澳大是有優勢的, 但教學人員的規模卻是我們的一個不足之處。雖然我們已經聘請 500 多位教學人員, 但這 500 多人是分散到不同領域和學院的。在某些學科領域甚至僅有一至兩位教授, 以至達不到臨界量 (critical mass)。此外, 澳門很小, 在國際上知名度也不高, 這讓我們有時候與其他大學合作會遇到一些困難, 這是澳大面對的另一項挑戰。

M: Research funding is very important for a developing university. We are capable of funding more than 50 per cent of all research proposals, while in Hong Kong it's usually around 20 per cent. So I think that in terms of funding we are in a good situation. One of our limitations is the number of our faculty members. Although we have recruited over 500 faculty members so far, these faculty members are shared by many areas at UM. The critical mass is not very high in some specific disciplines. In some areas there are usually only one to two professors. Another thing is that Macao is a relatively small city and not well-known in the world, and because of this, sometimes we encounter difficulties in setting up cooperative bridges with other universities in and outside the region.

澳: 中藥及微電子兩個國家重點實驗室的研究成果如何?

U: Tell us about the research achievements of the two state key labs.

馬: 2009 年澳大獲批成立澳門首兩個國家重點實驗室。經過數年的發展, 模擬與混合信號超大規模集成電路國家重點實驗室的晶片研究晉身國際固態電路會議論文數量最多的前 10 名大學、論文晉身權威 IEEE 資料庫熱門排行榜; 中藥質量研究國家重點實驗室成功申請 12 項國際或國內專利, 師生平均發表的 SCI 期刊論文數量, 名列全國重點實驗室前茅。在 2014 年初, 兩個國家重點實驗室完成了中期評估。中期評估的突出成績及新校園科研發展空間的擴大, 可以讓澳大在這兩個重點領域取得更好的發展。

M: In 2009, UM received the approval for establishing Macao's first two state key labs, the State Key Laboratory of Analog and Mixed-Signal VLSI (AMS-VLSI Lab), and the State Key Laboratory of Quality Research in Chinese Medicine (QRCM Lab). Both labs have achieved some very good results over the past five years. Because of the AMS-VLSI Lab, UM is now one of the ten universities that have presented the most papers at the Institute of Electrical and Electronics Engineers (IEEE) International solid-State Circuits Conference, which is considered the "Chip Olympics". Related papers have been ranked Most Popular Papers in the *IEEE Xplore* database. The QRCM Lab has also done very well. It has been granted 12 Chinese and international patents. It also ranks among the top among all state key labs in China in terms of the number of papers per person published in SCI-indexed journals. In early 2014, the two state key labs passed the mid-stage assessment with flying colours. This and the increased research space on the new campus will allow UM to achieve even better results in these two key areas.

澳: 除了微電子、中醫藥、健康科學的重點領域外, 還有哪些優先發展的研究領域?

U: Apart from microelectronics, Chinese medicine, and health sciences, are there any other priority research areas at UM?

馬: 電腦及資訊科學亦是澳大的重點研究領域。趙偉校長就是這領域的專家, 他是中國內地國家重點基礎研究發展計劃「973 計劃」物聯網專案的首席科學家, 由此可見, 在物聯網研究領域, 澳門在國家具有領導地位。除此之外, 機械人學及控制論也是科技方面的重點研究領域。此外, 近年我們從內地、葡萄牙及美國等地聘請資深教授加盟, 他們的研究非常突出, 促進了社會科學領域的研究和學術發展, 例如「澳門學」已成為澳大的一個「學術品牌」, 並形成一支以澳門問題研究為中心的多學科、跨領域的學術隊伍, 至今已發表有關研究論文近百篇, 出版專著 20 多部; 在社會學、犯罪學及國際關係領域, 師生的論文發表量也顯著上升。語言方面, 中文系、葡文系及英文系亦有不錯的表現。上述領域都屬澳大的重點研究領域。

M: Computer and Information Science is another key area. Rector Wei Zhao is an expert in this field. He is a chief scientist for a project on the Internet of Things (IoT) which is under the 973 Programme, a national research development programme. This shows that UM enjoys a leading position in China in the field of IoT. Robotics and Cybernetics are other key areas. In recent years, we have recruited senior professors from around the world, including mainland China, Portugal, and the United States. These professors have done very well in research in various areas of social sciences. Macaology is one example. Macaology has now become a "world academic brand" of UM. We have also formed a multidisciplinary research team, which is focused on the studies of Macao-related issues and covers many areas. This team has published nearly 100 research papers and over 20 monographs. In the areas of sociology, criminology, and international relations, the number of published papers by UM faculty and students has also seen a marked increase. On the language front, the Chinese, Portuguese and English departments have also done very well. The above areas are all key research areas at UM.

澳: 新校園的科研空間增大, 可如何促進研究發展?

U: How can the Scientific Research Base on the new campus promote research development at UM?

馬: 新校園的科研基地, 為研究發展創造了完善的硬件和軟件條件, 也為澳大帶來舊校園所沒有的新機遇。例如, 新校園為實驗室和儀器提供了足夠發展空間, 我們目前正在為健康科學學院建立大量新的生物學實驗室。此外, 新校園有一個條件更好的新動物實驗樓。我們可能會成立一個生物研究中心 (P3 Lab) 進行傳染病防治研究, 甚至有可能在國家重點實驗室研究項目的基礎上創建一至兩間衍生公司。

M: The Scientific Research Base on the new campus provides perfect "hardware" and "software" for research development. It also provides new opportunities which we didn't have on the old campus. For example, there is more space for labs and equipment on the new campus. We are setting up a large number of new biology labs for the Faculty of Health Sciences. There is also a new animal house which allows us to keep animals in a better condition. We will probably also set up a centre for biology research—the P3 Lab, which is designed for research in infectious diseases. With a larger space on the new campus, we may also be able to create one or two spin-off companies from the research projects conducted by the state-key labs.



總建築面積 123,860 平方米的科研基地可助澳大開拓新的研究領域
The Scientific Research Base, with a gross floor area of 123,860m², can help UM explore new research areas.



葛偉教授指癌症是健康科學學院研究的重中之重
Prof. Ge Wei says cancer will be FHS's most important research area

健康科學學院講座教授葛偉： 道路是曲折的，前途是光明的

FHS Chair Professor Ge Wei:
“The road is tortuous, but the future is bright.”

生命健康問題一直備受人類的高度關注，全球各地眾多尖端科學家也正不斷嘗試攻克眾多醫學棘手課題，如癌症、禽流感、愛滋病等。這類前沿醫學研究對於以往的澳大來說，幾近天方夜譚，但因為新校園帶來的機遇，澳大在 2012 年創立了健康科學學院（FHS），填補了在上述領域的空白。透過開展前沿科研，健康科學學院望促進現代生物醫藥及健康科學關鍵領域的知識傳播。本文專訪了協助創辦學院的代院長葛偉講座教授，暢談該院的人才培養策略、研究領域以及學院未來面對的挑戰。

Health has always been a topic of great concern to humankind. Leading scientists around the world are constantly trying to crack the code to some of the most challenging medical problems of our time, such as cancer, avian flu, and AIDS. In the past, cutting-edge research in such areas was almost unthinkable for the University of Macau (UM). Thanks to the opportunities brought by the new campus, UM established the Faculty of Health Sciences (FHS) in 2012, filling gaps in these areas. FHS hopes to promote the dissemination of knowledge in key areas of modern biomedicine and health sciences through cutting-edge research. In this article, we interview Chair Professor Ge Wei, interim dean of FHS who assisted with the founding of the faculty, about the FHS's talent development strategy, research areas, and future challenges.

葛：健康科學學院代院長葛偉講座教授 |

澳：《澳大新語》

澳： FHS 的定位是甚麼？

葛： FHS 的定位是研究型學院，我們不會一開始就要變成國際一流的學院，而是希望在不久的未來能快速發展成一個有國際影響力、在本地和鄰近地區具有重要地位的學院。

澳： FHS 的發展有哪些優勢？

葛： 現代生物學和生物醫學研究在很大程度上倚賴於大型設備以及最先進的技術平台，因此它對資金和空間的要求非常高。除了常規實驗室之外，FHS 在新校園將有一個 3,000 平方米的實驗動物大樓，可以做一些前沿的醫學研究，這就是空間硬件的優勢。另外一個優勢是資金，在資金配套和研究方向方面，學校都給予了大力支持，這些優勢令我們對學院未來的發展抱有極大的信心。

澳： FHS 的研究集中哪些領域？

葛： FHS 將成立五個研究中心，涵蓋學院的主要研究領域，包括癌症、發育及衰老、分子醫學、免疫學和傳染性疾病以及神經退化性疾病，這幾個領域都是全球醫學研究的熱點。目前癌症研究中心和生殖發育及衰老研究中心已經成立，其它三個中心現正籌設中。FHS 的本科和研究生課程也會圍繞這五個方向發展。

澳： 癌症是 FHS 未來的重點研究項目嗎？

葛： 目前我們招聘的 10 位教員當中，將近一半都是跟研究癌症有關，FHS 將來的院長也是研究癌症的專家，所以可以肯定地說，癌症是 FHS 的重中之重。更長遠一點來看，我們希望在澳大能夠成立包含基礎研究、臨床研究和最後臨床治療的一條龍癌症中心，並希望能進一步爭取成立專門研究癌症的國家重點實驗室，從而全面提升澳大在這領域的研究水平。若日後澳門、內地或鄰近地區的癌症患者在尋求治療時首先想到澳門，那就是我們夢想實現的時候了。

G: Ge Wei, chair professor and interim dean of FHS |

U: *umagazine*

U: How does FHS position itself?

G: FHS is a research-focused faculty. We don't expect to become a world-class faculty overnight; we hope that in the near future we could develop into a faculty with international influence and an important status in Macao and in the neighbouring regions.

U: What advantages does FHS have?

G: Research in modern biology and biomedicine relies heavily on large equipment and state-of-the-art technologies. It also requires considerable investment and space. Apart from regular labs, we are going to have a 3,000m² animal lab building on the new campus to conduct cutting-edge research. These are the advantages in space and facilities. Another advantage we have is funding. The university provides great support, in funding and in research direction. Because of these advantages, I am full of confidence in the faculty's future development.

U: What are FHS's main research areas?

G: We will establish five research centres, covering FHS's main research areas, including cancer; reproduction, development and ageing; molecular medicine; immunology and infectious diseases; and neurodegenerative diseases. These are the hottest areas of research in the international medical community. The Cancer Centre and the Centre of Reproduction, Development and Ageing have already been established. Preparations for the establishment of the three other centres are underway. Our bachelor's and postgraduate programmes will mainly focus on these five areas.

U: Will cancer be FHS's key research area in the future?

G: Of the ten faculty members we've recruited so far, nearly half of them study cancer. The future dean of FHS is also an expert on cancer. So, yes, cancer is definitely going to be the most important key area. In the long run, we hope to establish a one-stop cancer centre at UM which integrates basic research, clinical research, and clinical treatment. We also hope to establish a state key lab that specialises in cancer research, to improve the university's level of research in this area. Our dream is that one day cancer patients from Macao, mainland China and other neighbouring regions will think of Macao as their first choice.



澳： FHS 在培養研究人才方面有何策略？

葛： FHS 是一個沒有「系」的學院，我們計劃在 2015 年把澳大中華醫藥研究院的理學士學位（生物醫藥學）課程轉到 FHS，本科招生規模不會很大，目標每年招收 20 名學生。FHS 將會主力培養高質素的博士研究生。我們希望 FHS 的本科畢業生可以直接修讀博士課程，在課程設置上必須做好相關的銜接工作，例如在本科階段，學生就需要跟隨教授去到實驗室或研究中心參與感興趣的研究課題。若學生對研究產生濃厚興趣，自然會選擇升讀博士課程，這也是 FHS 課程配合學校推行的研習教育模式的一個重要方面。學生在課堂上是在吸收東西，在實驗室研究的時候，就在創造知識，這樣的培養模式是非常不一樣的。

U: Could you tell us about FHS's talent development strategy?

G: FHS is a faculty with no departments. We plan to have the Bachelor of Science (Biomedical Sciences) Programme, which is currently offered by UM's Institute of Chinese Medical Sciences, switched to our faculty in 2015. We won't recruit too many undergraduates. Our goal is 20 per year. We will focus on training high-calibre PhD students. We hope those who complete undergraduate studies in our faculty can move directly to PhD studies, and that means we must make sure our curriculum well prepares them for PhD studies. For instance, undergraduate students may need to participate in research projects that interest them in the lab or research centre with individual professors. And if they develop a strong interest in research, they would naturally want to pursue PhD studies. This is also an important way for us to support the university's research and internship education, which is one component of the "4-in-1" model of education. When students are having a class in the classroom, they are at the receiving end of knowledge, but when they are conducting research in the lab, they are creating knowledge. This model of education is very different.

澳： FHS 的教員主要來自哪裡？

葛： 新校園有優越的硬件環境，學校提供的資源也很充裕，吸引了來自美國、英國、紐西蘭、新加坡、韓國、香港等地教員，組成了相當國際化的師資團隊。他們研究的領域都是全球性課題，如癌症、公共衛生、愛滋病、老年癡呆等。在招聘的人員當中，老中青都有，這種配置的好處就是，讓年輕的教員可以從有經驗的同事身上學習到如何設立實驗室、培養研究生以及發表論文等。

澳： 短時間大量招聘教員有困難嗎？

葛： 除了教研，FHS 未來最重要的任務之一就是招聘新的教員。因為 FHS 是從零開始，學校給我們的目標是五年內大概要招到 60 位教授，即我們差不多以每年 10 至 15 位的速度招聘，這是一個比較大規模、蠻艱鉅的任務。除了招聘教員之外，我們還需要招聘大量的中層研究人員及技術人員，譬如博士後研究員和有經驗的實驗室技術員及研究助理，這類人才在澳門相當缺乏，因此招聘起來難度較大。

澳： FHS 將面對最大的挑戰是甚麼？

葛： 第一個挑戰是要招收到一流的研究生，到目前為止，FHS 所招收的研究生水平還是很高的，但五年之後要達到大學要求的招收數百名博士研究生的目標，這是非常艱鉅的任務，而更大的挑戰是，我們還要保證所有研究生都有這麼高質素水平。相信目前在香港各大學的任何一個學院也難以達到這樣一個目標。另外，我們還要吸引一流的博士後研究員來到澳大，這也是一個很困難的事情。但無論如何，這是全院努力的方向。總括而言，FHS 前行的道路是曲折的，但前途是光明的。

U: Where do FSH's faculty members come from?

G: Our faculty members come from around the world, including the United States, the United Kingdom, New Zealand, Singapore, South Korea, and Hong Kong. The excellent environment on the new campus and the generous resource support from the university are certainly a lure. Their research areas are all of international concern, such as cancer, public health, AIDS, and Alzheimer's disease. There are senior ones, middle-aged ones, and also young ones. The benefit of this composition is that young faculty members can learn from their senior colleagues, in how to set up a lab, how to train postgraduate students, and how to publish papers.

U: Is it difficult to recruit so many faculty members in such a short time?

G: Apart from teaching and research, one of our most important tasks in the future is to recruit more faculty members. FHS started from zero, and the university wants us to recruit 60 professors within five years, which means 10 to 15 every year. It is not easy. And apart from faculty members, we also need to recruit a large number of middle-level research and technical staff, such as post-doctoral fellows, experienced lab technicians, and research assistants. Macao is facing an acute shortage of these professionals, so it's not easy.

U: What is the biggest challenge for FHS?

G: Our first challenge is to recruit first-rate PhD students. The students we've recruited so far are of very high quality, but it would be very difficult to meet the university's requirement to recruit hundreds of PhD students within five years. A bigger challenge is to make sure that all the PhD students are of high quality. I think even universities in Hong Kong would find it hard to achieve that. Another challenge is that we need to attract first-rate post-doctoral fellows. But no matter how difficult, it is a goal we will work together to achieve. Overall, I think the road is tortuous, but the future is bright.



陳俊龍教授指學院未來更有信心培育頂尖的科技精英
Prof. Chen is confident in FST's ability to nurture exemplary students in science and technology

科技學院院長陳俊龍： 課程獲國際承認對學院發展具重大意義

FST Dean Prof. Philip Chen:
“International recognition of our programmes is of great significance.”

澳門大學科技學院經過 30 年的經驗積累，在課程結構、工程技術人才和創新科研領域取得了突飛猛進的發展，研究論文的數量和質量更並駕齊驅——該院目前是全校論文產量最多的學院，約佔總論文發表量的一半，論文更達國際先進水平。土木工程理學士學位、電機及電腦工程理學士學位、機電工程理學士學位三個課程今年更獲得國際上最具權威的本科工程學位資格互認協議——《華盛頓協議》成員的承認，意味著科技學院學生在畢業時已獲得國際工程界職業能力公認的國際要求，反映該院工程教育品質得到了國際社會的認可。本文訪問了一手帶領科技學院取得國際認證的陳俊龍院長，暢談該院課程如何通過《華盛頓協議》異常嚴格的評審，及其對推動科技學院進一步發展的重大意義。

UM's Faculty of Science and Technology (FST) has made remarkable progress over the past 30 years. It now ranks No. 1 among all the faculties at UM in terms of published papers, accounting for approximately 50 per cent of all published papers by UM. Earlier this year, three bachelor's degree programmes offered by FST were recognised by the signatories to the Washington Accord, which is the most authoritative international accreditation agreement for undergraduate engineering degrees. The accreditation shows international recognition of the quality of engineering education at FST; it also means that students of the three programmes will be eligible to obtain professional qualifications in numerous signatories to the Washington Accord after graduation. In this article, we interview FST Dean Prof. Philip Chen, who has played an instrumental role in gaining the accreditation. Prof. Chen discusses how the three programmes passed extremely stringent evaluation by the Washington Accord, and what implications the accreditation has for FST's future development.

優質課程提升學生競爭力

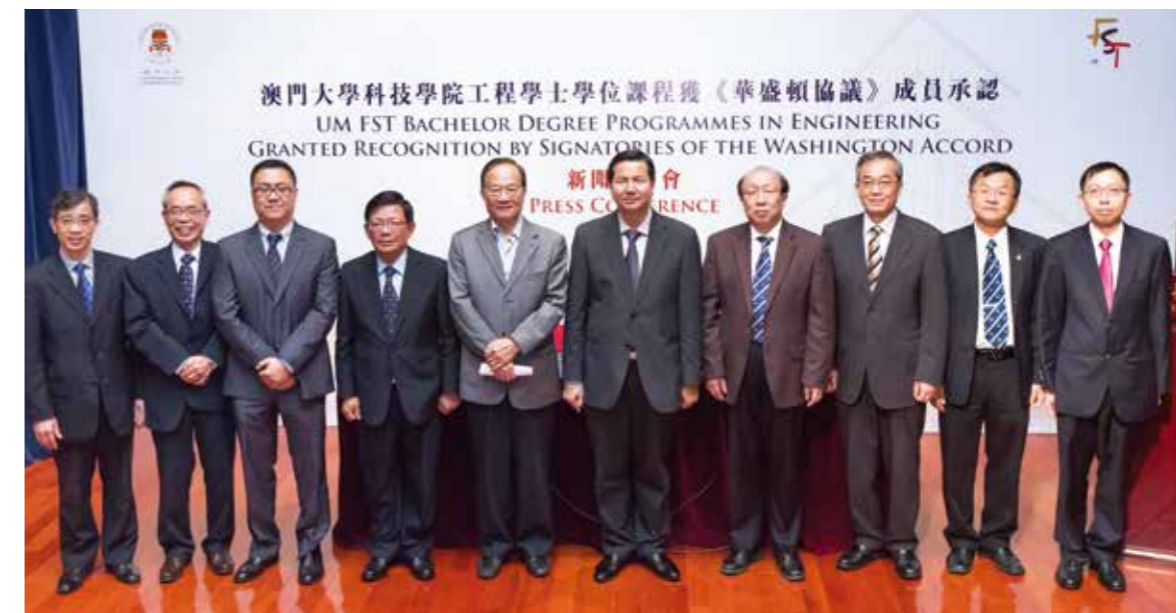
記者踏入位於澳大舊校園的科技學院院長辦公室，陳教授即伸出雙手熱情歡迎。辦公室不到 300 平方尺，各處堆滿了文件，幾乎把所有空間佔據，他有點不好意思地說：「地方很少，東西很多，但學院即將陸續搬到新校園，屆時無論辦公室環境、課室和研究空間都比現在的寬闊很多。」陳教授在 2010 年 1 月出任科技學院院長前已是一位譽滿國際的計算機智能系統研究專家，擁有 20 多年的專業經驗。前年更成為大中華首位擔任 IEEE 系統人機及智能自動學會主席的現職學者，目前也是系統人機及智能自動學會的期刊主編。

科技學院是由土木及環境工程系、電腦及資訊科學系、電機及電腦工程系、機電工程系、數學系所組成的學院。陳院長表示，「學院一直致力為學生提供優質的課程，亦非常重視與社會各界的科技機構和學術單位交流合作，務求令學生在大學所學習到的專業知識能切合現今社會實際需要，亦使學生的專業技能得到普遍的認同。這不單提升學生的市場競爭力，也為社會發展培育所需人才，使學院成為澳門科技及工程發展的教育中心。」

Offering Quality Programmes to Increase Students' Competitiveness

Hardly had we entered his office when Prof. Chen extended both his hands in warm welcome. Less than 300 square feet in size, his office was overflowing with documents. “Not enough space, but lots of stuff,” Prof. Chen smiled, a little embarrassed about the mess. “FST will start moving onto the new campus next week, and then we will have bigger offices, classrooms, and research facilities.” When Prof. Chen joined UM in January 2010 as the dean of FST, he was already a world-renowned expert on computational intelligence and intelligent systems with more than 20 years of professional experience. He was the first active scholar from the Greater China region to be elected president of the Systems, Man, and Cybernetics Society (SMC) of the Institute of Electrical and Electronics Engineers (IEEE). He is also the editor-in-chief of the *IEEE Transactions on Systems, Man, and Cybernetics: Systems*.

FST is committed to offering quality programmes through its five departments: Department of Civil and Environmental Engineering, Department of Computer and Information Science, Department of Electrical and Computer Engineering, Department of Electromechanical Engineering, and Department of Mathematics. “Apart from offering quality programmes, we also value exchange and collaboration with institutions for science, technology and engineering, to make sure that the technical expertise students acquire through our programmes meet the needs of society,” Prof. Chen said. “It helps to increase our students' competitiveness on the job market, and also we hope that through nurturing graduates that meet society's needs, we can develop FST into a local education centre in science, technology and engineering.”



澳門特區政府社會文化司司長張裕（左六）恭賀澳大課程獲《華盛頓協議》成員承認，他表示由此證明澳大持續優化教學質素的努力已得到國際的肯定。Cheong U (6th from left), secretary for social affairs and culture of Macao SAR, congratulates UM on three programmes being recognised by signatories to the Washington Accord, saying it shows UM's effort in enhancing its teaching and research is beginning to pay off.

審批程序繁複艱鉅

在今年初，土木工程學士學位、電機及電腦工程學士學位、機電工程學士學位更獲得《華盛頓協議》的承認，凡 2011/2012 學年起入讀上述學位的學生，以及 2011 學年之前入學並修滿相關課程的學生，畢業後將有資格在多國協議成員國考取當地工程師的專業資格。此為本澳首批學位課程獲確認符合《華盛頓協議》標準，亦屬其境外學術評審的首例。陳院長在四年多前來到澳大時，已決定要將學院的課程與國際接軌。他指出整個審批過程非常繁複：「難度最大莫過於『環環相扣』——從訂立教育目標，到將學院對每一位畢業生的期望清晰化，再到如何安排課程以達到期望的成果，課程的質量保證以及持續改良，學生人格培養及學術道德規範，這些都要求各個專業都有自己獨特的思考與清晰的定位。至於課程設置方面，學院必須要有系統的設計使它與標準尺度磨合。老師與助理們收集和整理大量資料，以及將每門課程的教學內容共享。」

在科技學院成功通過《華盛頓協議》承認之前，首要步驟是通過香港工程師學會會員的認可，陳院長對此解釋道：「此批澳大課程是國際上第一批以這種方式被認可的課程，因為澳門並非《華盛頓協議》會員，無法直接提交資料申請審核，但香港屬該會會員，因此我們須經香港工程師學會評審團的嚴謹審核後再提交予《華盛頓協議》，最終獲得所有會員國家及地區的認可。我們非常感激香港工程師學會對我們的支持和信任。審評過程也得到澳門工程師學會的鼎力支持，也因此科技學院搭起香港工程師學會與澳門工程師學會非常友好的橋樑。」

科研向國際先進水平邁進

「這可說是科技學院多年努力的成果！」陳院長認為能獲得《華盛頓協議》承認，首先是因為課程的質量已經達到國際認可的標準，其二是教學團隊的素質及對課程的要求也達到國際水平。此外，各個學術團體，包括大學校友和學術顧問等在審批過程中也付出極多，大家齊心協力，最後才能成功。同時在今年暑假，科技學院的電腦及資訊本科專業（已得到香港工程師學會認證）也會得到《首爾協議》的認證（編按：首爾協議是對電腦及資訊本科專業認證的國際組織）。

Accreditation Process Extremely Complex

Earlier this year, three bachelor's degree programmes offered by FST, namely Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical and Computer Engineering, and Bachelor of Science in Electromechanical Engineering, were recognised by the signatories to the Washington Accord. Students starting these three programmes in the 2011/2012 academic year or later, as well as those starting these programmes before 2011 and completing all required courses, will be eligible to obtain professional qualifications in numerous signatories to the Washington Accord after graduation. These are the first degree programmes in Macao that have been recognised under the Washington Accord. It is also the first out-of-jurisdiction accreditation meeting the Washington Accord standards. When Prof. Chen joined UM four years ago, he made a quiet vow to himself to work to bring FST's academic programmes up to international standards. Thanks to everyone's joint effort, his wish has come true despite the difficulties encountered in the process. "The process was very complex," said Prof. Chen. "What was the most difficult was that there were many steps, and every step was closely linked to the next one. First we needed to identify our educational objectives. Then we needed to specify our expectations for graduates of different programmes, how we planned to arrange the courses to achieve expected outcomes, how to realise quality assurance and continuous improvement, how to help students in their character development, and how to ensure academic integrity. And these required us to position every programme clearly and uniquely. Curriculum design needed to be done in a systematic way to meet the relevant standards. Our faculty members and their assistants collected and sorted through a large amount of data and portfolios, and shared the content of each course."

But that's not all. Before gaining recognition under the Washington Accord, FST needed to first gain recognition from members of the Hong Kong Institution of Engineers (HKIE). "The three programmes are the first in the world to be recognised in this way," Prof. Chen explained. "Macao is not a signatory to the Washington Accord, so we couldn't submit the application to the Washington Accord directly. Hong Kong is a signatory, so we had to go through the strict evaluation by HKIE first and only then could we submit the application to the Washington Accord, and eventually we gained recognition from all the signatories. We are very grateful to HKIE for supporting us and having faith in us. We also received great support from the Macau Institution of Engineers (MIE), and we feel honoured that we built a bridge of friendship between HKIE and MIE in the process."

Aiming for International Standard

"This is a great achievement of many years of hard work," Prof. Chen said. "The three programmes have gained recognition under the Washington Accord because first, the quality of these programmes meets the standards of the Washington Accord, and second, the quality of our faculty members and their requirements for the programmes also meet international standards. Of course, the joint effort of the various parties, including our alumni and academic consultants, has also been indispensable to our success." Prof. Chen told us that in addition to the three programmes, FST's Computer and Information programme, which has already received accreditation from HKIE, is expected to receive accreditation under the Seoul Accord—

對於學院未來的發展，陳院長滿懷期待地說：「搬到新校園後，科技學院將增設更多實驗室與實驗器材，這對教學質量的提升提供了紮實的硬件條件。同時，更大的辦校空間也意味著有機會招收更多高質量、有研究精神的研究生來推動大學的研究發展。」

an international accreditation alliance that accredits Computer and Information Science programmes—this summer.

Prof. Chen is full of confidence in FST's future. "After we move onto the new campus, FST will have more labs and lab equipment, and this will provide favourable conditions for us to further enhance our teaching," Prof. Chen says. "More space also means we will be able to recruit more high-quality, research-minded postgraduates to promote research development at the university."

課程獲國際承認

科技學院的三個理學士學位課程皆達到《華盛頓協議》的標準，是國際協議上的一個新突破。畢業生將可申請成為香港工程師學會的畢業生會員，參加學會的工程畢業生培訓計劃，從而考取正會員資格，與國際接軌的正會員資格達到國際專業工程師協議及亞太工程師的標準，並享有 22 個專業資格互認協議的權利。

工商管理學院的理學士學位（會計學——專業會計）及（會計學——會計與資訊系統）課程的畢業生可獲澳洲會計師公會（CPA Australia）豁免部份考試科目。理學士學位（會計學——專業會計）課程同時獲香港會計師公會（HKICPA）認可，畢業生可直接報讀專業資格課程。此外，財務學理學士學位課程也入選享譽國際的投資行業專業團體特許財務分析師協會（CFAI）大學課程認可計劃，成為該計劃中亞太地區首個得到 CFAI 認可的課程。全球的投資專家、學者及其他特許財務分析師協會會員可透過 CFAI 得知澳大財務學理學士學位課程的專業資格，從而加強相關畢業生的就業競爭力。

澳大課程獲得國際承認對大學來說意義重大，證明澳大的學術和教學達到國際水平，加速澳大邁向一流大學的目標，同時也肯定了澳大精品本科教育和優秀師資團隊的教學理念。

International Recognition of Academic Programmes

Three bachelor's degree programmes offered by FST have been recognised by the signatories to the Washington Accord. Graduates of the three programmes will be eligible to obtain professional qualifications in numerous signatories to the Washington Accord. They will also be eligible to become Corporate Member by participating in the engineering graduate training scheme "A" as a Graduate Member of the Hong Kong Institution of Engineers. The Corporate Member can enjoy recognition under two international engineering agreements (the International Professional Engineers Agreement, and the APEC Engineer Agreement) and 22 qualification accreditation agreements.

Graduates of the Faculty of Business Administration's (FBA) Bachelor of Science (Accounting—Professional Accountancy) programme and Bachelor of Science (Accounting—Accounting and Information Management) programme can gain exemptions from CPA Australia's examinations in some subjects. The Bachelor of Science (Accounting—Professional Accountancy) programme has also gained recognition from the Hong Kong Institute of Certified Public Accountants (HKICPA). Graduates of this programme can directly apply for professional qualification programmes. The Bachelor of Science in Finance programme has become the first programme in the Asia-Pacific region to be recognised under the University Recognition Program of CFA Institute, which is a world-renowned global association of investment professionals. This gives graduates of this programme a competitive edge as investment experts, scholars, and other members of the institute from around the world can see the recognition on the CFA Institute's website.

The fact that some of UM's academic programmes have gained international recognition is of great significance. It shows that UM has reached international standards in some aspects of teaching. In addition to providing fresh momentum for the university to progress towards a world-class institution, it also proves that UM's commitment to providing quality undergraduate education and building an outstanding faculty team is beginning to pay off.

《華盛頓協議》成員包括美國、英國、加拿大、愛爾蘭、澳大利亞、紐西蘭、中國香港、南非、日本、新加坡、台北、韓國、馬來西亞、土耳其、俄羅斯等 15 個正式成員，以及孟加拉、中國、印度、巴基斯坦、斯里蘭卡、菲律賓六個預備成員。

Signatories to the Washington Accord include the United States, the United Kingdom, Canada, Ireland, Australia, New Zealand, Hong Kong China, South Africa, Japan, Singapore, Taipei, South Korea, Malaysia, Turkey, and Russia. Countries that have provisional signatory status include Bangladesh, China, India, Pakistan, Sri Lanka, and the Philippines.



我的諾貝爾之路—— 楊振寧專訪

My Road to the Nobel Prize— Interview with Chen Ning Yang

文 Text | 呂莉莉 Lis Loi 筆錄 Transcription | 校園記者高紅 UM Reporter Elisa Gao 圖 Photo | 李思 Manuel Reis

「那時物理學家們的處境曾被描述為一個被關在黑屋子中的人。他知道在某一個方向一定有一個門可以走出去，但是這個門在哪個方向呢？」在其自傳裡，楊振寧這麼描述著。曾在這個黑屋子裡摸索的他，不斷的碰撞、討論和思考。1957年，楊振寧和李政道解開了物理學界之謎，打破當時奉為圭臬的「宇稱守恆理論」，發現並提出「宇稱不守恆」，繼而成為最早得到諾貝爾獎的華人物理學家之一。2014年2月，楊振寧教授到訪澳門大學，以《我的學習與研究經驗》為題，和觀眾分享他的諾貝爾之路，講座一票難求。在講座前一天，《澳大新語》獨家約訪楊振寧教授，請他分享：在這條諾貝爾之路上，大學究竟佔了甚麼角色？

“The situation the physicists found themselves in at that time was like a person being locked in a pitch-black room, where he knew with certainty that there was a door somewhere that would lead him out, if only he knew the right direction; but which was the right direction?” Like the physicists described in his autobiography, Chen Ning Yang was once fumbling in this pitch-black room, bumping his head again and again while trying to figure out the right direction. In 1957, Chen Ning Yang and Tsung-Dao Lee discovered that “parity conservation,” which until then was believed to be one of the fundamental geometric conservation laws that applied to all events, did not hold true in some cases, and they proposed the idea of “parity non-conservation” and suggested experiments to test their hypothesis. Because of their “penetrating investigation of the so-called parity laws which has led to important discoveries regarding the elementary particles”, they became the first two Chinese to receive the Nobel Prize in Physics. In February 2014, Prof. Yang visited the University of Macau to give a lecture entitled “My Experience as Student and Researcher”, in which he shared his road to winning the Nobel Prize. On the day prior to the lecture, Prof. Yang gave an exclusive interview to *umagazine* to talk about the role his university education played in winning the Nobel Prize.

楊：楊振寧 | 澳：《澳大新語》

Y: Chen Ning Yang | U: *umagazine*

澳：你在普林斯頓待了17年，這17年有你所說的「興趣→準備工作→突破口」的經歷，其中你有厭倦過嗎？會累和辛苦嗎？

U: **You stayed at Princeton for 17 years, where you experienced, as you once put it, a three-step process, “interest→preparation→breakthrough”. Did you ever get tired, physically and mentally?**

楊：做我們這種研究工作的，沒有覺得累的觀念，原因是我們所發生興趣的題目，常常有它引人入勝的地方，所以是興趣驅使我們去研究，研究不一定成功，可是並不覺得苦。有些運動員訓練的時候，要花很大的毅力，做科學研究工作沒有這個現象。通常都是有很大的興趣，這個興趣有很大的吸引力，所以沒有覺得有很困惑的情形。當然你有一個觀念，想了半天，做了一些研究和計算，可是不成功，當然有點沮喪，可這不是一種痛苦。

Y: Doing the kind of research that we do, “tired” is a word that never crosses our minds, because the subjects that interest us often have something fascinating about them. In other words, we are driven by our interests, so even if we don’t always succeed, we never get tired. For some athletes, they need to consciously use their willpower to persevere through the training, but it’s not the case with scientific research. Those who are engaged in scientific research often are greatly interested in what they do, and the interest itself is an enormous pull, so you don’t get tired or confused. Of course, sometimes when you have an idea, you rack your brains, do some research and calculations, but end up not getting anywhere, you could feel a little frustrated, but I wouldn’t say that’s a painful process.

澳：那在研究生活裡，你覺得最沮喪的是甚麼？

U: **What’s the most frustrating thing for a researcher?**

楊：我覺得最使得一個研究人員沮喪的，就是他有了一個問題，總是左衝右突都不能突圍。比如在1956年，那時我們這個領域的前沿研究人員，都在搞一個問題叫 $\theta-\tau$ 之謎，關於宇稱守恆的問題。我們當時覺得自己是在一個黑屋子裡，這個黑屋子裡頭我們不知道向哪個方向去摸索，在這個黑屋子牆上找一個門。當時最困擾的是，在黑屋子裡，你不知道是向前向後向左向右，這是困擾的，不過我想，並沒有

Y: I think the most frustrating thing for a researcher is if he has a problem but just can’t solve it no matter if he tackles it from left or right. For example, in 1956, all the leading researchers in our field were trying to solve the “ $\theta-\tau$ puzzle”. At that time we felt like we were in a pitch-black room, and we knew there was a door somewhere, but we didn’t know which direction to go. In a dark room, you don’t know if you should go forward, backward, to the left or right, and that’s the most frustrating thing, but again, I wouldn’t say that was a painful experience. Sometimes, after thinking for a whole day, maybe I would decide to try right, and so

楊振寧在澳門大學舉辦的分享講座一票難求
Chen Ning Yang gives a lecture to a full house



痛苦。有時候想了一天，覺得也許向右邊走就可以。於是就向右邊去摸索。不過通常是摸索了半天都沒有結果，有時就想，也許應該向左邊。這樣的經驗，是所有做研究的人都常常要經歷的。

澳：你認為作為一名研究者或是一名學生，他應該要有怎樣的學習態度和個性呢？

楊：我想這個與人有關，與當時題目也有關係，而且同一個題目在不同的時期，所需要的態度也不一樣，比如說物理學到了 20 世紀與 21 世紀是分的很清楚。有一組人做理論，有一組人做試驗。我就是做理論的。有時，在物理學發展的歷史裡，理論領先，新的主意，一般是念理論的人提出來的；可是另一種時候，是做試驗的人研究出新現象，成為當時這個領域裡頭最重要的研究方向。所以，在不同的時代，同一個領域，甚麼是最大的推動力，是不一樣的。當然不同的人，同是做理論物理的人，有的人喜歡做一類的研究，喜歡用一類的方法去看問題，有一類人又會用另一類不同的方法。在不同的時候，不同的研究氣質和風格，成功的可能性常常是不一樣的，所以這是一個瞬息萬變的情景。

澳：實驗物理學者和理論物理學者，這兩者的合作是否很重要？

楊：當然。在我剛做研究生的時候，一九四幾年、一九五幾年開始，那個時候，已經知道有幾種基本粒子，整個世界都是由這幾種粒子造出來的，可是忽然在那幾年之內，有做試驗的工作者，發現了一些從前所沒有見過的粒子，而這些粒子不是做試驗的人、也不是做理論的人所預料到的，就給它們起了個名，叫做奇異粒子。所以 50 年代，最紅的問題就是要研究這些奇異粒子是些甚麼東西，他們有甚麼性質，以及還有沒有更多的奇異粒子。這些問題是試驗物理學家所啟發出來的，理論物理學家沒有提出過這些粒子。這是一個理論需要實驗的例子。反過來的例子也很多。

I would fumble in that direction, but usually without any success, so I would think, maybe I should try left instead. Every researcher goes through this kind of experience.

U: What kind of personality and attitude towards learning do you think a researcher or student should have?

Y: I think it varies from person to person, and depends on the subject of research as well as the historical period in which the research is conducted. For example, in the 20th century, the division was quite clear—it still is in the 21st century—we have theoretical physicists and experimental physicists, and I belong to the first group. Sometimes, theoretical physicists lead the development of physics, which means new ideas are proposed by theoretical physicists. But at other times, it is the experimental physicists that make new discoveries which point to new directions. So, the answer to “what is the greatest driving force in a given field” depends on the specific historical period. And of course, even in the same group, different people have different preferences regarding research subjects and methods. Because of the differences in historical periods, personalities, and research styles, the chances of success tend to vary. So it's a very fluid situation with many variables.

U: Do you think it's very important for experimental physicists and theoretical physicists to work together?

Y: Absolutely. When I was a graduate student, which was in the 1940s or 1950s, we already knew several elementary particles, which are what the world is made up of. But during those few years, some experimental physicists discovered some particles they had never seen before, and because these particles were not what experimental physicists or theoretical physicists had expected, they were given the name “strange particles”. So, in the 1950s, these strange particles became the hottest subject of research. Physicists tried to find out what they were, what characteristics they had, and whether there were more of them. These questions were inspired by experimental physicists; the strange particles were not proposed by theoretical physicists. So this is an example of how theories need experiments, and of course there are also many examples of how experiments need theories.

楊振寧教授接受《澳大新語》專訪
Chen Ning Yang gives an exclusive interview to *umagazine*



澳：實驗物理和理論物理學家思考的方式不一樣，在合作上是否會有困難？

楊：大家的經驗不一樣，當然會有困難。而且大家的價值觀也不一樣，更會加深困難。

澳：你曾說過，在西南聯大跟同學的討論，奠下了你對物理的熱情以及討論方式，能否分享？

楊：如果對於基本的問題發生了疑問的話，尤其是非常基本的問題，這個時候辯論是最激烈的，就好像是國家跟國家之間發生爭吵的話，小事情就算了，大事情不能夠這麼就放棄。讀書的時候，對難懂的東西最好跟同學辯論，這是我的經驗。

U: Experimental physicists and theoretical physicists have different ways of thinking. Will this pose any difficulty for their collaboration?

Y: Different people have different experience, which will of course make collaboration a little difficult. Besides, different people have different values, which will make collaboration even more difficult.

U: You once said, debating questions with your classmates at the National Southwest Associated University(NSAU) fuelled your passion for physics and deeply influenced your way of discussing questions. Could you talk a little bit about this?

Y: The most intense debates tend to be about fundamental issues. It's like two countries having an altercation. If it's about something inconsequential, maybe you could just let it go, but you can't give up just like that with big issues. My experience is that if you are a student and you have difficulty understanding something, it's better to discuss or even debate with your classmates.

澳： 在你求學的生涯中，大學佔了一個甚麼樣的角色呢？

楊： 我在西南聯大唸書的時候，學了很多物理學的基本原理，西南聯大的物理課程教得非常認真，也非常紮實，這給了我一個很紮實的基礎，就好像是蓋房子，在地基上打了很多樁，弄得很整齊。到了芝加哥大學以後，發現芝加哥物理系的風氣跟這個完全不一樣：他們所感興趣的，不是過去的已經成經典的物理學知識，而是一些新的現象。我既得到了西南聯大的教育好處，又得到了芝加哥大學研究氛圍的好處，兩個大學都在我的一生中起了極重要的作用。

澳： 你說芝加哥大學是重要啟蒙者，那你在西南聯大的地基是否也很重要？

楊： 當然。我有很多芝加哥大學的美國同學，他們沒有我在西南聯大所累積下來的很好的很紮實的基礎，所以學習沒有我快。

澳： 比較國內外的學校，國外學校會比較提倡同學之間多討論，但國內學校則傾向上課紮實，鼓勵學生多唸書。你認為對學生來說，怎樣才算是一間好的大學？

楊： 從一個學生的立場講起，如果他去一個學校，這個學校能把他引導到一個方向，這個方向將來大大有發展，而又很適合他做，這個就是好的學校。假如把他引到越走越困難的方向，那

U: **What role have your universities played in your life as a student?**

Y: I learned a lot of basic physics theories at NSAU. The physics programme was very strong and very well taught at NSAU. The university put a lot of thought and effort in the teaching of physics. That gave me a solid grounding in physics. It's like building a house—first you need to drive sufficient piles into the soil to provide foundation support. After I went to the University of Chicago, I found that the ethos in the physics department there was completely different from that of NSAU. The University of Chicago was more interested in new phenomena than in classic knowledge of physics. I have benefitted both from the solid teaching at NSAU and from the good research atmosphere at the University of Chicago. So these two universities have played an extremely important role in my life.

U: **You said that the University of Chicago is like an important mentor to you. What about the solid grounding NSAU gave you? Is that also very important?**

Y: Yes of course. I had many American classmates at the University of Chicago, and they didn't learn as fast as I did, because they didn't have a solid foundation like me.

U: **Chinese universities tend to focus on teaching and encourage students to read more, while universities in Western countries tend to encourage peer discussion. What kind of university do you think is good for the students?**

Y: From a student's point of view, if the school can lead him or her in a direction that has enormous potential and suits the student, then it's a good school. Conversely, if a school leads the student in a direction that turns out to be more and more difficult, then it's not a good school. Of course, a student might ask,

麼這個學校就是不好的。當然他就會問，我怎樣才知道一個學校是符合這樣的條件呢？這個問題無法有好回答，不過報名入學前必須瞭解學校的過去教學成績。

澳： 一間學校要達到這樣的目的的話，是否要透過優秀老師對學生做到好的引導呢？

楊： 對！這個非常重要，在科學的前沿也好，社會科學前沿也好，一個系的系主任還有系裡的元老，就要看清楚了這個系、看清楚了哪幾個領域會有發展，就向這些發展，就引進這些領域的優秀老師。那麼這個系在之後的五年、10年就靠這個方向的發展而變成了一個非常重要的系。假如這個系的主任和元老，對這個選擇做了不正確的決定，選擇了一個沒有前途的，那麼對整個系的發展，以及這個系裡年輕學生的發展，都是不利的。

how do I know if a school meets this criterion? There can't be any satisfactory answer to this question, but before applying, a student must know the school's track record in teaching.

U: **So does it mean that if a school wants to fulfil this purpose, it needs to have outstanding teachers to provide good guidance to the students?**

Y: Yes, and this is very important, whether for science or social sciences. The head and veteran professors of a department must be able to identify the most promising areas for their department, and then they should focus

on these areas and recruit the best teachers in these areas. If they can do this, in about five to ten years, their department is likely to become an influential department in these areas. Conversely, if the department head and the veteran professors make a wrong decision and focus on an area with no future, it would have a detrimental effect on the department and the students.

“ 如果他去一個學校，這個學校能把他引導到一個方向，這個方向將來大大有發展，而又很適合他做，這個就是好的學校。
if the school can lead him or her in a direction that has enormous potential and suits the student, then it's a good school. ”



在《我的學習與研究經歷》講座前，楊振寧和來自澳門和珠海的大專生交流，勉勵學子。
Chen Ning Yang chats with students from Macao and Zhuhai before his lecture "My Experience as Student and Researcher"



楊振寧

1957年獲諾貝爾物理學獎。生於中國安徽，中學時因一本《神秘的宇宙》而開啟他對物理的探索。於中國西南聯合大學研究所畢業後，赴美深造，分別於芝加哥大學和普林斯頓大學進行研究工作，後長期執教紐約州立大學石溪分校。楊於統計物理、粒子物理及量子場等領域成就斐然，除其著名的「宇稱不守恆」理論外，他與羅伯特·米爾斯提出的楊-米爾斯理論，對基礎物理學具有深遠影響。

About Chen Ning Yang

Chen Ning Yang shared the 1957 Nobel Prize in Physics with his long-time collaborator Tsung-Dao Lee. They were the first two Chinese to win the Nobel Prize. Born in Anhui province, China, Chen Ning Yang's interest in physics was kindled by *The Mysterious Universe*, a book he read in middle school. After graduating from the National Southwest Associated University, he went to the United States to pursue further studies. After graduation he carried out research work at the University of Chicago and Princeton University. Later he taught at the State University of New York at Stony Brook for more than three decades. He has made significant contributions to various fields of physics, including statistical physics, condensed matter physics, quantum field theory, and mathematical physics. In addition to the famous "parity non-conservation", he also proposed the Yang-Mills theory with Robert Mills, which has had a profound impact on basic physics.



機會之門為誰而開？ 諾貝爾獎得主斯蒂格利茨談不平等的代價

The Door of Opportunity—For Whom Does It Open?
Nobel Laureate Joseph E. Stiglitz on the Price of Inequality

文 Text | 呂莉莉 Lis Loi 圖 Photo | 李思 Manuel Reis

「這是一個最好的時代，也是一個最壞的時代。」

自由貿易和全球化經濟促進了各國發展，創造了財富；同時，各國貧富懸殊差距漸大，社會充滿不平等現象。諾貝爾經濟學獎得主約瑟夫·斯蒂格利茨於2014年3月應邀到澳門大學，解讀在自由貿易那百花齊放的表面之下，種種存在的不平等，尤其是機會的不平等。在這個人人追逐夢想的年代，斯蒂格利茨的講座讓我們反問：機會之門為誰而開？

對澳大來說，著名的諾貝爾經濟學獎得主斯蒂格利茨教授並不陌生。早在2002年，斯蒂格利茨便在澳大作他獲獎後首次亞洲公開演講。今再度造訪，其講座依然大受歡迎。在講座中，斯蒂格利茨以「不平等的代價」為題，揭示了在自由經濟和全球化下所存在的不平等現象及人人所需付出的代價。

“It was the best of times. It was the worst of times.”

Free trade and globalisation help to promote economic growth and create wealth, but at the same time they have contributed to the widening gap between the rich and the poor and have bred inequalities that permeate every aspect of our society. In his talk at the University of Macau (UM) in March 2014, Prof. Joseph E. Stiglitz, Nobel laureate in economics, discussed the numerous inequalities lurking beneath the surface of a prosperous society, especially inequalities in opportunity. In an age where we are encouraged to seize every opportunity to make our dreams come true, Prof. Stiglitz's talk left us with a thought-provoking question—the door of opportunity, for whom does it open?

Prof. Stiglitz is no stranger to UM. He gave a lecture at UM in 2002, which was his first public talk in Asia after receiving the Nobel Prize in Economic Sciences. His second lecture at UM was just as popular as the first one. In the talk, entitled “The Price of Inequality”, Prof. Stiglitz laid bare the numerous inequalities that exist in today's globalised world and discussed the prices we are paying for them.

斯蒂格利茨回憶90年代初首次到訪澳門，指出珠三角地區在短短25年的時間內可以有如此巨大的變化，很令人佩服。他指出，世界各地也經歷了許多變化，其中一個便是不平等現象的加劇。

富人越富 窮人越窮

那麼，這些不平等現象是甚麼呢？斯蒂格利茨以美國為例，經濟衰退結束後的所謂「復甦期」，收入增長的其中95%流向最頂層的1%，而底層的99%並沒有感受到經濟復甦。斯蒂格利茨補充，事實上當地的財富中位數下跌四成，貧困問題增加，而男性全職勞動者的收入中位數甚至低於40年前的水平。

支持自由市場一派的經濟學家認為透過提供減稅等優惠措施予企業和富人，將有助改善整體經濟，繼而造福底層普羅大眾。斯蒂格利茨透過舉證說明，這種涓滴經濟學只會造成貧富差距擴大，而底層人民則需面對多種不平等對待，包括收入、財富、醫療、免受環境危害以及獲得司法幫助的權利等。「2008年經濟危機過後，不平等現象在全球越演越烈，特別是在發達國家更是嚴重，在這些國家的底層人民因此承受著不同的痛苦。」斯蒂格利茨表示。

Prof. Stiglitz opened his talk with an observation of the dramatic changes in the Pearl River Delta region in the last 25 years since his first visit to Macao in the 1990s. “What has happened in the Pearl River Delta region in the last 25 years has been really impressive,” Prof. Stiglitz said. “Very dramatic changes in a very short period of time. In much of the world, there are other dramatic changes that have gone on, and one of the dramatic changes is the increase in inequality in many countries around the world.”

Rich Richer, Poor Poorer

How exactly has inequality increased? Prof. Stiglitz cited his home country—the United States—as an example. “In the United States, 95 per cent of the increase in income since the so-called end of the recession went to the upper 1 per cent,” Prof. Stiglitz said. “That meant the bottom 99 per cent have not seen a recovery.” Equally dramatic are data on what is happening to income and wealth in the middle. “Median wealth fell by 40 per cent. Poverty is up. For full-time male workers, it's much worse; the median income of males today in America is lower than it was 40 years ago,” Prof. Stiglitz said.

Free market advocates believe that providing tax breaks and other incentives to businesses and wealthy people will benefit poorer members of society by improving the economy as a whole. But Prof. Stiglitz pointed out that this so-called “trickle-down economics” will only serve to widen the gap between the rich and the poor and make those at the bottom suffer various inequalities, from income and wealth to health care, exposure to environmental hazards and access to justice. “Things have gotten a lot worse in the last few years, particularly in the aftermath of the global financial crisis of 2008,” said Prof. Stiglitz. “This is particularly true in the developed countries. Those at the bottom have been hurt in different ways.”



約瑟夫·斯蒂格利茨接受《澳大新語》專訪
Prof. Joseph E. Stiglitz gives an exclusive interview to *umagazine*

斯蒂格利茨進一步指出，這個問題中國同樣無法倖免。這 35 年來中國不僅經濟發展，不平等現象同樣增多。他表示，在發展中國家裡，儘管中國的不平等現象並非最嚴重，然而若和巴西相比，巴西大力投資改善醫療、教育、青少年營養等問題，從而有效減少該國不平等現象。

斯蒂格利茨指出：「經濟因素具有全球性，各國所受經濟因素的影響都是大同小異的，但不同國家之間的結果卻相差很遠，這就說明，這不單是經濟的問題，而是和政策有關，而政策本身是由政治決定的，所以我們在討論不平等時不能忽略政治和政策在其中所扮演的核心角色。」

不平等的機會之門

傾向富人的政策所帶來的後果除了貧富懸殊加大之外，還有社會底層人民所遭受的不平等對待，尤其是底層人士難以靠努力而流動到社會上層，斯蒂格利茨稱是機會上的不平等。他指出，數據顯示美國年輕人的收入和其父母的收入和所受教育成正比，所以美國孩子能否成功的關鍵在於他們是否有成功的父母。「我經常開玩笑說，選對父母很重要，如果沒有成功的父母，基本上機會是很少的，還不如放棄好了。」

斯蒂格利茨舉例，部份美國學生因其父母收入關係，需背負學習貸款；有時，畢業後的無薪實習也難以負擔，有時需端碗盤打臨時工，種種因素進而影響了向上流動的機會。

這種機會上的不平等，打破了人們普遍認為努力便可有所成就的「美國夢」。斯蒂格利茨指出：「過去幾年的研究顯示，機會的平等跟結果的平等，兩者關係密切，也就是，機會越不平等的社會，收入和財富不平等的現象就越嚴重。」

高等教育是否平等？

在種種造成不平等機會的因素中，斯蒂格利茨提醒，教育也在其中。他指出，教育對人的一生有極大影響，而成功父母的孩子往往擁有較大機會獲得高等教育，他認為，人們獲得高等教育的機會和難易程度不同，而這正是造成不平等現象的主要原因之一。

And the problems are not unique to developed countries. According to Prof. Stiglitz, China is not immune to these trends. "What China has done in the last 35 years is not only to grow more than almost any other country, but it's also been able to grow its inequality more," Prof. Stiglitz said. "But China is not the emerging market with the highest level of inequality. There are other countries in the developing world that have worse inequality. But some of them, like Brazil, invested a lot in education, health care, food, and nutrition for young people, and in a relatively short time, Brazil has succeed in reducing the degree of inequality."

As tempting as it is to blame inequality on economic forces, economic forces are not the only culprit. "The economic forces that are at play are the same on both sides of the Atlantic, underlying economic forces basically are global in nature," Prof. Stiglitz explained. "The outcomes, though, differ very markedly from country to country, and that tells us that it's not just economics that's driving what is going on in inequality; it's really about policies, and policies themselves are determined by politics. So when we come to talk about and try to understand inequality, we can't ignore the central role of policies and politics."

Inequality of Opportunity

Another inequality, which perhaps merits more concern than inequality in income and wealth, is inequality of opportunity. It is very difficult, noted Prof. Stiglitz, for people at the bottom to make it to the top, and that is a good example of inequality of opportunity. Prof. Stiglitz said that statistics show that the income and education of a young American and the income and education of his parents are closely linked. In other words, whether a child in the United States can succeed depends to a large extent on whether he or she has successful parents. "So sometimes I say jokingly, there is one critical decision that each young child should make, and that is choosing the right parents," said Prof. Stiglitz. "If you make that decision wrong, you might as well give up."

Prof. Stiglitz observed that some students in the United States, whose parents are not very well-off, pay for college expenses with student loans, and even after graduation these students sometimes cannot afford to work unpaid internships, and end up working as waiters.

These all affect the young people's opportunity to move upward, and have caused many to become disillusioned with the "American Dream". "Research over the last few years shows that equality of outcomes and equality of opportunities seem to be very highly correlated," said Prof. Stiglitz. "Societies with a very high level of inequality of outcomes in income and wealth have very high inequalities of opportunity."

Inequality in Higher Education

There are many factors that contribute to inequality of opportunity, and one of them is inequality in education. Prof. Stiglitz believes that education has a profound effect on people's lives, and children with better-off parents tend to have a better opportunity to go to college. "One

儘管現今網絡的發展提供了人們求得知識和資訊的渠道，但斯蒂格利茨提醒，在世界上有很多窮困的人無法上網，例如在中國偏遠的農村地區，要上網並不容易。

當教育也成為社會階級流動的門檻時，教育機構該如何努力消弭這道門檻，並提供相對平等的機會呢？斯蒂格利茨表示，高等教育機構可提供獎助學金及公共教育等，讓弱勢族群也能有平等機會接受優秀高等教育。

目前澳門政府設有免費的中小學教育和學習津貼，澳門大學等高等教育機構亦設有各項獎助學金，以保證年輕人的受教育權利。但斯蒂格利茨提醒，能接受優質教育，是一件非常幸運的事，是政府和社會為年輕一代的未來所做的投資，是一份禮物，望學生能夠銘感於心，日後回報社會。

斯蒂格利茨勉勵澳大學子：「年輕人在為自己的幸福和前途努力的同時，亦應積極主動回饋社會，更應明白不是人人都能擁有同等的受教育機會，所以應盡己所能，幫助弱勢社群。」

of the major sources of inequality are differences in access to higher education," Prof. Stiglitz said.

While the internet has been very important in making knowledge accessible, Prof. Stiglitz pointed out that many poor people around the world, including those in remote rural areas of China, do not have access to the internet.

So what can we do to provide relatively equal opportunities? Prof. Stiglitz suggested that universities should provide scholarships, and governments should make public education available, to ensure that disadvantaged groups also have equal access to quality education.

Macao seems to do a relatively good job of providing scholarships and public education. The Macao SAR government provides free education until the end of high school as well as subsidies for students. Local universities including UM also provide various kinds of scholarships to make sure that young people have equal opportunities to receive education. "Having access to good education is really a privilege," said Prof. Stiglitz. "It's a gift that society and the government invested in young people's future. Hopefully the students will return that investment."

"Too often, there is a focus on just increasing their own sense of well-being," said Prof. Stiglitz. "But it's important for them to contribute to the community, to realise that not everybody has had that same opportunity, and to make sure that those who have been disadvantaged can get a helping hand."

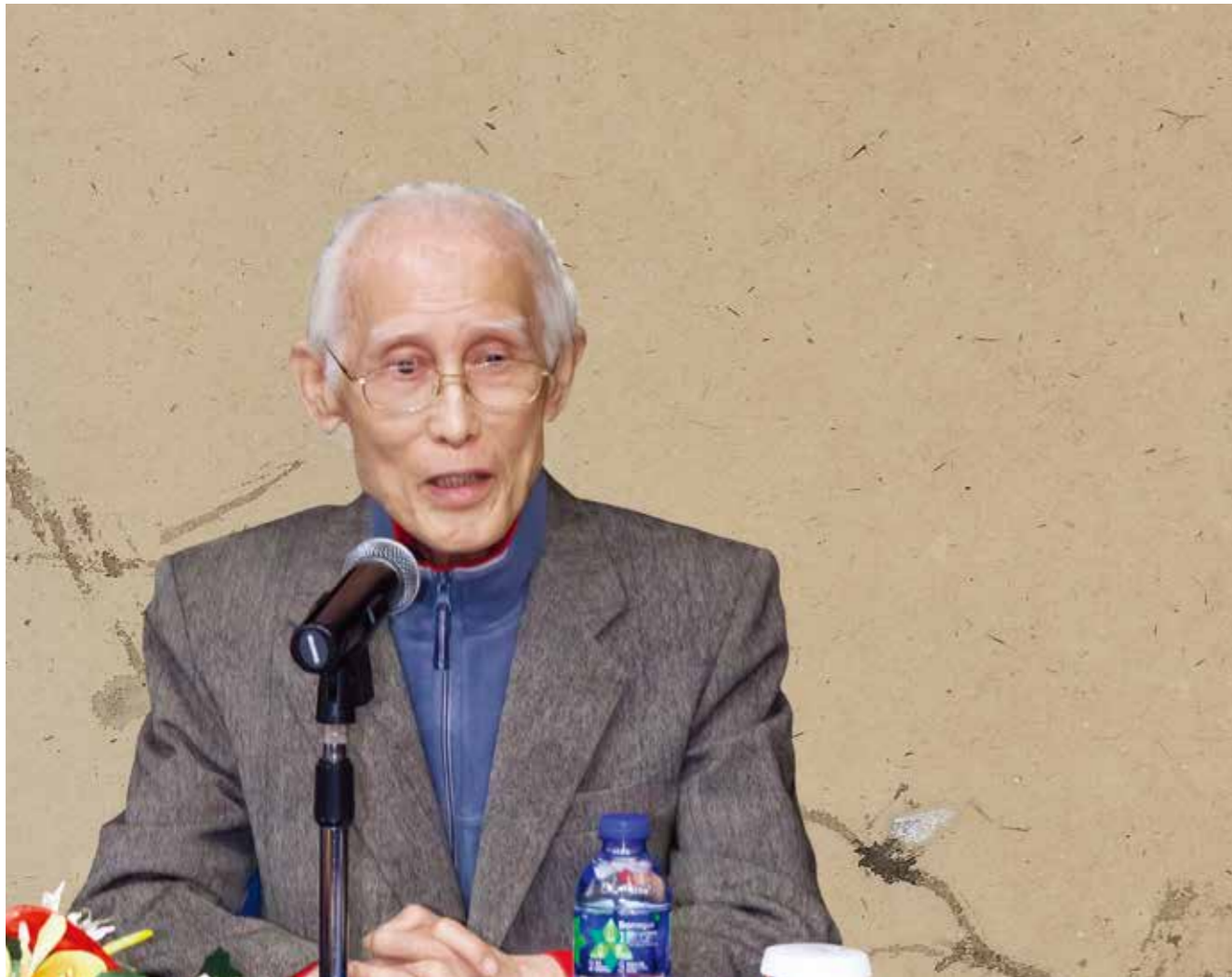


約瑟夫·斯蒂格利茨

諾貝爾經濟學獎得主、當代具影響力的經濟學家之一。曾任世界銀行副總裁與首席經濟學家，並曾任教於普林斯頓大學、史丹福大學、麻省理工等知名學府，目前任教於哥倫比亞大學。其研究對宏觀經濟學、公共部門經濟學等領域貢獻良多，並以對全球化的管理以及自由市場經濟學家的批判著稱。

About Joseph E. Stiglitz

Prof. Joseph E. Stiglitz is a Nobel laureate in economics and one of the most influential economists of our time. He is the former senior vice president and chief economist of the World Bank. Prof. Stiglitz has taught at several renowned universities including Princeton University, Stanford University, and the Massachusetts Institute of Technology. He is now University Professor at Columbia University. He has made major contributions to numerous areas of economics, including macroeconomics and economics of the public sector. He is known for his critical view of the management of globalisation and free-market economists.



靈感 and 文學—— 鄉愁詩人余光中

Inspiration and Literature— Interview with Poet Yu Kwang Chung

文 Text | 張麗鳳 Zhang Lifeng

圖 Photo | 李思 Manuel Reis

「小時候 / 鄉愁是一枚小小的郵票 / 我在這頭，母親在那頭 / 長大後，鄉愁是一張窄窄的船票 / 我在這頭，新娘在那頭……」

這首廣為流傳的詩作使詩人和散文家余光中的名字聞名世界。

余光中，一生從事詩歌、散文、評論、翻譯這「四度空間」的寫作，現已出版詩集、散文集、評論集、翻譯等 50 多種。余光中喜歡旅行，足跡遍及世界各地，詩歌的靈感也隨著他的足跡湧發。2013 年 12 月，余光中來到澳門大學，接受由澳大頒發的榮譽博士學位。當時他以《靈感一大來源——論藝術經驗之轉化》為題，為澳大師生及澳門的文學愛好者奉獻了一個豐盛的文化大餐。當日熱烈而火爆的場面至今讓人久久難忘；而那些未能擠進講堂聆聽講座的人們更是叫苦不已、遺憾之聲不絕於耳。

君子有成人之美之心，就在大家還為去年錯失余光中的講演而惋惜時，今年三月他再次應邀至澳，並成為澳大駐校作家，和澳門開始一個月的「蜜月」之旅，這個消息無疑讓澳門的春天更加美麗而溫暖。在「蜜月」開始之初，余先生就以《旅遊與文化》為大家奉獻了自己幾十年來的經驗心得，並舉辦了詩歌朗誦會和大家一起讀詩、品詩，共同感受詩歌的魅力，澳大學生看到了一個更加真實、風趣的文學家。

《澳大新語》有幸專訪余光中先生，讓讀者更深入地了解這位文學大師。

When I was a child, my homesickness was a tiny stamp, linking my mother at the other end and me this. When I grew up, my homesickness became a ticket, by which I sailed to and from my bride...

This is an excerpt from "Homesick", the most widely-circulated poem by the Chinese-speaking world's best-known poet and prose writer Yu Kwang Chung.

Yu has published more than 50 titles in what he describes as the "four dimensions" his works cover—poetry, prose, criticism, and translation. In writing he loves to travel across these different dimensions, and in life he also loves to travel. His love of travel has taken him around the world and has served as a constant wellspring of inspiration for his poetry. In December 2013, he visited the University of Macau (UM) to receive an honorary doctorate. Later he gave a talk entitled "A Major Source of Inspiration—On the Transformation of Artistic Experience" in a jam-packed auditorium—so packed, in fact, that even the aisles were overflowing. Those latecomers who tried unsuccessfully to squeeze into the hall were left sighing outside as the door closed unsympathetically on a cultural feast that was too good to be missed by any literature lover.

As if to make it up to those who had missed his earlier talk, Yu came back this March, this time as a writer in residence at UM. The news that Yu was going to stay in Macao for an entire month was like a welcome warm spring breeze, announcing the start of a "honeymoon" for those in love with his works. The "honeymoon" opened with a talk on "Travel and Culture", in which he shared his life experience, and a poetry reading, where he read poetry with the students. These face-to-face interactions gave the students a chance to see a more intimate and humorous side of Yu, and for those who have never met Yu in person, we hope our exclusive interview for this issue of *umagazine* might give them a deeper understanding of this literary master as well.



余光中教授和學生合影
Prof. Yu Kwang Chung with the students

余：余光中 | 澳：《澳大新語》

Y: Yu Kwang Chung. | U: *umagazine*

澳：與您獲得的若干榮譽相比，您如何看待澳大授予的榮譽學位，以及如何看待澳大對您的評價？

余：這也是一份榮譽，是我第四次得到榮譽博士學位。最早一次是 2003 年，獲得香港中文大學榮譽博士學位，距今已經 10 年了。而今再次得到澳大頒發榮譽博士學位，這表示學術界對我的認可，也是一種鼓勵和榮譽。我的寫作仍然在繼續，並沒有枯竭。我和澳大之間也並不是毫無淵源，早在姚偉彬校長在任時，就來澳大演講過，當時演講的題目是《詩與音樂》。

在被授予博士榮譽學位時，澳大的評價多是溢美之詞。但是可能因為時間關係，頒發學位時，我有些成績沒有充分展開。其實，除了詩歌，我還在散文方面著墨甚多，有十幾本散文集，我曾經說過詩與散文，等於雙目，兩者並存才可以呈現立體的世界，我經常說「雙目合，視乃得」，表達的就是這個意思。詩歌是我最早涉獵的文類，而今我在翻譯、詩歌、散文、評論等各方面沒有偏廢。

“詩與散文，等於雙目，兩者並存才可以呈現立體的世界。Poetry and prose are like two eyes, which, only when working together, can present the world in all its dimensions and richness.”

The citation delivered at the degree conferment ceremony mostly consisted of kind words of praise which I don't think I fully deserve; and perhaps due to time constraints, some aspects of my work were not elaborated in the citation. Actually, apart from poetry, I'm also a prose writer. I have published more than ten prose collections. I once said that poetry and prose are like two eyes, which, only when working together, can present the world in all its dimensions and richness. I often quote this line from Robert Frost, "As my two eyes make one in sight," which about sums it up. I started out on the journey of writing as a poet, but now I'm involved in all the "four dimensions"—translation, poetry, prose, and criticism, without negligence to any of them.

澳：對於社會上對您為「鄉愁詩人」的定位，您感受如何？是欣然接受還是有所保留？

余：對於「鄉愁」詩人的定位，一則是喜，一則遺憾。《鄉愁》寫的比較短，格律簡單，容易背誦，被選入教科書後，散播非常廣。中央電視台編曲演唱，後來王洛賓、關牧村、羅大佑等十幾位譜曲演唱，使得「鄉愁」這個名片越來越被世人所矚目。但是就是這張名片，把臉給遮住了，定位雖然也貼切，但是卻狹窄了些。比如後來我有很多寫環保的詩歌，卻難以涵蓋其中。

U: What do you think of the honorary degree from UM compared to the other honours you have received? And what do you feel about what was said about you in the citation?

Y: It is also an honour. It is the fourth honorary doctorate I have received. I received my first honorary doctorate from the Chinese University of Hong Kong in 2003, which was about ten years ago. Receiving another degree from UM shows academia's recognition of me, which is an honour and encouragement. I'm still writing—the well of inspiration for writing hasn't dried up. Actually my relationship with UM goes back a little further—I gave a talk at UM when Prof. Lu Vai Pan was the rector, and I remember the title of the talk was "Poetry and Music".

U: You have the reputation as a "homesick poet". How do you feel about that? Are you entirely happy or are there mixed emotions?

Y: Part of me feels happy, and part of me feels it's perhaps a bit too narrow. "Homesick" is short, and has a straightforward metrical pattern, which makes it easy to memorise and recite. It started to circulate widely after it was included in the textbook. CCTV [editor's note: a TV channel in mainland China] made a song out of the poem. Later a dozen singers and songwriters, including Wang Luobin, Guan Mucun and Lo Ta-yu, also produced different versions of songs. If "Homesick" is a business card, then its inclusion in the textbook and its adaptation into so many different versions of songs has attracted more and more attention and increased its visibility to the point that the card has covered up the face. I wouldn't say "homesick poet" is inaccurate, but I feel it is perhaps a bit too narrow. For example, later I wrote many poems about environmental protection, which apparently don't fall into the "homesick" category.

澳：漢語新詩在世界文學格局中，如何獲得較高的地位，較廣泛的影響？您對漢語新詩獲諾貝爾文學獎的可能性如何理解？

余：現在漢語新詩在國際上的地位還不很高，也不普及。漢語詩歌在國際上的地位不是一定的。比如中國古典詩歌就有漢學家們在研究，並列入了中國文學的課程。漢語新詩就是「五四」以來的白話漢詩，發展了還不到 100 年的時間，100 年放在文學史上來看是很短的。如今在英語霸權當道的現實條件下，中文作為世界三大語言之一，在西方有 3,000 萬人在學，實際上還不算多，因此漢語的使用也談不上廣。隨著華文的傳播，可能漢語新詩會越來越被認識，傳播得也會更廣些。

至於諾貝爾文學獎之所以備受矚目，是因為這個獎宣傳性大，是由瑞典王室舉辦，因而顯得更隆重，不像由政府舉辦的獎項，會鼓吹政治意義。即便是這樣，我認為這個獎仍然是「西方文學獎」，而不是「世界文學獎」。我們必須意識到漢語翻譯成英文是非常困難的，不像其他歐洲語系、拉丁語系等，相互轉換起來比較容易。泰戈爾之所以獲得諾貝爾文學獎，很大一部份原因是他用英文寫作。所以我們對於諾貝爾文學獎不必太在意，不要一廂情願地去提倡並奉為唯一標準。

U: How can "new Hanyu poetry" have a higher standing and a wider influence on the international literary scene? What's your take on the chances of "new Hanyu poetry" winning the Nobel Prize?

Y: The international standing of "new Hanyu poetry" is yet to be improved, and it has yet to reach a wider audience. The international standing of "new Hanyu poetry" needs to be understood in context. Take classical Chinese poetry. Some sinologists are studying classical Chinese poetry, and some of the classical poems have been included in the curriculum for Chinese literature students. When we say "new Hanyu poetry", we mean poetry written in vernacular Chinese which emerged after the May Fourth Movement. So it's been barely 100 years, which is a very short period in the long literary history. Chinese is one of the three major languages in the world, and currently about 30 million people in the West are learning Chinese, which is actually not so many, and the fact remains that today's world is under the hegemony of the English language, and so we really can't say that Hanyu is being used extensively. I think maybe as more and more people start to learn the language, "new Hanyu poetry" will reach a wider audience.

About Nobel Prize—I think the reason why it has received so much attention is because first, there have been a lot of promotions, and second, it is organised by the Royal Swedish Academy of Sciences, which makes it look more grand and prestigious, because unlike awards organised by governments, it doesn't seem to carry as much political undertone. But even so, I still think that Nobel Prize is just a "Western literary prize", not a "world literary prize". We have to remember that unlike translation between different European languages or Latin languages, which is relatively easy, it is very difficult to translate Hanyu into English. A major reason Tagore won the Nobel Prize in Literature is because he wrote in English. So we needn't care too much about Nobel Prize. We shouldn't put it on a pedestal and regard it as the sole standard, because it's not.



澳大校長趙偉（右）向余光中致送紀念品
UM Rector Wei Zhao (right) presents a souvenir to Yu Kwang Chung

澳：漢語新文學、漢語新詩是澳大提出的概念，它可以將現當代文學、台港澳文學、海外華文文學一體化，不分中心邊緣。對此，您有怎樣的評價？

余：這種提法在教學、研究方面確實有較強的整合力，有利於消除中心和邊緣的界限，全面地把握研究狀況。但是我並不都認可，因為在習慣上，和漢語相對應的是回語、藏語等。不在中國使用的往往才稱為「華語」，而在國內日常生活中用則稱為「普通話」。「華語」不會產生政治聯想，華文則可以在全世界用。所以如果是在學術研究方面使用我沒有什麼意見，並覺得這種提法很有道理，但是在日常使用中則不十分贊同。尤其是在新文學開創時期，胡適也只是提出「國語的文學，文學的國語」。

澳：您對澳大新校園有什麼印象？

余：看到澳大新校園，那裡不僅有配套完善的教學設施，住宿條件及周邊環境也非常好，為教師教課、學生組織社團活動提供了很多便利。希望澳大師生都能好好珍惜，把握這個機會，一起推動澳大邁向更高的層次。

U: UM proposed the concepts of "new Hanyu literature" and "new Hanyu poetry", hoping to eliminate the boundaries between "centre" and "periphery" and integrate modern and contemporary literature; Taiwan, Hong Kong and Macao literature; as well as overseas Huayu literature. What's your opinion on this?

Y: I agree—but only up to a point. I think it could indeed help with integration in terms of teaching and research—it could help to eliminate the boundaries between "centre" and "periphery" and gives one a complete picture where research is concerned. But I don't think it's a very good idea to use these concepts in our everyday life. We use the term "Hanyu" to distinguish it from languages used by ethnic minority groups in China, such as Huiyu [editor's note: the language of the Hui ethnic minority group], and Zangyu [editor's note: the language of the Tibetan ethnic minority group]. The language spoken outside of China is referred to as "Huayu", while the one people in China use in their everyday life is called "Putonghua". "Huayu" doesn't have any political undertone, and it can be used throughout the world. So if these concepts are only to be used in academic research, that's fine—actually it makes a lot of sense; but I don't think we should use them in our everyday life. Even Hu Shih, when advocating the creation of new forms of literature, merely proposed "a literature of the national language, a national language of the literature."

U: What's your impression of UM's new campus?

Y: I've seen the new campus. It has very good teaching and residential facilities, with beautiful surroundings, which will make teaching and event organisation very convenient. I hope UM teachers and students seize the opportunity and treasure the new campus and work together to help the university scale new heights.

余光中教授於澳大談靈感來源
Prof. Yu Kwang Chung talks about his source of inspiration



拔海 余光中

給生于風災的女嬰碧雅

被咒的千島南國
天兔之後再來海燕
你母親卻非燕子
重負滿胎，只能
在家村陸沉的外海
抱一截木柱漂浮
你睡在羊水中，怎知
母親在海水中正跟
豪雨和颶風交手
隨時會滅頂，沒于一
一排接一排浪頭
這，絕非公平的決鬥
大哉母愛，贏的是母親
只憑着一條臍帶
竟敢與死亡拔河，不
——拔海

2013.11.14

余光中《拔海》手稿
A manuscript of one of Yu Kwang Chung's poems

《鄉愁四韻》

給我一瓢長江水啊長江水
酒一樣的長江水
醉酒的滋味
是鄉愁的滋味
給我一瓢長江水啊長江水

給我一張海棠紅啊海棠紅
血一樣的海棠紅
沸血的燒痛
是鄉愁的燒痛
給我一張海棠紅啊海棠紅

給我一片雪花白啊雪花白
信一樣的雪花白
家信的等待
是鄉愁的等待
給我一片雪花白啊雪花白

給我一朵臘梅香啊臘梅香
母親一樣的臘梅香
母親的芬芳
是鄉土的芬芳
給我一朵臘梅香啊臘梅香

澳大中文系和鏡海詩社學生朗誦余光中的作品
Students from UM's Department of Chinese and
the Jinghai Poetry Society of Macao read Yu Kwang
Chung's poems



大師講座 余光中談靈感來源

Master's Talk—Yu Kwang Chung on the Source of Inspiration

2013年，余光中來到澳門大學，談《靈感一大來源——論藝術經驗之轉化》，為文學愛好者奉獻了一場精彩絕倫的文學盛宴；還特別做客「余光中先生工作坊」，為文學愛好者獨開小灶，手把手近距離地指導文學初寫者，為他們把脈開方，和眾人分享他的創作經驗，以及他是如何將藝術經驗轉化為靈感。

美感經驗之互通

余光中認為藝術創作必須具備三個條件，即知識、經驗和想像。只有這樣，才能筆補造化。他認為藝術正如 Malcolm De Chazal 所言，「藝術就是使造化加速，讓神靈放慢」(Art is nature speeded up and God slowed down)，也如唐代詩人李賀所說，「筆補造化天無功」，甚至如 Oscar Wilde 所認為的「不是藝術模仿人生，而是人生模仿藝術」(Life imitates Art far more than Art imitates Life)。

余以登山為例，輔以柳宗元、王質和自己的詩歌作例子，說明比喻是天才之試金石，並且要以不類為類才算高明。

寫實主義：直接經驗與間接經驗

「竹外桃花三兩枝，春江水暖鴨先知。蒹葭滿地蘆芽短，正是河豚欲上時。」余光中借蘇軾《惠崇〈春江晚景〉》一段來闡明寫實主義中的直接經驗和間接經驗，寫詩者要注重發現和吸取不同的經驗來豐富認知感受。

在講解了寫實主義之後，余光中進而通過舉達芬奇、包慈、尚帕尼等人作畫的《最後的晚餐》，對照《馬可福音》的記載，指出有些題材不適合寫實。

通過色彩、構圖、造型等方面，余光中和聽眾一起分

During his visit to UM in 2013, Yu gave a talk entitled "A Major Source of Inspiration—On the Transformation of Artistic Experience". He also led a workshop where he shared his experience with beginning writers and answered their questions.

Transformation of Artistic Experience

Yu believes that there are three prerequisites for artistic creation, namely knowledge, experience, and imagination. Only when all three are present can "art prevail where nature fails", he quoted a line from one of the poems by the Tang dynasty poet Li He. He thinks that art is, as Malcolm de Chazal put it, "nature speeded up and God slowed down," and contrary to popular belief that art imitates life, Yu agrees with Oscar

Wilde who once observed that, "Life imitates art far more than art imitates life."

He used mountain climbing, along with his own poems and poems by Tang dynasty writer Liu Zongyuan and Song dynasty writer Wang Zhi, to illustrate that mastery of metaphor is the mark

of a genius, and that truly ingenious metaphors are created by finding similarities where none seem to exist.

Realism: Direct Experience VS Indirect Experience

The famous Song dynasty poet Su Shi once wrote a poem which goes like this, "Beyond the bamboo grove, several peach trees are in bloom/The river is warming, which the ducks are first to know/Beach wormwood is teeming, the asparagus just sprouting/Ah, the season when globefish are coming upstream!"¹ Legend has it that some of the poet's contemporaries took issue with the word "ducks"; why ducks had to be the first to know, they asked the poet, why not geese? Actually, explained Yu, as the title of the poem, "Inscription on Huichong's Painting of a Spring River", implies, this knowledge did not come from the poet's direct experience, but from his indirect experience, which was his observation of a painting. Yu used this example to stress the importance of using both direct and indirect experience to find more sources of inspiration for poetry.

But Yu also pointed out that some subjects do not lend themselves very well to realistic reproduction, citing the different versions of the painting *The Last Supper* by different artists including Leonardo da Vinci, Dieric Bouts, Philippe de Champaigne, etc, all of which were

“藝術創作必須具備三個條件，即知識、經驗和想像。”

There are three prerequisites for artistic creation, namely knowledge, experience, and imagination.

享感知經驗，同時以自己創作過程為例，細細剖析藝術創作之過程。如他在為劉國松《月球漫步》題寫詩歌時，將自己想像成在月球漫步的阿姆斯特朗，位置的變化讓詩人忽然想到李白那流傳千古的詩句「舉頭望明月，低頭思故鄉」，應該倒過來改為「舉頭望故鄉，低頭踏明月」。自然的聯想和想像獲得了古詩所沒有的美感效果和空間，可謂是美感經驗互通的最佳範例。

閱讀與意象

在工作坊上，余光中鼓勵學生多讀書，他認為開卷有益，但同時強調盡信書不如無書；他看重舊小說介乎文言和白話之間的那份文辭之美，認為中文寫作時應注重文字本身的美，而不可以追求故事。

余光中告知文學初寫者，剛寫詩歌時不要感歎人生，不寫哲理，而寫個人的、家庭的情感。詩要由一個主題、思念、感情，靠具體的形象表達出來。他舉《七步詩》的例子，認為這正是用看得見的具體東西，把握看不見的情緒的最佳案例。他認為意象和節奏是詩歌表達的兩大重點，學生不妨從鍛煉、操縱意象開始。

他建議，先看作家的選集，從模仿做起，三五年之後，就可以達到超越的時代；同時要堅持寫，每天都動腦筋寫幾句給自己看。余光中以自己為例，初寫詩歌時，他曾模仿新月派，寫了一些生硬的豆腐塊詩歌；後來受中國古風的影響，寫詩不分段，再後來隨著認知的提升，詩體、題材都有較大的拓展。



余光中於席上仔細聆聽學生朗讀其作品
Yu Kwang Chung listens as the students read his poems

based on the same story of Jesus's last supper with his disciples recorded in the *Gospel of Mark*.

Yu shared his experience with the audience from the perspectives of colour, composition, and modelling in painting. He used one of his poems, which was inspired by Liu Guosong's painting *Walking on the Moon*, as an example to explain how a new work can be created by transforming artistic experience. When he was creating the poem, he said, he was imagining himself as Neil Alden Armstrong taking a leisurely stroll on the moon, when it suddenly occurred to him that the two lines from the famous poem by the Tang dynasty poet Li Bai, "Looking up, I see the bright moon; looking down, I think of my hometown," perhaps should be re-written into "Looking up, I see my hometown; looking down, I'm walking on the bright moon." This transposition came naturally from his active imagination, giving birth to a new poem with a fresh aesthetic appeal and dimension the original poem didn't have.

Reading and Imagery

At the workshop, Yu encouraged the students to read more, as one could always benefit from reading, but he also stressed that if one believes everything one reads, one might as well not read at all. He loves classical Chinese literature, which was written in a language in between vernacular Chinese and classical Chinese, for their beauty of words. He advised the students to put the beauty of words before story-telling in their own writing.

He advised beginning poets to write about personal experiences and emotions instead of life and philosophy. He believes that the abstract theme or emotion of a poem needs to be expressed through concrete imagery. He cited "The Quatrain of Seven Steps", a poem by Cao Zhi from the Three Kingdoms period, which he thinks is one of the best examples of expressing an abstract emotion with concrete imagery. In addition to imagery, he told the students, rhythm is also very important for poetry. Indeed, he explained, imagery and rhythm are the two key tools by which poetry express beauty, and he advised the students to start with practicing how to become better at using imagery.

He suggested that beginning poets should start with reading and imitating works by established poets and practicing writing every day, even when it feels hard to come up with anything and even if there are no other readers except themselves; and if they keep doing this, it is possible to surpass their role models within three to five years. When he first started writing poetry, he told the students, he used to imitate the Crescent Moon School and wrote some awkward modern metrical poetry and later, under the influence of classical Chinese poetry, started to write poems with no stanza breaks. As his understanding deepens, his poems began to acquire a much greater breadth both in style and in subject.

旅行與文化

「夫天地者，萬物之逆旅；光陰者，百代之過客。」
(李白《春夜宴桃李園序》)

旅行是語言的翻譯，翻譯是語言的旅行，兩者之間有一種形而上的相通。古今中外的大文學家們，無不注重旅行的意義。只有這樣，才能深入認識不同地區的歷史文化與風土人情，從而開拓視野，豐富個人知識。

在工作坊中，余光中向學生介紹了中外文學藝術中對行旅的關注和表達，並以此開啟旅行在時間和空間轉換中與人生旅途之關係。從西方的《奧德賽》、《出埃及記》、《堂吉珂德》，到東方的《大唐西域記》、《西遊記》、《徐霞客遊記》，他細數中西文學中著名的遊記，既看到遊記本身的價值，更引導學生意會到這些遊記後來都變成了象徵，是人類存在方式的各種表達。

早年余光中便曾遠赴歐洲大陸暢遊學習，他藉此勉勵學子，每一個人都有旅行，每一段旅行都有與之相關的文化，要從一點一滴裡學會感悟。

Travel and Culture

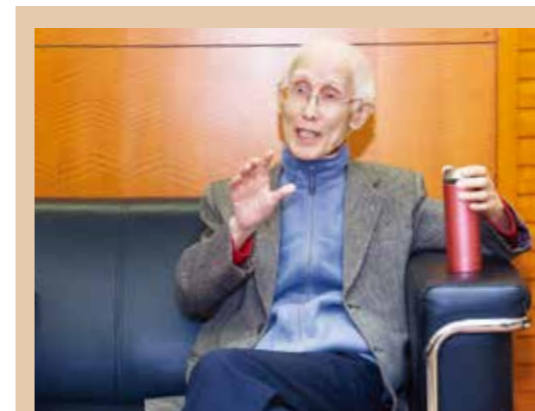
"The universe is a temporary inn for all living things. Time is the transit visitors over the span of one hundred generations" ("Preface to the Feast in Peach and Plum Garden on a Spring Night" by Li Bai²).

“旅行是語言的翻譯，翻譯是語言的旅行，兩者之間有一種形而上的相通。
Travel is the translation of languages, and translation is the travel of languages. There is a metaphysical connection between the two.”

Travel is the translation of languages, and translation is the travel of languages. There is a metaphysical connection between the two. Literary masters across the world, from ancient times to the modern day, have all understood the value of travel—only through travel can one gain a deep understanding of the histories, cultures and customs of different places, thereby broadening one's horizons and enriching one's knowledge.

At the workshop, Yu introduced students to famous literary works with travel as the main theme, from Western works like *Odyssey*, *Exodus*, and *Don Quixote de la Mancha*, to Eastern ones such as *Journey to the West*, *Journey to the West in the Great Tang Dynasty*, and *Xu Xike's Travel Diary*. He explained how travel, in its temporal and spatial changes, is similar to life's journey. While helping students to see the value of the travel diaries in these works, he also explained how these travel diaries later became symbols, or rather, ways of expressing human existence.

Yu talked about his travels in Europe when he was young, noting that everyone travels, and each travel allows one to experience a culture unique to that journey. He encouraged the students to take in each moment while travelling and stay open to what these little moments have to teach.



余光中

著名詩人、散文家、評論家、翻譯家、編輯人。先後就讀於金陵大學、廈門大學；1950年赴台，畢業於台灣大學外文系。赴美進修，獲愛荷華州立大學藝術碩士學位。先後任台灣師範大學、政治大學及香港中文大學教授，又任台灣中山大學文學院院長、現為該校的光華講座教授，在海峽兩岸四地及亞歐美各地講學或任客座教授；為香港中文大學、台灣中山大學、澳門大學等校榮譽博士，北京大學駐校詩人。今年應邀擔任澳門大學「文學藝術家駐校計劃」駐校作家。著譯有《白玉苦瓜》、《逍遙遊》、《梵谷傳》等數十種。

About Yu Kwang Chung

Yu Kwang Chung is a renowned poet, prose writer, critic, translator, and editor. He first studied at the Private University of Nanking and then transferred to the University of Amoy (now known as Xiamen University).

He went to Taiwan in 1950. After graduating from Taiwan University's Department of Foreign Languages and Literatures, he went to the United States where he later received a master's degree in fine arts from Iowa State University. He was professor at Taiwan Normal University, Chengchi University, and the Chinese University of Hong Kong. He was the dean of the College of Liberal Arts at Sun Yat-sen University, Taiwan, and is currently its Kung Hua Chair Professor. He has given lectures and served as visiting professor at numerous Asian, European and American universities. He has received honorary doctorates from the Chinese University of Hong Kong, Sun Yat-sen University (Taiwan), and UM. He is a poet in residence at Peking University. This year he became a writer in residence at UM under the Writers-and-Artists-in-Residence Programme. He has published more than 50 titles, including a poetry collection *White Jade Bitter Guard*, a prose collection *Untrammelled Traveler*, and a translated work, *Lust for Life*, which is a fictional biography of artist Vincent Van Gogh.

Notes: 1, English translation of this poem is by Wen Shu, Wang Jinxi, and Deng Yanchang. 2, English translation of this poem is by E. C. Chang.

以人為本 新校園創建良好育人環境

Creating a Good Learning Environment through a People-oriented New Campus

文 Text | 張愛華 Ella Cheong 筆錄 Transcription | 校園記者秦萱 UM Reporter Zoe Qin

圖 Photo | 李思、吳景洪 Manuel Reis, Kidonis Ng



連廊的設計方便師生在校園互動交流

The covered walkways facilitate teacher-student interaction and peer interaction

自然環境保護和綠色健康生活是人們普遍關注的焦點，大學校園是一個融合學習和生活的小社區，因此，澳門大學新校園在建築過程中一直貫徹「以人為本」的環保設計理念，並在空間設施和功能佈局上配合專業、通識、研習和社群教育的「四位一體」教育模式，為師生提供一個探索知識、追求學問的環保、健康、安全的新校園。

Environmental protection and green living has become a focus of interest for communities around the world. It is no exception for the University of Macau's (UM) new campus, which is itself a small learning and residential community. During the construction of the new campus, UM has followed the "people-oriented" and "environmentally-friendly" principles, in order to build a green, healthy and safe campus with a functional layout that is conducive to the implementation of the "4-in-1" mode of education. This education model consists of discipline-specific education, general education, research and internship education, as well as community and peer education.

校園規劃重視生態環保

新校園不追求雄偉輝煌，但卻體現「環境育人」的宗旨，在規劃上著重促進師生間的交往及跨學科的交流，使師生能夠在綠意盎然的環境裡研究學習。新校園內有 60 多幢建築物，整體規劃重視開敞空間的佈局和生態環保的理念，並強調人與自然的和諧共存。校園發展總監宋傑堯表示：「校園的佈局主要按東南西北四大區域來劃分，將學習、科研、住宿和生活區按功能分佈於各區。各核心區域之間僅五分鐘的步行距離，加上連接各建築物之間的連廊走道，天氣炎熱之際，連廊內也涼風習習，師生身處其中，活動和交流非常便利。」

節能措施覆蓋全校

新校區的樓宇設施和空間增大，如何做到更加環保和節省？宋傑堯表示，新校園景觀水體廣泛收集校區雨水並採用循環處理再利用技術。校園北區建築群採用區域供冷以節省空調機房的建設；體育館與學生活動中心採用光伏能源等環保新技術；研究生宿舍及住宿式書院均全面採用中央式太陽能熱水系統等，既環保又節能。「學生活動中心內的建築材料、設備和通風設計符合環保標準，還申報了國內綠色建築三星認證。校區建築均為南北朝向加強自然通風效果，減少日光直射，外牆盡可能少用玻璃幕牆以降低室內冷源損耗。保證課室、教學樓、實驗室的通風及空氣質量。另外，新校園還設置中水回用管網系統，所有校區污水經氹仔污水廠處理後，成為可再使用的中水，再回到校內用來補充水系景觀、澆灌園林綠地和噴灑道路、沖洗汽車及廁所。」



校園發展總監宋傑堯
Gordon Song Kit Io, director of the Campus Development Office

Environmentally-friendly Design

The design of the new campus reflects the university's belief that environment plays an important role in education and that humans and nature should coexist in harmony. The new campus has more than 60 buildings, none of which is particularly ornamental or grand. The design places less emphasis on impressive appearance and more emphasis on facilitating teacher-student interaction and cross-disciplinary communication; one way to achieve that purpose is construction of many covered walkways and open spaces. "The new campus is divided into four parts—east, south, west, and north, with each part having a different main function," explains Gordon Song Kit Io, director of the Campus Development Office (CDO). "Different core areas are within walking distance of each other. It takes about five minutes to walk from one area to the next. Besides, the different buildings are connected by covered walkways, which are breezy even in hot days. These help to create an environment in which teachers and students can comfortably walk about the campus and communicate with each other."

Campus-wide Energy-efficient Systems

How does the university achieve environmental protection and energy efficiency with the increased facilities and space on the new campus? Mr. Song explains the artificial lake and other scenic bodies of water on the campus will source recycled rainwater, and a district cooling system is used for buildings in the north area to save the construction of an air conditioning system control room. Environmentally-friendly photovoltaic systems are used in the Sports Complex and the Student Activity Centre. A central solar water heating system provides hot water to all the Postgraduate Houses and residential colleges. "Building materials, equipment, and ventilation systems in the Student Activity Centre all meet environmental standards, and we have applied for the three-star rating for green buildings. All the buildings are south-facing for better ventilation and less direct sunlight. Glass walls are avoided where possible to reduce the energy consumption of the cooling system. Also, there is a water reuse system on the campus. All wastewater from the campus is treated by a wastewater treatment plant in Taipa to become reclaimed water which is then reused on the campus for irrigation, road and car cleaning, toilet flushing, and other purposes."



學生活動中心申報了國內綠色建築三星認證
The university has applied for the three-star rating for green buildings for the Student Activity Centre

新校園內，除特許車輛外，一律禁止汽車行駛，鼓勵單車出行，目的是減低排放，營造低碳校園。校園管理代總監陳麗芬表示：「在搬入新校園的第一年，大學會提供租用單車服務，帶動單車文化。在節能方面，我們正研究推行能源管理計劃，在辦公室和走廊已開始進行減燈措施及設置自動熄燈系統，並在洗手間裝設行動感應燈，以多種節能措施配合大學推行環保校園的綠色使命。」

To reduce carbon emission, only authorised vehicles are allowed to travel on the campus, and biking is encouraged. "In the first year after we move to the new campus, the university will provide bike rental service to cultivate a culture of biking," says Linda Chan Lai Fan, acting director of Campus Management Office (CMO). "As for energy-saving, we are studying the possibility of launching an energy management plan. We've already started implementing some of the measures, including delamping extra lights in offices and corridors and installing motion detector lighting systems in washrooms. We hope these measures can help build a green campus."



校園管理代總監陳麗芬
Linda Chan Lai Fan, acting director of the Campus Management Office

多元化體育設施倡健康文化

新校園設有綜合性室內體育館、室內游泳館、田徑及足球場、戶外體育場地，體育設施比舊校園更加多元化。室內場地包括健身室、訓練館、乒乓球室、羽毛球館、壁球場、舞蹈室、課室及多功能室等，還有新增的體適能實驗室供教育學院師生做研究。而主場館未來還可以進行籃球、排球、手球、合球或五人足球等運動比賽。

新校園體育場地和運動類型也比舊校園有所增加，例如籃球場由一個增至 14 個，網球場由兩個增至 10 個半（加半個練習場），健身室設備也全面提升。新校園還新增一個標準 50 米恆溫泳池和一個沙灘場。體育事務總監陳炳祥博士說：「澳大新校園的體育設施在大中華區屬一流水平。沙灘排球、足球、手球和合球能夠在同一所大學進行，在美國、台灣、內地和香港也只有少數大學能夠做到。」

戶外體育設施是校園推廣環保意識的硬件條件，足球場是天然草場而非人造草場，這不僅有利環保，同時對運動員的傷害程度也會減少。新校園各處都有體育設施，有助推廣健康的校園文化。陳炳祥博士補充，其部門日後會積極推動學生多參與體育運動，強身健體，訓練個人意志和培養團隊精神。「我們真心希望越來越多人能夠參與運動，這樣健康的體育文化才會更興旺。大家都熱愛運動，身心健康，對大學的整體發展也是一件好事。」



體育事務總監陳炳祥博士
Patrick Chan Ping Cheung, director of the Office of Sports Affairs



校園體育設施十分完善
The new campus has a great variety of sports facilities

Various Sports Facilities to Foster a Culture of Health and Fitness

The new campus boasts a greater variety of sports facilities than the old campus, including a Sports Complex and various outdoor sports facilities. The Sports Complex includes a sports pavilion, indoor swimming pool, fitness room, training hall, table tennis room, badminton hall, squash courts, dance room, classrooms, multi-purpose room, and physical fitness laboratory, which is a new addition where students and staff from the Faculty of Education may conduct research. In the future, the sports pavilion will be able to host basketball, volleyball, handball, korfbal and 5-a-side futsal competitions.

Not only is there more variety in sports facilities, there is a significant increase in quantity as well. For instance, there are 14 basketball courts and 10.5 tennis courts (0.5 being the training court) on the new campus, compared to 1 and 2 respectively on the old campus. Fitness equipment is also of much higher quality. There is also an Olympic-standard 50-metre heated indoor swimming pool and a beach court. "The sports facilities on our new campus are first-rate in the Greater China region," says Dr. Patrick Chan Ping Cheung, director of the Office of Sports Affairs. "If we look at universities in the United States, Taiwan, mainland China, Hong Kong and Macao, perhaps UM is one of the few universities where you can play beach volleyball, beach soccer, beach handball, and beach korfbal on the campus."

Environmental awareness is evident in many aspects of the design, including the outdoor sports facilities. For instance, the soccer pitch uses natural grass instead of artificial turf, which is not only more environmentally-friendly, but also helps to reduce the severity of sports-related injuries. The ubiquitous sports facilities may also help to foster a culture of health and fitness. Dr. Chan says his office hopes to encourage more students to participate in sports so they can stay fit and healthy, improve willpower, and develop team spirit. "We sincerely hope that more and more people will participate in sports, because only



恆溫游泳池採取對人體損害最低的臭氧消毒方式
Ozone disinfection is used for the heated swimming pool to minimise harm to the human body

安健及環境事務辦公室主任梁超明
Michael Leung Chiu Ming, head of the Office of Health, Safety and Environmental Affairs

校園安全 學習生活更愜意

新校園有逾萬名成員，要確保人人身心健康，是任重道遠的工作。新校園現有場地均依照兩個標準來建設：安全及可用性。陳炳祥博士說：「運動場地是否使用木地板，地面是否平整，地板密度如何，我們都需要仔細考慮。恆溫游泳池採取對人體損害最低的臭氧消毒方式，其水質含氧量還有池邊和池底環境也要保證安全，讓使用者能夠有效、安全地使用。」另外，安健及環境事務辦公室在新校園每座建築交付澳大之後，都會進行兩大檢測工作：一、空氣指數的測試，分別測試每小時室內空氣轉換率，以及甲醛和揮發性有機化合物含量，確保不會超標；二、水質監測，以保證水質安全。

新校園設立一個擁有先進設備的科研基地，內裡有眾多實驗室設備和危險品，安健及環境事務辦公室主任梁超明表示：「我們已為此購買了化學品管理系統軟件，並正在測試中。將來新校園購置的所有化學品都要經過該系統軟件檢測，主要目的是控制危險品總量不要太高。」

新校園設有一個診所，讓大學成員能得到妥善醫治。安健及環境事務辦公室負責診所的日常管理工作，梁超明表示，「我們正在考慮將診所服務時間延長到晚上約八點，未來也會增聘更多醫護人員，另外也會舉辦更多有關身心健康和營養方面的講座，希望大學成員都能夠保持身心健康。」

through everyone's participation can we truly foster a culture of health and fitness," Dr. Chan says. "Sports are important to our physical and psychological wellbeing, and if everyone is healthy and happy, it would benefit the university's development in the long run."

Safe Campus for More Comfortable Learning and Living

All the buildings on the new campus have been constructed to meet strict safety and usability standards, to make sure that more than 10,000 students and staff can work, study and live in a safe and healthy environment. "Should we use wood flooring inside the sports venues? Is the ground level? What's the flooring density? These are some of the questions we needed to consider carefully," Dr. Chan says. "We use ozone disinfection for the heated swimming pool to minimise harm to the human body. The quality of water and the oxygen content must meet safety standards; the poolside environment and the environment at the bottom of the pool must also be safe." The Office of Health, Safety and Environmental Affairs (HSEO) conducts two kinds of testing after each building is handed over to the university. One is air quality testing. This is to test the air changes per hour and the concentration of formaldehyde and other volatile organic compounds to make sure they are within the safe range. The other is water quality monitoring to make sure water quality meets safety standards.

The new campus has an advanced scientific research base, with various kinds of lab equipment and hazardous substances. Michael Leung Chiu Ming, head of HSEO, says: "We've already bought system software for managing chemicals and we are in the process of testing it. All the chemicals we buy in the future will go through checking by this software, and the main purpose is to make sure the total quantity of hazardous substances is not too high."

There is a medical centre on the campus, and HSEO is responsible for its day-to-day operation. "We are considering the possibility of extending

密切監察水體蚊患情況

新校園擁有大量湖水和園林景觀，園林綠化及水體面積達 54 萬平方米，有助吸收二氧化碳，緩和熱島效應，增加生態棲息地，為師生創造了一個自然的環保綠化生活小區。湖體綠化面積增大的同時也帶來蚊患的影響，陳麗芬承認水體管理和水質監測是其部門一項很艱鉅的工作。「第一次面對這麼大的湖區，我們之前並沒有這方面的監測經驗。經過多次考察，已基本掌握水質監察的工作。滅蚊方面，我們會在校園設多個試點，取樣和收集數據，全校不同地點安裝了 200 多部捕蚊器，密切監測蚊患情況。」

引新技術提升服務水平

新校園是一個開放式的校園，在未來也會漸漸成為澳門的地標，如何在開放的同時又不影響到寧靜的校園環境？校園管理部已實施一系列的措施，以保障大學成員的安全，包括密切與澳門海關及澳門治安警察局加強聯繫、制定《公共地方使用規則》，以及使用分區管理連同中央監控管理的辦法，在校園各處安裝閉路電視，並在西、南邊增加新的保安崗位等。陳麗芬表示，為減省內部的人力資源，已引入了「綜合設施管理」的外判服務，加強設施管理工作，未來還會引進新的技術、知識，以提升校園管理和服務的水平。

澳大自 2007 年加入「亞太區健康大學網絡」後，一直致力構建健康、安全及環保的校園，為學生及教職員提供一個優質的學習、科研及工作環境。作為一所支持高校環保的大學，澳大將持續鼓勵全校師生身體力行，支持建設一個寧靜、少車、低碳、無障礙和持續發展的校園，讓澳大成為本地區環保先驅的典範。



the service hours until about eight o'clock in the evening, and we are also hoping to recruit more staff to work in the medical centre," says Mr. Leung. "We will also organise more talks on nutrition and physical and emotional health, to help our students and colleagues stay healthy."

Mosquito Control

There is an artificial lake and a variety of green landscapes on the campus, with a total area of 540,000 square metres. The artificial lake and the green landscapes help absorb carbon dioxide, reduce the heat island effect, increase ecological habitats, and create a natural, environmentally-friendly, green residential community for the students and staff. However, the increased area of lake water and green spaces also provides fertile breeding ground for mosquitos. Ms. Chan admits that water management and water quality monitoring are a great challenge for her office. "This is the first time we need to manage an artificial lake of this size, and we don't have any prior experience to draw on," Ms. Chan says. "We visited several places to learn from their experience in monitoring the quality of water. For mosquito control, we have set up several test spots on the campus to collect samples and data. We are installing more than 200 mosquito killers across the campus, and we are closely monitoring the situation."

Introduce New Technologies to Increase the Level of Service

The new campus is an open campus, and will likely become a Macao landmark in the future. To make sure the campus maintains an atmosphere of peace and tranquility while staying open to the public, CMO has implemented a series of measures, including closely liaising with the Macao Customs and the Macao Public Security Police Force, establishing rules on the use of public areas, and zone management with central monitoring. Closed circuit TV surveillance systems have been installed in various spots on the campus, and new security booths have been added in the west and south areas. Ms. Chan says that to save internal manpower, her office has outsourced integrated facility management service to a facility management company, and in the future new technologies and knowledge will be introduced to increase the quality of campus management service.

As a member of the Asia-Pacific Network of Healthy Universities since 2007, UM is committed to building a healthy, safe and environmentally-friendly campus to provide an excellent environment for learning, research and work. In the future, UM will encourage its students and staff to work together to build a peaceful, low-carbon, barrier-free, and sustainable campus with low vehicle traffic, so as to become a regional role model in environmental protection.

新校園有大量湖水和園林景觀
There are large bodies of water and a variety of green landscapes on the campus

在優化教與學的路上

On the Road to Enhancing Teaching and Learning

文 Text | 呂莉莉, 黎卓君 Lis Loi, Lesley Lai

圖 Photo | 李思, 何杰平, 部份由受訪者提供 Manuel Reis, Jack Ho, with some provided by the interviewee



CTLE 定期舉辦工作坊, 和教師分享如何於課堂上應用 moodle 網上教學平臺
CTLE regularly organises workshops to teach faculty members to use moodle as an online platform for teaching

全球化的世界, 各國求才若渴。各地大學無不積極培育適合社會的人才, 澳門特區政府更於 2014 年 4 月建立了人才培育長效機制, 務求能解決目前澳門人才緊絀的困境。澳門大學, 作為培育本地人才的搖籃, 應如何優化和改革其教育策略和教學模式, 以因應瞬息萬變的澳門社會?

In this increasingly globalised world, every country is thirsting for talent. Governments and universities around the world are actively seeking to nurture high-calibre graduates to meet society's needs. In April 2014, the government of the Macao Special Administrative Region (Macao SAR) established a long-term talent development mechanism, in an effort to address the acute talent shortage in Macao. How can the University of Macau (UM), a leading institution of higher education in Macao, reform and enhance its teaching and learning, to meet the constantly changing needs of the Macao society?

三月中旬, 午餐休息時間, 一群老師聚集在澳大智能課室。他們分成小組, 一邊聽著講師分享「成果導向教學模式」, 一邊利用自身教學經驗和組員討論可行性。參與的成員既有院長, 也有來自國外的教授, 也有本地的講師。他們透過講師分享, 再討論以考試作為評量學生學習成果的優與劣, 討論如何鼓勵學生自主學習。

這是澳大教與學優化中心(下稱中心)所定期舉辦的教學工作坊, 讓老師們能夠在課餘時間, 一同磋商教學模式, 透過討論、分享經驗和研究外國教育趨勢, 提高教學成效。這類的工作坊每學期會舉辦五六次, 主題不同。中心的主任為來自美國的施博智教授, 曾在美國馬里蘭大學教學中心任職總監, 他表示, 系所對工作坊的參與度幾乎和馬里蘭大學同樣熱烈。「別忘了系所是自發性地參與呢!」施博智表示。

事實上, 除了美國馬里蘭大學, 國外不少優秀大學皆設立單位, 致力研究如何提升教學品質。於 2009 年, 澳大設立教與學優化中心, 希望透過組織或資助相關培訓、研究等活動, 提升教與學的品質。除於圖書館建立相關館藏, 也定期舉辦各式工作坊、講座。其中包括如何於課堂上應用科技等實用主題, 獲得不少教職員好評。

和其它大學不一樣的是, 澳大教與學優化中心另外配合澳大「四位一體」的教育模式, 在專業學科外, 也需改善通識教育的教育品質, 同時提供一系列的博雅講座讓學生有機會在課室外學習通識。

從設立教與學優化中心為第一步, 澳大這所年輕大學在提升教學品質的路上, 正邁開大步前進。

In mid-March, a group of faculty deans and professors participated in a lunchtime workshop in a smart classroom at UM. Divided into several groups, they listened to the instructor share the "Outcome Based Teaching and Learning" and discussed its feasibility with group members based on their own teaching experiences. They also discussed the pros and cons of measuring learning outcomes with test results as well as ways to encourage students to use their own initiative in learning.

This is one of the workshops organised by UM's Centre for Teaching and Learning Enhancement (CTLE). The purpose of the workshop is to improve teaching outcomes by having participants discuss problems they encounter in teaching, brainstorm solutions, share experience, and study international trends in education. The CTLE workshops are held five or six times a semester, with a different theme each time. Prof. Spencer A. Benson, former director of the Center for Teaching Excellence at the University of Maryland and current director of CTLE, is pleased with the attendance rate. "In terms of attendance of the faculty, it is nearly as good as what I achieved at the University of Maryland," Prof. Benson says. "Remember, all of this is voluntary."

In fact, many outstanding universities around the world have established similar centres. UM's CTLE was founded in 2009, with the purpose of enhancing teaching and learning through organising and sponsoring relevant training and research activities. In addition to increasing the library collection on improving teaching and learning, CTLE regularly organises various workshops and talks, which have been very well received.

Unlike similar centres at other universities, which are mostly focused on enhancing the level of teaching and learning in general, UM's CTLE needs to fulfil another mission, which is to provide support for the university's unique "4-in-1" model of education and enhance general education. The centre organises talks on liberal arts education to provide students with opportunities to receive general education outside the classroom.



教師在課餘時間, 透過教學工作坊, 磋商教學模式
Faculty members discuss teaching and learning at a workshop

澳大教學 一手機會 一手挑戰

Both Opportunities and Challenges Aboard

教與學優化中心主任施博智教授
Prof. Spencer A. Benson, director of the Centre for Teaching and Learning Enhancement

自 2009 年澳大教與學優化中心成立，至今近五年，曾在美國馬里蘭大學和香港參與教學優化和通識教育工作的中心主任施博智教授表示，教與學優化中心目前著重於提高學生學習還有鼓勵師生於課堂上應用網絡科技。他強調，要想追上國際高等教育水平，澳大不能單純複製別處的成功途徑，而是要推陳出新，創造具有澳門特色的一套成功模式。

施博智回顧中心過去的工作，他表示成立教與學優化中心是澳門大學作出改變、提高教學水準的重要第一步。中心繼而具體執行能提高教學成效的行動。施博智分享，目前中心與資訊及通訊科技部密切合作，不定期舉辦 iPad 等電子學習設備的應用課程，以提高教師使用電子器材教學的意識，並取得不錯的成效。其於午間舉辦的 moodle 網上教學平台工作坊也成功增加 moodle 的使用率。施博智表示：「沒有什麼事情是可以一蹴而就的，但可喜的是，我們在不斷進步。」

今年夏天，澳大搬至新校園，在逐步改善教學的路上，嶄新的教學設施正正助其一臂之力。施博智認為新校園是一個有趣又不可預知的地方，給中心帶來了一個尋找創新和最佳解決方法的機遇。他指出，「新校園提供了一個推動教學迅速變化的機會。我們計劃在新校園的課室增加更多互動設計，增加學生的參與。」



CTLE's current focus is on increasing student learning and the use of technology in classrooms. Prof. Benson stresses that in order to catch up with top-tier universities and be successful, UM cannot just transplant what works elsewhere; the institution must find a way that benefits Macao's unique identity.

Establishing CTLE is the first step in the university's effort to improve teaching quality. CTLE has implemented some concrete measures aimed at improving teaching outcomes. For instance, CTLE is now working closely with the Information and Communication Technology Office to increase the use of electronic devices in teaching, which has achieved very good results. The Moodle lunchtime conversations have been very successful in increasing the faculty's use of Moodle. "Nothing changes overnight," says Prof. Benson. "But we are making progress."

This summer, UM started moving to the new campus. The advanced teaching facilities will go a long way towards enhancing teaching and learning at UM. Prof. Benson thinks the new campus is an interesting and unpredictable place which provides a wonderful opportunity for creativity to address the challenges facing the university. "It may provide an opportunity to move things rapidly forward within the changing teaching and learning," Prof. Benson says. "We plan to make some of the classrooms more interactive to increase student engagement. Not in rows, but rather in groups."

機會與挑戰中尋找平衡

機會和挑戰往往並存。新校園中擁有更多的公眾空間，該如何創新規劃？課室數目如何增多？資源如何有效分配？施博智提出更多即將面對的問題。除外，該如何利用新機遇繼續提升澳大教學質量以達到世界一流大學的水平，更是教與學優化中心的一大挑戰。

目前國際上，高等教育趨於注重學生學習參與度和科技應用。施博智指出，澳大在應用科技上落後南韓、台灣和香港。他以美國興盛的網上教育為例，指出澳大需要並將會持續改善。因文化差異，澳大的學生學習參與度也比西方國家的低。「我個人的觀察是，澳大本科學生的課堂參與度與西方國家相比有大概五年的差距，但正快速提高。澳大資源豐富，無論在教學、研究或招攬人才上，都正迎頭趕上國際水準。」儘管如此，施博智指出，澳大不應單純移植他國經驗。「澳門就是澳門，我們要找到澳門的特別之處，並加以利用，就能建立澳門高等教育的獨特位置。」

教與學優化中心主任施博智教授認為，新校園可迅速推動優化教學。
Prof. Benson thinks the new campus may provide an opportunity to move things rapidly forward within the changing teaching and learning

Meeting Challenges, Seizing Opportunities

Both opportunities and challenges abound on the new campus. How to make use of the increased public spaces in an innovative way? How much has the number of classrooms increased compared to the old campus? How to better allocate resources? These are some of the challenges facing the university. For CTLE, one of the biggest challenges is seizing the new opportunity to continue to improve the quality of teaching that is expected of a world-class institution.

Prof. Benson notes that the international trend in teaching is to increase student engagement and the use of technology. "With respect to technology and the use of technology in classrooms, UM is behind where it should be, behind South Korea and Taiwan, and certainly behind Hong Kong," says Prof. Benson. "I think the level of student engagement in undergraduate classes in Macao is less than that seen in the Western world. Part of that has to do with cultural differences. From my personal observation, Macao is about five years behind. But Macao is catching up very quickly. UM is catching up in research, in recruitment, and in teaching very fast, because of the resources. However, Macao is Macao. It must retain its identity and capitalise on that identity in order to find its unique place in higher education."



當教學 不再只限於課室

Teaching and Learning beyond the Classroom

澳大代副校長（學術）兼教育學院院長范息濤
Prof. Fan Xitao, interim vice rector (academic affairs) and
dean of the Faculty of Education



自 2004 年賭權開放，澳門社會經歷極大變化。澳大不時反問，甚麼模式的教與學，才能培育出最適合社會發展的未來棟樑。澳大代副校長（學術）兼教育學院院長范息濤指出，未來需要全方位的人才，而澳大的教學模式將不再只侷限於課室。

回憶起近 10 年來澳門的轉變，范息濤院長表示，澳門社會經濟的轉型和多元化，以及求才若渴的情境，當初很多人始料不及。他指出，現澳門已有一定資本，例如透過和周邊區域合作，提供了產業多元化的一定空間。范息濤談及，澳門未來應往更高層次產業發展，例如健康、衛生和文創等。

事實上，澳大於今年初新設立健康科學學院，而設計學院也正籌備中，設計學院未來的研究方向可能會側重於與澳門經濟發展密切相關且具有直接影響的領域。這正是應對社會產業多元化的第一步。「要培育甚麼類型的人才，就看甚麼樣的產業最適合於澳門發展。」范息濤表示。

Macao experienced great changes after the gambling monopoly was abolished in 2004. Amid these changes, the University of Macau (UM) has never stopped asking: What strategies of teaching and learning are most effective in nurturing graduates who can best meet the needs of the society? Prof. Fan Xitao, interim vice rector (academic affairs) and dean of the Faculty of Education, believes that society needs well-rounded people; and in order to nurture such well-rounded graduates, UM is extending teaching and learning beyond the classroom.

“The social and economic transformations and diversification as well as the high demand for talent in Macao are what many people did not anticipate a decade ago,” says Prof. Fan. “Now, Macao has some resources. For instance, collaboration with its neighbouring regions has created room for economic diversification, and in the future, Macao should put more effort in developing advanced industries, such as health industry, and cultural and creative industries.”

In fact, UM has already taken the first steps toward aiding Macao's economic diversification; the Faculty of Health Sciences was established early this year, and preparations are underway to establish a Faculty of Design, which is expected to focus on those directions that are likely to have more direct and relevant impact on Macao's economic development. “What kind of graduates do we need? That depends on which industries are most suited to the needs of Macao,” Prof. Fan says.

課室外培養軟實力

緊隨社會發展脈動而設置學系，無疑為學生提供了更多專業技能的選項，也望可為澳門培育一群各形各色的人才。除了專業技能外，范息濤不忘提醒，學生應多方面發展「軟實力」，即領導力、主動力、說服力和溝通、解決問題等能力。「你怎麼和別人打交道，怎麼在不同場合說服別人，這些是專業實力之外所需要的軟實力，大部份的成功都離不開軟實力。」

那麼，甚麼樣的教學方式能培養軟實力呢？今年新學期起，住宿式書院正式投入運作，范息濤說，「除了專業學習，學生要參與書院活動，書院遠不只是學生宿舍，而是在課堂以外創造許多機會，包括社會服務、師生交流等，讓學生在專業外能培養軟實力。」言教不如身教，在書院裡，來自不同系所和背景的師生們，透過自主舉辦活動，可共同交流，教與學不再只限於課室內。這樣的書院式學習模式，有許多國際名校應用已久，他強調，「在書院內，任何時刻都是教與學的好時機！」

而最終目標，如范息濤所說，將是鼓勵學生自主學習，這也是「四位一體」教育模式裡的核心精神，在住宿式書院裡、在社群裡、在科研時皆能主動求知。「亞洲文化習慣聽令而行，而不習慣採取主動。大學將是學生建立積極主動態度的好機會。人們若要在職涯上走得遠，這主動態度不可少。」

Developing Soft Skills outside the Classroom

Establishing new faculties and departments undoubtedly provides more opportunities for students to acquire technical expertise which is in demand, but Prof. Fan believes that developing soft skills, such as leadership, initiative, effective communication, and problem-solving, is equally important. “How do you deal with different people? How do you persuade people under different circumstances? These are soft skills that are crucial to success,” Prof. Fan says.

If soft skills are so important, how can universities help their students to acquire them? The residential college system is one way to achieve that goal. Extending the teaching and learning experience beyond the classroom setting through the residential college system has been a long-running practice at many of the world's renowned universities. Starting the 2013/2014 academic year, several new residential colleges have become operational on UM's new campus. Each college is home to teachers and students from different departments, faculties, and backgrounds. Through the organisation of various activities, teachers and students have more opportunities to interact with each other. “In addition to studies in their chosen areas of expertise, the students also need to participate in activities organised by their colleges,” Prof. Fan says. “Each college is more than a dormitory building. It provides various opportunities for learning outside of the classroom through community service, teacher-student interaction, and so on, and all these activities are designed to help the students develop soft skills. Within the college, every moment is a teaching moment; every moment is a learning moment.”

And the ultimate purpose, according to Prof. Fan, is to encourage students to “take their own initiatives” in the pursuit of knowledge, not just inside the classroom but also in the residential college, in the community, and beyond. This is also the core spirit behind UM's “4-in-1” model of education. “Asian students are more used to taking instructions than taking initiatives, and college years should provide wonderful opportunities for them to learn to take their own initiatives,” says Prof. Fan. “That's an indispensable quality if one wishes to go far in one's career.”

服務中學習，給予中成長—— 學生志願者走出象牙塔

Learn through Serving, Grow through Giving—
The World outside the Ivory Tower

文 Text | 李淼 Miumiu Li 圖 Photo | 李思，部份由受訪者提供 Manuel Reis, with some provided by the interviewee



澳大學生杜玥與志願者朋友在赤道合影
UM student Du Yue with the other volunteers at the equator line

21 世紀，需要的是什麼樣的學生？

在澳門大學，一批學生海外志願工作者每年到不同國家幫助當地人民；另亦有一群學生服務領袖到安老院等社福機構，無償服務社會。如今，不少年輕學子不再只是被動接受課堂上的知識，他們走出象牙塔，接觸社會，主動回饋。

近年來，海內外眾多大學對社區服務活動的關注日益增加。學生通過志願者服務，接受挫折和挑戰，克服困難並獲得成長。這種課堂外的教育模式，已成為大學教育不可或缺的一部分，也是學生自我發展的最好方式。

What kind of students do we need in the 21st century?

Today, many college students are not content with being ensconced in their ivory towers, passively soaking up knowledge in the classroom. They yearn to experience the world outside the campus and give back to society.

More and more universities have also realised the important role of community service in education. Creating opportunities for students to give back to society as volunteers so they can grow and learn how to deal with setbacks and challenges has not only become an integral part of education outside the classroom, but is considered one of the best ways to help students realise personal development.

Every year at the University of Macau (UM), some students travel abroad to work as volunteers, helping people in different countries, while a group of Service Leaders contribute to the local community by visiting social welfare organisations such as nursing homes.

愛是付出， 更是延續—— 澳大服務領袖計劃 Love Is Continuous Giving— Service Leader Programme at UM

學生崔善怡
Student Chui Sin I

由澳大學生輔導及發展處舉辦的服務領袖計劃，是一個非常年輕、嶄新的活動組織。

今年四月，澳大學生事務部再度舉辦社區服務展覽會，小小的展覽空間擺放了九間澳門社福機構攤位，也擠滿了前來詢問的學生。在展覽會上，澳大第一屆服務領袖正式成立。此計劃目前已匯聚了 16 名同學，主要希望能夠招募校園內對志願工作有興趣的同學，一同服務社會，共同學習成長。

澳大工商管理專業一年級學生崔善怡在服務領袖計劃中擔任公關工作，比起其他快樂享受大學生活的一年級學生，她選擇把課餘時間拿來服務社會。崔善怡自小就已接觸義工領域，小學時便參加學校組織的義工活動，後因課業而中止，直到進入大學，自由時間增多，才有機會真正實現做志願者的理想。活潑外向的她說，加入計劃的原因非常簡單，就是想要幫助別人，看到對方開心，就是自己最大的收穫。

來自西安的賈驍駿，是澳大歐洲事務專業研究生一年級學生。他同樣從小參加義工活動，通過接觸社會上需要幫助的人，切實感受到生活的珍貴，亦希望幫助更多人體會生活的樂趣。這些可說是推動他堅持志願者工作的原因。

目前賈驍駿擔任第一屆服務領袖計劃主席，通過與十多位成員的共同努力，逐漸搭建較為完整的組織體系。成員們分工合作，共同商議、策劃未來的系列活動。



The Service Leaders are participants in the Service Leader Programme (SLP), which is organised by UM's Student Counselling and Development Section.

At the Service Fair 2014 organised by the Student Affairs Office in April, the booths of the nine social welfare organisations were swarming with interested students. The first group of 16 Service Leaders was also inaugurated at the fair.

Chui Sin I, a first-year student from the Faculty of Business Administration, is one of them. She is mainly responsible for PR-related work. An outgoing, extraverted young woman, she chooses to spend her free time serving the community instead of having fun like many other students for a simple reason—helping others through volunteer work has been her dream since childhood, and she believes making others happy is a reward in itself. Chui started participating in volunteer activities when she was in primary school, but had to stop later because of school work. It was not until she began studying at UM, with more free time at her disposal, that she was able to dedicate herself to volunteer work in earnest.

Like Chui, Jia Xiaojun, a first-year postgraduate student of European studies, also has a long history of participating in volunteer work. Helping others has made him more keenly aware of how life is a precious gift to be cherished. He hopes to help more people experience the joys of life, and this is what motivates him to do volunteer work.

As the current president of SLP, Jia has developed an organisational structure in collaboration with the other members. Now they are planning for future activities.



服務領袖計劃主席賈驍駿
President of the Service Leader
Programme Jia Xiaojun

整合公益資源 讓愛延續

除了整合校園的志願者資源外，服務領袖計劃更注重公益活動的延續性。賈驍駿表示，傳統公益活動大多是安排好時間地點，舉辦一次志願服務工作之後就結束，這種模式容易給人留下「做 Show」的印象。而服務領袖計劃希望能夠考慮到每次活動之間的關聯，瞭解服務對象自身需要，針對具體需求制定一系列活動方案。

以四月的「仁慈堂安老院志願活動」為例，學生志願者通過一個月的時間，與長者溝通互動，讓長者感受到同學們的關愛。為體現計劃的延續性，活動結束後義工們仍持續關注安老院，並隨時根據需要提供服務。

首次舉辦此類活動，學生們一點也不馬虎。活動展開前，他們評估可能遇到的困難和問題，例如如何掌握和長者溝通的技巧、如何鼓勵長者投入遊戲節目等。為了解決這些困難，他們與安老院社工聯繫，提前到場參觀，學習社工的溝通技巧和工作方法；在活動展開時，亦有經驗豐富的社工在現場指導以及處理突發事情。

目前服務領袖計劃正努力爭取與澳門各大非政府組織合作，未來合作模式或由非政府組織負責資金和籌劃，服務領袖計劃負責招募志願者。賈驍駿對計劃的未來充滿希望，他認為服務社會不是一時一地的工作，希望這項活動一直延續到無限的未來。

SLP Values Continuity

In addition to mobilising volunteers, SLP also values continuity of charity activities. Jia says that because most charity activities are done on a one-time basis, they tend to give the impression that the organisers are just “putting on a show”. SLP aims for continuity. Participants hope to establish a series of activity plans that are tailor-made to suit the needs of those they serve.

Take the volunteer activities at the Our Lady of Mercy Home for the Elderly in April. Instead of a one-day event, the activities lasted an entire month. Every day, volunteers talked to the residents, played games with them, and provided services, in an effort to make them feel loved and cared about. Even after the end of the month, volunteers still kept in touch with the residents and provided services when needed.

Though new to organising this kind of activity, everyone gave their best effort. Foreseeing that they might encounter difficulty communicating with seniors and engaging them in games, they visited the elderly home in advance and consulted social workers there to learn how best to communicate with the residents. They also invited experienced social workers to provide onsite guidance and handle unexpected situations.

Currently SLP members are seeking opportunities to work with major nongovernmental organisations (NGOs) in Macao. If their efforts are successful, future activities may be sponsored and organised by the NGOs, with SLP responsible for recruiting volunteers. Jia is full of hopes for SLP's future, saying that community service should not be a one-time event and hoping that SLP will continue in the years to come.

我在肯亞 做義工的日子 Those Days as a Volunteer in Kenya



學生杜玥
Student Du Yue

2013年8月通過國際經濟學商學學生聯合會（AIESEC）澳大分會出國參加海外志願者項目的大概有30多人，分別去了俄羅斯、埃及、馬來西亞、巴基斯坦、黎巴嫩等地。澳大學生杜玥則選擇前往非洲肯亞。

位於肯亞奈洛比市的基貝拉貧民窟，是非洲第二大貧民窟。面積為2.5平方公里，居民總人口在60萬到120萬人之間，相當於澳門一至兩倍的人口數量。

此項目為期一個半月，出發前杜玥也在害怕和猶豫。擔心疾病、擔心治安，像所有不瞭解當地的人一樣擔心條件太艱苦。可是當她踏上非洲土地的那一刻起，所有的擔心都消失了：原來非洲並不是甚麼都沒有。

她起初被指派在肯亞的脊椎損傷醫院工作。由於醫院義工已經飽和，她通過聯繫當地的志願者，選擇去基貝拉貧民窟為居民提供教育說明、拍攝影片及舉辦畫展。建在廢物和垃圾堆上的基貝拉非常髒臭，治安也很差，時常發生志願者背包被偷的情況。

信任，是她在貧民窟遇到的最大挑戰。很多志願者、甚至當地領事館的工作人員都曾告誡她，不要相信肯亞人。然而她漸漸發現，很多當地人其實非常友善，他們會帶領志願者在貧民窟參觀，提供各種資訊。你對他們報以信任，他們也會將你當朋友。

In August 2013, more than 30 students went to different countries of their choice, including Russia, Egypt, Malaysia, Pakistan, Lebanon, and Kenya, to work as volunteers, through a 1.5 month overseas volunteer programme organised by AIESEC UM [editor's note: AIESEC is short for "Association Internationale des Etudiants en Sciences Economiques et Commerciales"]. Du Yue chose Kenya, where she eventually volunteered in the Kibera Slum.

The Kibera Slum in Nairobi, Kenya, with a size of 2.5 square kilometres, is the second largest slum in Africa. It has a population of between 600,000 and 1.2 million, which is more than twice the population of Macao.

Before she left Macao, Du was afraid and hesitant, worrying about everything from diseases to security. Like many people who don't know much about Africa, she was worried about the harsh living conditions. But all her worries vanished the moment she set foot in Africa, and what went through her mind was, "looks like it's not true that Africa doesn't have anything."

At first Du was assigned to work at a spinal cord injury hospital in Kenya, but there were already too many volunteers there. So she contacted some local volunteers and from the options they provided she chose to go to the Kibera Slum to educate residents, make videos, and organise art exhibitions. Built on waste and trash, the Kibera Slum is extremely polluted, smelly and dangerous. Security is very bad—volunteers often had their backpacks stolen.

Trust is the greatest challenge Du experienced in the Kibera Slum. Even volunteers and those working in the local embassy advised her not to trust Kenyan people. But she found from her own experience that many locals were actually very nice; they would take the volunteers to visit the slum and provide all sorts of information. Du found that if she trusted others, they treated her like a friend.

在基貝拉隨處可見開朗熱情的當地人。雖然生存環境非常惡劣，但他們不會放棄對未來的夢想：環遊世界、賺大錢、開公司……「雖然這些都很難實現，但他們仍然堅持夢想。」這是此行帶給杜玥最大的震撼。

在去肯亞之前，杜玥以為當地人需要的僅僅是物質關懷，但在與當地人同吃同住的時候，她才發現肯亞居民希望接觸外界，希望獲得更多的資訊以及精神上的支持和幫助。忘記他們是弱勢群體，尊重他們，關懷他們，這才是他們最需要的。

與其他學生相比，杜玥對公益事業有著更大的熱情，甚至將其作為未來人生的規劃。2012年她選擇進入澳大社會學專業學習，但因為發現所學知識也許並不適用於將來的志願者工作，於是她轉系學習葡語專業。杜玥對自己未來的目標非常明確：通過學習葡語，以便將來加入巴西或非洲葡語國家的非政府組織從事語言類工作。

自去年加入 AIESEC 澳大分會後，杜玥不單參加暑期專案，更擔任海外志願者計劃出境交流部部長一職，希望幫助更多要認識世界、挑戰自己的志願者實現夢想。她認為海外志願者計劃並不是一次旅行，而是一個珍貴的學習機會，可以幫助有需要的人，並將中國人的善意帶給世界，讓更多人瞭解中國。

Everywhere in the Kibera Slum, Du met cheerful, hospitable Kenyan people. Despite the extremely harsh living conditions, they never gave up their dreams to travel around the world, to make money, to open a company... "Although these dreams are very hard to realise, they never give up, and I was deeply humbled by that kind of spirit."

Before her trip to Kenya, Du thought what Kenyan people needed was just material support. It was not until she lived with the locals on a daily basis that she realised that they longed to be in contact with the outside world, to have access to information, and to have emotional support. What Kenyan people need the most, Du realised after her trip, is for the outside world to forget that they are the disadvantaged group, and to respect and care about them as fellow human beings.

Du is genuinely passionate about causes that advance social welfare. She is even planning to pursue a career in the field. In 2012 she was admitted to the Department of Sociology at UM. Later she found what she was learning might not be relevant to what she was planning to do in the future, so she transferred to the Department of Portuguese. Her goal is very clear: learn Portuguese well and try to join one of the nongovernmental organisations in Brazil or Portuguese-speaking countries in Africa to work in a language-related position.

Ever since she joined AIESEC UM last year, Du has not only participated in the summer programme, but has also served as the head of the overseas exchange department of the programme to help more volunteers who wish to challenge themselves and know more about the world to realise their dreams. She believes the overseas volunteer programme offers not just a trip, but a valuable opportunity to learn, to help those in need, to show the goodwill of the Chinese people to the world, and to help more people know more about China.



基貝拉孤兒學校的學生靠表演雜耍來維持學校的開銷
Students from an orphans' school in the Kibera Slum perform juggling to keep the school afloat



1. 基貝拉孤兒學校的孩子們
2. 開朗熱情的當地孩子
3. 他們渴望接觸外界，獲得更多資訊以及精神上的支持。

1.Children at an orphans' school in the Kibera Slum in Nairobi, Kenya.
2.Cheerful, hospitable local children
3.They long for contact with the outside world, more access to information, and emotional support.



當科學遇見社會秩序與公正—— 澳大的獨特學科

Where Science Meets Social Order and Justice—A Unique Programme at UM

撰文 English text | 李德 Spencer Li De 中文翻譯 Chinese translation | 陳靜 Ruby Chen

自古以來，人類就通過種種努力，力求建立公平公正的社會秩序。縱觀人類發展史，哲學家 and 思想家們無一不苦苦思索，試圖找到建立安全公正社會政治制度的最好方式。然而，直到上世紀中，對犯罪和司法的研究才成為一門獨立的學科。在過去三、四十年間，犯罪學與刑事司法是全世界社會科學領域發展最快的學科之一。今天，包括劍橋大學、牛津大學、賓夕法尼亞大學和多倫多大學在內的很多領先學府都提供這方面的課程。

犯罪學與刑事司法的迅速發展主要歸功於學生對犯罪、司法、法律、公共安全和法醫學等問題的濃厚興趣，也反映了在執法、矯正、法院及安防行業不斷增長的就業機會。

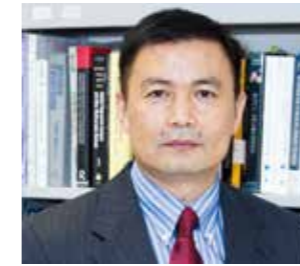
正是在這樣的背景下，澳門大學於 2009 年建立犯罪學研究生課程。在不到五年的時間裡，該課程已發展成為亞洲規模最大最優質的課程之一。目前，該課程擁有 40 名碩士生和 12 名博士生。該課程的絕大多數教學人員均在犯罪學與刑事司法領域的領先學術期



Mankind has been struggling to find social order and justice since the earliest times. Throughout human history, philosophers have contemplated the best ways to build safe and just social and political systems. However, the study of crime and justice did not become an independent academic discipline until the middle of the last century. In the last three to four decades, criminology and criminal justice has been one of the most rapidly developing academic disciplines in social sciences around the world. Today, these programmes are offered at many leading universities, including the University of Cambridge, the University of Oxford, the University of Pennsylvania, and the University of Toronto. The rapid growth of criminology and criminal justice is driven by students' strong

interest in issues of crime, justice, law, public safety, and forensic science. It also reflects growing employment opportunities in law enforcement, corrections, courts, and security industries.

It was against this backdrop that the University of Macau (UM) established a postgraduate programme in criminology in 2009. In less than five years, the programme has become one of the best and largest in Asia. It now has more than 40 master's students and 12 PhD students. The programme has assembled a distinctive group of faculty members with strong publication records in leading academic journals in criminology and criminal justice. The faculty has assumed leadership



本文作者為澳門大學社會學系系主任、亞洲藥物濫用研究學會主席。曾於美國司法部擔任統計師及項目主管。亦曾任馬里蘭大學和佛羅里達州立大學犯罪學和刑事司法學助理教授。

Prof. Spencer Li De is the head of the Department of Sociology at the University of Macau. He also serves as the president of the Asian Association for Substance Abuse Research. Previously, he held assistant professor positions in criminology and criminal justice at the University of Maryland and Florida State University. Before joining UM, he worked as a statistician and project director at the US Department of Justice.

刊上發表過多篇論文。此外，該課程在亞洲數個關鍵領域具有領導地位。例如，亞洲犯罪學學會和亞洲藥物濫用研究學會的總部均設於學院內。亞洲頂尖犯罪學期刊《亞洲犯罪學期刊》的編輯部也設於此。

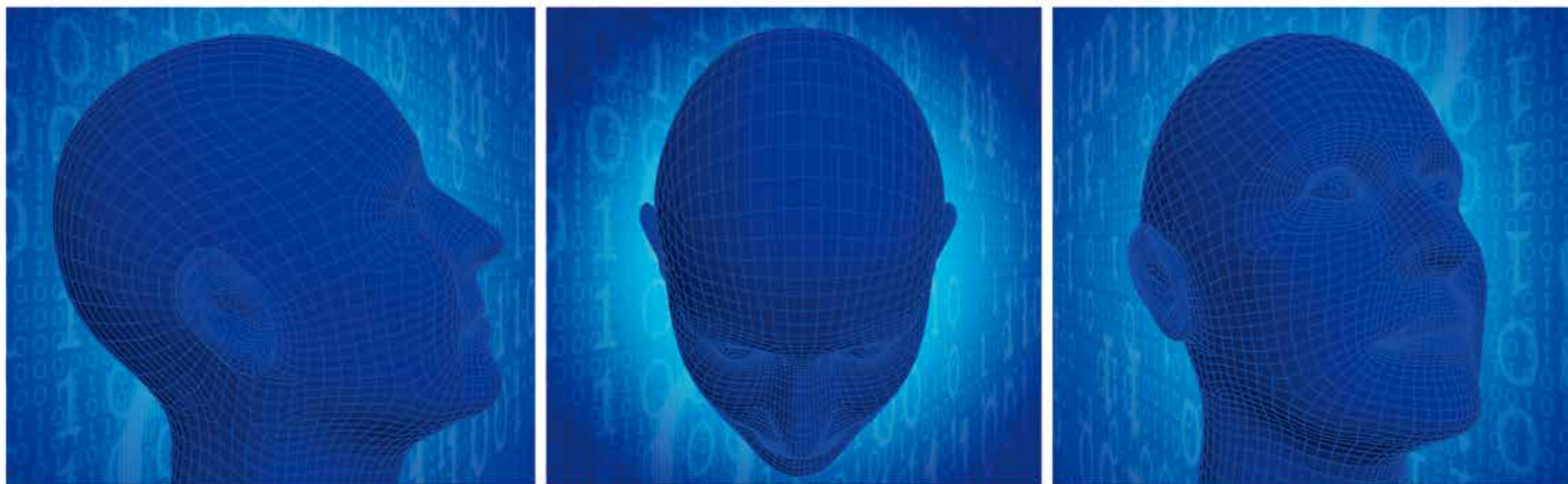
研究也是澳大犯罪學課程的一個優勢領域。該課程師生所從事的研究活動主要分成兩大類。一類旨在促進對犯罪和偏差行為分佈及原因的認識與瞭解。另一類是與政策相關的研究，旨在推動在澳門、中國內地以及世界其他地區建立良好公正的社會秩序。作為一個跨學科領域，犯罪學需要用到社會學、心理學、法學、經濟學、教育學、公共衛生學、公共行政學以及神經學等多個學科的理論和方法。澳大的犯罪學研究，不管是學術型研究還是應用型研究，都體現了這種跨學科思維。以下是該課程教學人員所從事的其中一些研究項目。

李德教授目前所研究的兩個課題涉及社會學、心理學、法學和教育學。第一個課題是父母教養方式對兒童發展結果（包括青少年犯罪）的影響。通過深入訪問中國其中一個大城市的 30 個中學生及其家長和班主任，李教授發現，中國家長的教養方式很難用西方的分類方法（即專制型、權威型、放任型和忽略型）進行準確界定。儘管如此，他發現放任型和忽略型的教養方式會顯著增加對兒童發展的負面影響，包括導致反社會態度、少年犯罪以及學習成績差。雖然權威型的教養方式可以減少中國青少年的行為問題，這種影響往往受制於家庭動態的其他方面，特別是親子關係。為進一步分析這些問題，李教授對同一個城市的

roles in several key areas in Asia. For example, the headquarters of the Asian Criminological Society and the Asian Association for Substance Abuse Research are both located in the programme. The editorial office of the top journal of criminology in Asia, *Asian Journal of Criminology*, is also located here.

Research is an area of strength of the criminology programme at UM. The staff and students in the programme focus on two types of research. One is scientific research designed to advance knowledge and understanding of the distribution and causes of crime and deviant behaviour. The other is policy-related research aimed at promoting social order and justice in Macao, mainland China, and the rest of the world. Being an interdisciplinary field of study, criminology draws theories and methods from many different academic disciplines, including sociology, psychology, law, economics, education, public health, public administration, and neurology. Criminological research at UM, be it academic or applied, reflects these diverse perspectives. The following are some of the research projects conducted by the academic staff in the criminology programme at UM that exemplify this multidisciplinary approach.

Two of the criminological issues studied currently by Prof. **Spencer Li De** are related to sociology, psychology, law, and education. The first one is the influence of parenting styles on child development outcomes including juvenile delinquency. Through in-depth interviews with 30 middle school students, their parents, and head teachers in a major city in China, Prof. Li found that the Western typology of parenting styles that classifies parenting practices into four distinctive categories, including authoritarian, authoritative, permissive, and neglectful styles of parenting, does not fit neatly with how Chinese parents raise their children. Nevertheless, he found that permissive and neglectful styles of parenting significantly increase negative child developmental outcomes, including antisocial attitudes, delinquency, and poor school performance. While authoritative parenting reduces behavioural problems among Chinese youth, its influence tends to be modified by other family



3,100 多名初高中學生做了問卷調查，收集了一組具有代表性的數據。目前，他正著手研究收集的數據，想看看這些數據是否支持之前訪問得出的結論。

李教授目前從事的另一個研究項目是中國的「大宗謀殺」現象。李教授借助 NVivo 軟件，分析 2000 年至 2011 年期間發生在中國的近 600 宗涉及兩人以上死亡的殺人案件。其研究結果否定了殺人犯都是瘋子神經病的傳統看法。當然，殺人犯中屢見反社會人格，但「大宗謀殺」一般都是非隨機事件，而且殺人者自己覺得，他們這麼做是很有「道理」的。李教授發現有兩個社會因素是造成這種「大宗謀殺」現象的最主要原因。其中一個是關於榮譽和復仇的文化。有些人信奉「以眼還眼，以牙還牙」，認為報復是實現公正的唯一途徑。這些人往往覺得，被人傷害了，就有權報復，不這麼做會被視為懦弱，是一種恥辱。如果是家人受到傷害，不能通過復仇捍衛家庭榮譽的話，會被視為對家庭的背叛。對信奉這一原則的人來說，最終極的報復不僅僅要殺死傷害他們的那個人，還要殺光他的全家，包括所有女人和孩子，以免留下活口日後尋仇。另一個社會因素就是，政治司法制度未能保護邊緣群體的基本權利。當今，很多中國公民深知其權利受到侵犯，卻苦於沒有機會通過公平的司法和行政途徑為自己討回公道。憤怒鬱鬱不得發，悶在心中日積月累，最終便火山爆發，以極端的暴力行為表現出來，導致殘殺大群無辜陌生人的慘劇。李教授認

dynamics, especially parent-child relationship. To further examine these issues, Prof. Li has collected survey data from a representative sample of more than 3,100 middle and high school students living in the same city. He is analysing the data to determine if the survey data corroborate the findings generated from the personal interviews.

Another project that Prof. Li currently conducts is mass murder in China. Using the popular software NVivo, Prof. Li analysed case reports of nearly 600 homicides involving two or more deaths that occurred in China from 2000 to 2011. His research refutes the conventional wisdom that mass murderers are all crazy lunatics. Despite a high prevalence of antisocial personality among the perpetrators, mass murder is typically non-random and actually makes strong "sense" to the murderers. Prof. Li found two social factors contributing significantly to mass murder in China. One is the culture of honour and revenge. The notion of "an eye for an eye" is deeply rooted in the Chinese principles of justice and retribution. People tend to believe that if someone wronged them, they have the right to retaliate. Actually, not doing so would be seen as a sign of cowardice and dishonour. In the family context, failure to defend family honour through revenge is seen as betrayal. For many of these people, the ultimate form of revenge is not only to kill the person who caused the wrong but also his or her entire family, including all of the women and children, so that no one in that family will be left to retaliate at some future time. The other social factor contributing to mass murder in China, according to Prof. Li, is the failure of political and justice systems to protect the basic rights of the marginalised groups in the population. Nowadays, many citizens of China strongly believe that their rights are violated. Yet, they do not have a fair chance to receive justice through legal proceedings or administrative processes. The anger that built up inside over time may eventually erupt into extreme

為，中國社會如果不解決導致暴力行為的根本原因，「大宗謀殺」現象將會更頻繁地出現。

劉建宏教授在過去兩年同時從事幾個項目的研究，都是為了一個目標，即建立一個「亞洲典範理論」。他比較西方與亞洲的刑事司法制度，重點研究概念層面的不同，並認為這些不同之處深深影響了刑事司法制度的運作。他認為，亞洲式的智慧可以引導刑事司法改革朝著正面的方向前進。「亞洲典範理論」指出，西方關於犯罪和司法的概念是「個體論概念」，即個體是研究的單位；而亞洲概念則具有集體取向，是「相關概念」。西方刑事司法和犯罪控制的對象是犯罪本身，而亞洲關注的是人與人之間的關係。西方對犯罪的定義是，個人違反國家刑法的行為，犯罪的概念是「以國家為中心的」。這個概念將犯罪視為犯罪者與國家之間的衝突，因此，國家必須找出罪犯，施加懲罰。與西方刑事訴訟中採用的衝突理論相反，亞洲更傾向於非衝突的方式，強調找到解決方法，鼓勵犯罪者供認真相，表示悔改，換取寬恕。解決方法包括正式和非正式的懲罰。劉教授的建議是，不妨建立一個綜合體系，吸取東西方智慧，為未來刑事司法改革提供參考。

趙若輝博士目前從事的項目是中國西部某個較落後城市青少年犯罪以及青少年對警察的態度問題。針對許多西方國家研究多時的一些重要課題，她在該城

violence, such as mass killings of a large number of strangers. Prof. Li predicts that mass murder will occur more frequently in China if the society does not address the root causes of the violent behaviour.

Prof. Liu Jianhong has been working on several projects in the last two years with a unified objective to build an "Asian Paradigm Theory." His work in this area compares the Western criminal justice system with Asian systems to focus on variations at the conceptual level and argues that these conceptual differences still deeply influence the operations of the criminal justice system. He contends that Asian wisdom can contribute to positive directions of criminal justice reforms. The Asian paradigm theory points out that the Western concept of crime and justice is an "individualistic concept"—individuals are the unit of the examination. However, Asian concepts implicitly or explicitly reflect a collective orientation: they are "relational concepts." The target of Western criminal justice and crime control is the crime, while the target of Asian crime control concerns human relations. In the Western paradigm, crime is defined as an act of individuals in violation of state criminal laws. The concept of crime is "state centred". This concept of crime views crime as a conflict between the state and the offender. Therefore, the issue is that the state must identify and punish the offender. In contrast with the conflict approach adopted in the Western criminal procedure, the Asian paradigm desires a non-conflict approach. It stresses working out a solution. The offenders in the processes are encouraged to confess the truth, express remorse and receive forgiveness. The solution is backed up by formal and informal punishment. An integrated system is suggested to draw wisdom from both West and East to inform future criminal justice reforms.

The research project that Dr. Zhao Ruohui is currently working on aims to explore juvenile delinquency and juvenile attitude toward the police

市的 22 個高中裡對 2000 多位學生進行隨機問卷調查，希望收集數據回答這些問題。問卷調查的目的是分析中國和西方國家青少年犯罪和受害的區別和相似之處。除了青少年犯罪問題之外，該研究還探討了中國青少年與警察之間的關係。目前，趙博士已開始著手分析相關數據，並已發現有證據支持以下的假設：第一，警官往往會對街道角落或犯案黑點那些看似無人監管或「迷失方向」的青少年格外留意，因為他們的出現通常會加劇當地居民的恐慌心理。第二，青少年對警察的看法一旦形成往往很難改變，會一直帶入成年。

郭世雅博士當前研究的一個課題是家庭暴力。在美國，家庭暴力是大學生普遍面臨的一個嚴重問題。為瞭解導致家庭暴力的因素，郭博士進行了一項實證研究。她希望通過實證可以確定，哪些風險因素導致有些美國大學生淪為家庭暴力的受害者或實施者。換言之，為什麼有些學生更容易淪為家庭暴力的受害者或實施者？郭博士於 2011 年至 2012 年期間在美國一間中等規模大學收集的數據顯示，家庭成員濫用藥物是導致有些學生淪為家庭暴力受害者的一個重要風險因素。另外，通過瞭解某人童年有否經歷過家庭暴力，可以對其將來是否會對親密伴侶實施暴力進行較為可靠的預測。童年經歷過家庭暴力的人比沒有經歷過家庭暴力的人更容易對其親密伴侶實施家庭暴力。結果表明，應該為濫用藥物人士提供有效治療，並加強防止虐待兒童的援助。

蔡天驥博士的主要研究領域包括：生物因素和社會因素對行為的影響以及量化研究方法的設計。蔡博士特別感興趣的是如何結合社會因素和生物因素來研究各種社會問題，如社會與健康行為、階層化以及社會網絡。例如，他發現某些基因型（DAT1, DRD2 和 MAOA）對青少年偏差行為的影響取決於社會過程，例如家庭動態、同伴關係以及上學情況。雖然基因變異可能會增加青少年出現偏差行為的可能性，但正面的社會影響往往能在某種程度上抵消這種影響；同理，正面社會影響的缺乏可能會放大基因變異的影響。他還發現，雖然遺傳傾向有時會導致有些青少年更容易染上吸毒、吸煙、不良的飲食習慣以及從事冒險的性行為，但朋友的行為作為一個特別重要的環境因素，或許可以在某種程度上中和基因的影響。

in a less-developed western city of China. The survey she administered to a random sample of more than 2,000 students in 22 high schools in China collected information on important research questions that have been studied in many Western societies. The objective of the survey was to find out the differences and similarities in juvenile delinquency and victimisation between China and its Western counterparts. In addition to assessing juvenile delinquency, the study explored the youth-police relationship in China. Dr. Zhao is analysing the survey data and evidence supports the following hypotheses: first, police officers tend to pay close attention to youths who seem unsupervised or “disoriented” in street corners or some known crime hotspots since their presence tends to elevate the levels of fear among local residents; second, adolescents’ perceptions of the police are likely to become fixed, producing an enduring effect carrying over well into adulthood.

One of the issues studied by Dr. **Kuo Shih-Ya** in her current research is domestic violence, a serious epidemic among college students in the United States. To understand what factors contribute to such a phenomenon, Dr. Kuo conducted an empirical study to identify risk factors for domestic violence victimisation and perpetration among American college students; that is, why some students were more likely to experience victimisation of domestic violence or abuse their partners than other students. The data was collected at a mid-size university in the United States between 2011 and 2012. The results revealed that abusers’ habitual substance use was an important risk factor related to students’ victimisation of domestic violence. Childhood victimisation was a strong predictor to future violence on intimate partners; those who experienced abuse in childhood tended to abuse their intimate partners compared to those who did not have such childhood victimisation experience. The results indicated that effective substance treatment and the prevention of child abuse in early childhood programmes should be available to those who are in need.

The research interests of Dr. **Cai Tianji** centres on two areas: social mechanism of how biological and social factors influence behaviours, and developing quantitative research methods. Specifically, he is interested in the integration of sociology with biological factors in the studies of sociological issues such as social and health behaviour, stratification, and social network. For example, he has found that the effect of certain genotypes (DAT1, DRD2 and MAOA) on adolescent delinquent behaviour depend on social processes, such as family dynamics, peer relations, and school-experiences. Positive social influences tend to reduce the delinquency-increasing effect of a genetic variant, whereas the absence of social controls may amplify the effect of these genetic variants. He also found that friend behaviour might be a particularly important environmental moderator of the expression of genetic disposition (DAT1) for adolescent drug use, smoking, dietary habits, and risky sexual behaviour.

Dr. **Liu Haiyan** conducted a comparative study of the criminal

劉海燕博士對美國和中國的知識產權刑法實施進行了比較研究，重點研究知識產權刑事執法的對象、作用、後果以及影響因素。研究揭示了在刑事執法階段對轉移到中國的知識產權進行保護的獨特理由、作用以及意外後果。劉博士發現，宏觀層面的文化、經濟、政治和法律因素導致中國人普遍缺乏知識產權意識，沒有認識到知識產權是自然的、不可剝奪的私有產權。兩國知識產權刑事執法的具體情況受到幾個中級因素和情境因素的影響。兩國刑事執法的重點存在大量相似之處，這就表明，在刑事執法中，經濟狀況是決定因素。政治因素也影響中國知識產權刑事執法的對象。這些因素包括國家實施干預以保護煙酒行業的稅收利益、制訂相關公共政策以打擊威脅人們健康和安全的假冒產品，以及為了實現其他政治目的而開展的管控，例如對媒體的控制以及對出版物的進口限制。在考慮各種公共政策、社會正義以及當前發展要點後，劉博士的結論是，中國的治本之策在於發展知識財產相關產業、提高公民和企業的知識產權意識、創造尊重權利和規定的文化、鼓勵私營機構索取和使用私有權，允許公民監督政府活動，從主動式行政刑事執法向被動式民事執法轉變。

徐建華博士最近的研究重點是中國的現代「駱駝祥子」們，即如今在廣州駕駛摩托車、自行車、三輪車或電動自行車載客的「搭客仔」。徐博士過去幾年在廣州訪問了大量警察和搭客仔，也親身觀察了他們的日常工作。通過這些訪問和親身觀察，徐博士發現，三輪車載客業作為一種道德經濟，對在大城市遭受來自社會各個層面排拒的中國民工來說，具有特別的謀生意義。廣州警察每年沒收超過 25 萬輛三輪車，對貧窮的民工來說，這意味著 2.5 億至 5 億元的經濟損失，這無疑也造成民工和警察之間的關係異常緊張。



“允許公民監督政府活動，從主動式行政刑事執法向被動式民事執法轉變。”

Allow citizen supervision of governmental activities, and to move from proactive administrative and criminal enforcement to more reactive civil enforcement.

United States and China have been influenced by several mid-level and situational factors. In particular, substantial similarities across the foci of criminal enforcement in the two countries indicate that economic conditions are determinant forces in criminal enforcement. Political factors also influence the targets of criminal enforcement of IPR in China. These factors include state interference to protect tax interests in tobacco and alcohol industries; public policies to fight against counterfeits that pose health and safety threats; and other political goals, such as control of the media and importation restrictions on publications. After considering various public policy, social justice, and current development points, Dr. Liu concludes that the root solutions for China are to develop IP-related industries, cultivate the IPR consciousness of citizens and companies, to establish respect for rights and rules in general, to encourage the claiming and mobilisation of private rights by private entities, to allow citizen supervision of governmental activities, and to move from proactive administrative and criminal enforcement to more reactive civil enforcement.

The recent research of Dr. **Xu Jianhua** focuses on the modern version of Rickshaw Boys (Luotuo xiangzi) in China, known as “dakezai”, who drive motorcycles, bicycles, tricycles or electric bicycles as taxis in modern-day Guangzhou. Through extensive interviews with the police, rickshaw drivers as well as participant observation about police work and rickshaw drivers’ daily work over the past several years, Dr. Xu finds that rickshaw driving, as a moral economy, has particular meaning for migrant workers to make a living when they suffer from multidimensional social exclusion in urban China. Every year, Guangzhou police will confiscate over 250,000 rickshaws, which means around 250-500 million yuan economic loss for poor migrant workers. Undoubtedly,

雖然大多數情況下，搭客仔不得不被動接受謀生工具被沒收的命運，但有些被逼急了就會通過種種暴力行為，包括自焚、自殺、襲警、傷害無辜群眾、甚至發動暴亂，來表達他們抗議、沮喪和絕望的心情。徐博士認為，來自社會各個層面的排拒是導致民工暴力襲警的宏觀架構層面的原因。在中國迅速發展的都市化進程中，社會因素如何催生了暴力？社會對弱勢群體的排拒如何導致社會暴力行為的蔓延？徐博士的研究對這些問題做出了一針見血的回答。

從以上這些例子我們可以看到，很難用傳統分類方法對犯罪學研究進行歸類，因為犯罪學領域的研究課題往往涉及法律、社會、心理學、行政學等多個學科領域的問題，是跨學科研究的綜合體。為徹底瞭解犯罪學的相關問題，找到解決方法，我們通常需要採用一個多角度多方位的綜合方法去進行研究。犯罪學是一門真正超越了傳統學科界限的科學。而且，犯罪學不只是科學研究，它還關乎政策與實際，以推動集體力量建立一個公正有秩序的社會為己任。學術研究帶來科學發現，然後通過犯罪學領域的政策分析，我們可以將這些科學發現轉化為以證據為基礎的政策與實踐，從而更好的保障個人權利，提高生活質素，建立良好的社會秩序。或許正因為此，我們才說，不管是學術層面還是應用層面，犯罪學都是一門跨學科的研究。

the confiscation creates a huge tension between migrant workers and the police. Although most of the time rickshaw drivers have to passively accept their fates as their tools for making a living are confiscated, some desperate drivers resort to various forms of violence, including self-immolation, suicide, attacks on police or innocent bystanders and even rioting, to protest and express their frustration and desperation. Dr. Xu argues that multidimensional social exclusion is the macro-structural reason behind migrant violence towards the police. This research provides much insight into how violence is socially produced in China's rapid process of urbanisation as well as how social exclusion can lead to the risk of a violent society in a broad context.

In sum, these examples illustrate that it is difficult to categorise criminological research using traditional typologies. Frequently, the issue under study is related to more than one disciplinary concern. It could be a legal issue, a sociological conundrum, a psychological riddle, or an administrative dilemma, but more often than not it is some combination of two or more of these elements. To understand criminological problems thoroughly and to find solutions to the problems, we often need to study them with an integrative approach that incorporates several perspectives. Criminology is truly a science that transcends traditional academic boundaries. Further, criminology is not just about scientific research. It is also about policies and practices, the collective endeavours to build an orderly and just society. Academic research provides scientific discoveries. It then takes the policy analysis in criminology to translate the discoveries into evidence-based social policies and practices to improve individual rights and wellbeing as well as social order. These are what make criminology both an academic and applied field of interdisciplinary study.



本文作者為澳門大學健康科學學院助理教授。其主要研究領域是利用天然藥物，（包括採用毒液縮氨酸等）來治療癌症、糖尿病和類風濕性關節炎等疾病。

Dr. Henry Kwok Hang Fai is an assistant professor in the Faculty of Health Sciences, University of Macau. His research interests are mainly in the areas of natural drug discovery including venom-based peptide/protein and antibody therapy for the treatment of diseases such as cancer, diabetes and rheumatoid arthritis.

「毒咬」之藥—— 來自大自然的巡航導彈 Drugs with "Monster" Bite: Nature's Cruise Missiles

撰文 English text | 郭珩輝 Henry Kwok Hang Fai 中文翻譯 Chinese translation | 陳靜 Ruby Chen

天然毒液和毒素因其卓越的藥效，長期以來令人類深深著迷。自古以來，人們就懂得從大自然中尋找各種天然材料來改善健康，治療疾病。而這些天然材料都是取自於人類聚居地附近以及偏遠地區的動植物和礦物質。數百萬年以來，這些地區都不斷上演著一場為生存而鬥爭的生物戰。現代生物學家認為應該將這些

生物武器用來造福人類，用於對抗目前尚未能根治的頑疾。這是現代生物學的一個悖論——在實驗中，利用很多天然毒素所具有的多樣性和選擇性，來研究生理功能紊亂背後的生物機理；另一方面，透過阻礙生物功能或機理的正常運作從而增加對天然毒素特性的瞭解。

希拉毒蜥（圖1）和墨西哥串珠蜥（圖2）是同屬於毒蜥科的兩個不同物種，一直以來人們誤以為希拉毒蜥和墨西哥串珠蜥是世界上唯一的兩種毒蜥。它們經常出現在民間傳說和神話中；在墨西哥和美國西南部的印第安居民眼裡，它們是邪惡、死亡和權力的象徵。毒蜥慢吞吞的動作以至攻擊時的致命一咬，讓



圖1. 希拉毒蜥（學名：*Heloderma suspectum*）
Figure 1. Gila monster (*Heloderma suspectum*)

Venoms and toxins of natural origins have long bewitched humankind as a result of their pharmacological effects. Since ancient times, people have used various materials from nature to improve their health and cure their illnesses. Substances were derived from flora, fauna and mineral sources located both in people's immediate surroundings and also in remote areas. The biological warfare has been going on in the immediate surroundings

and remote areas for millions of years as each organism living there has fought for its survival. Modern biologists believed that we could put that biological weaponry to use for the good of humankind in the ultimate defeat of diseases which have thus far remained intractable. They used the large diversity and selectivity of many natural toxins to investigate the molecular mechanisms of physiological functions that they disrupt. This is one of the paradoxes of modern biology -- it advances in an anti-physiological manner; understanding of a biological function is often gained through experiments that are devised to block functions or mechanisms.

Gila monster (Figure 1) and Mexican beaded lizard (Figure 2) are two distinct species, and belong to the Family of Helodermatidae. Until recently, Gila monster and Mexican beaded lizard were thought to be the only two venomous lizards in the world. They have figured largely in folklore and myth, representing evil, death or power to various Native American residents of Mexico and the Southwest United States. From

人一方面為之著迷，一方面膽戰心驚，而它們高超的生化戰本領又讓人不由心生敬畏。毒蜥的毒液成分複雜，包含多種生物活性分子，如毒素、蛋白質以及能令入侵者迅速癱瘓的縮氨酸。其劇烈的毒性應該不只是某個成分單一作用的結果，而是所有成分之間複雜的生化、藥理和生理反應的結果。

過去幾十年間，希拉毒蜥和墨西哥串珠蜥的毒液成為許多科學家研究的對象，特別是新類型藥物的研究。如研發成功，這類新類型藥物將有望應用於臨床治療。然而，美國和墨西哥政府將毒蜥列入《瀕臨絕種野生動植物國際貿易公約附錄二》（CITES Appendix II）以及《歐盟附件乙指定》（EU Annex B designate）內，並禁止毒蜥及其毒液的銷售和出口。大部分關於毒蜥和其毒液的研究都已暫停，是因為對毒蜥毒液進行蛋白質組研究和基因體研究需要犧牲實驗動物或者切除毒蜥的毒液腺，此外，毒液的提取方面也存在諸多問題。

經過研究團隊的共同努力和不懈嘗試，我們與美國亞利桑那索諾拉沙漠博物館（Arizona-Sonora Desert Museum）的同事合作設計出一種經改良的簡化方法，可以在不傷害毒蜥的情況下成功提取毒液（圖3）。我們已就該成果發表了一份聯合報告。該研究報告可算是自學者阿靈頓（Arrington）於1930年首

their drawling movements to the viciousness of their defence bite and the devilry of their venom, helodermatid lizards have never failed to fascinate and terrify and their capabilities in biochemical warfare have always commanded respect. Helodermatid venoms are complex mixtures of many bioactive molecules such as toxins, proteins and peptides that effectively immobilise invaders. The toxic nature is probably not due to just one fraction of the venom, but rather, due to the complex biochemical, pharmacological and physiological interaction of all the components.

Over the last few decades, the venom of Gila monster and Mexican beaded lizard have been the object of much research, particularly that directed towards the discovery of novel agents, which may have applications in clinical therapy. However, the US and Mexican governments have listed them as CITES Appendix II / EU Annex B designate, and put a commercial ban on any sell or export of helodermatid lizards and their venom. Most of the venom research on *Heloderma* species has been stopped due to the fact that the proteomic and genomic research on helodermatid venom requires animal sacrifice or surgical removal of the lizards' venom glands, and acquiring venom for research is also problematic.

With a great team effort and many trials and errors, my research group and our collaborator at the world-renowned Arizona-Sonora Desert Museum in the US have jointly reported a simple modified technique for the successful venom acquisition from helodermatid lizards that is harmless to the protected lizards (Figure 3). This report has significantly contributed to the field of lizard venom research since Arrington in 1930 explored a first published method

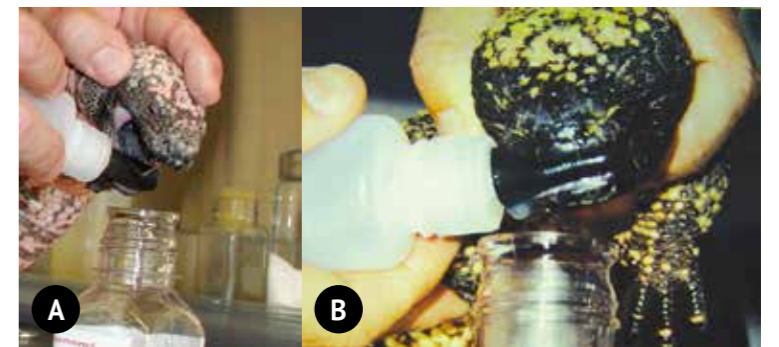
圖 2. 墨西哥串珠蜥（學名：*Heloderma horridum*）
Figure 2. Mexican beaded lizard (*Heloderma horridum*)



個公開發表的毒蜥毒液提取方法以來對該領域最重大的貢獻。通過蛋白質組和基因組研究，我們對提取自希拉毒蜥和墨西哥串珠蜥的原毒液進行純化和特性分析，從而發現了一種新的縮氨酸 Helokinetastin。從希拉毒蜥和墨西哥串珠蜥身上分離出來的 Helokinetastin 擁有完全相同的基因排序，這或許能解釋為何這兩種毒蜥擁有相似的生物學反應，也表明 Helokinetastin 可能是由同一祖先毒液縮氨酸進化而來，或是祖先細微進化演變的結果。此外，Helokinetastin 的生物活性也為我們提供了大量寶貴的資料和新的研究方向，將來或可幫助我們研發出治療藥物的主要成分。Helokinetastin 作為緩激肽 B2 受體縮氨酸抑制劑，對毒蜥毒液的總體毒效應起到補充作用。充分瞭解其作用機理後，或可將其用於製造舒緩激肽拮抗劑，以控制癌症及類風濕性關節炎患者因服用消炎藥而出現的相關疾病。當然，此研究加深了我們對毒液成分及其活性的瞭解，這本身已為我們提供了非常有價值的資料，為日後醫藥科研提供參考。

圖 3. (A) 頭成 30-45 度角的毒蜥正在咀嚼塑料移液器
(B) 毒液自毒蜥（頭成水平角度）下顎流出
Figure 3. (A) Helodermatid lizard held with its head at a 30-45° angle (below horizontal) and in the process of chewing the bulb
(B) A drop of venom comes out from the helodermatid lizard's lower jaw

on helodermatid venom extraction. Through proteomic and genomic approaches, purification and characterisation of crude venom from Gila monster and Mexican beaded lizard paved the way for the discovery of a hitherto undiscovered peptide -- Helokinetastin. The two identical sequences of isolated Helokinetastin from Gila monster and Mexican beaded lizard probably explain the similar biological actions in both species and also suggest that Helokinetastin evolved from the same ancestral lizard venom peptide or minor evolutionary changes from an ancestor. The biological activity for Helokinetastin also gave us valuable insights and information and avenues to pursue that may lead to the production of lead components for possible therapeutic agents. The role of Helokinetastin as the bradykinin B₂ receptor inhibitor peptide supplements the overall toxic effect of the helodermatid venoms. The mechanism of action, once fully understood, could possibly be used in the production of bradykinin antagonists in the management of conditions associated with anti-inflammatory for cancer and rheumatoid arthritis therapies. Nevertheless, the elucidation of venom components and their activity is a valuable resource in itself.



目前，在所有從毒蜥毒液中分離出來的治療劑當中，最為人熟知的莫過於用來治療糖尿病的 exendin 縮氨酸。這種藥物當中的主要成分是從墨西哥串珠蜥和希拉毒蜥的 exendin-3 和 exendin-4 中發現的。基於此方面，這些縮氨酸的哺乳類聚集定位和基因數據具有一定的參考價值。曾有報告指出犬類涎腺含有類似 exendin 的免疫反應性，不過研究人員未能在人類涎腺組織裡發現 exendin 免疫反應性。通過解剖毒蜥，不僅可以確定這些縮氨酸在毒液腺裡的分布，還能克隆這些縮氨酸的基因密碼。不過，由於目前美國和墨西哥禁止銷售和出口 CITES Appendix II 所列明的受保護瀕危物種，這些問題尚未有進一步解答和進展。為克服這個難題，我們的研究團隊嘗試了一個頗具挑戰性的創新方法，從原毒液本身進行克隆，而特別值

Nowadays, the most famous and commonly known therapeutic agents isolated from helodermatid venoms are the exendin peptides in the treatment of diabetes. The lead compounds for this drug were discovered from exendin-3 and exendin-4 of Mexican beaded lizard and Gila monster. In this regard, mammalian localisation and genetic data of these peptides is of some interest. Whereas canine salivary glands are reported to contain exendin-like immunoreactivity, researchers were unable to detect exendin immunoreactivity in human salivary tissue. Anatomic dissection of helodermatid lizards would be very helpful in determining the distribution of these peptides within venom glands, as well as cloning of the genes coding for these peptides. However, as I mentioned earlier, current restrictions on access to these CITES Appendix II protected and endangered species in the US and Mexico delay further clarification of these issues. In order to overcome this issue, my research team thus attempted to obtain this information by a novel and highly-speculative route -- cloning from the crude

得一提的是，我們用毒液充當毒腺組織，結果在沒有犧牲動物的情況下，我們從希拉毒蜥身上成功克隆了 exendin-4，同時也獲得了希拉毒蜥 exendin-3 的首組基因數據。此外，我們也從墨西哥串珠蜥身上獲得了 exendin-3 及其先導體的首組基因數據。我們的結果證明，採用凍乾長達一年以上的原毒液，也可以成功克隆互補脫氧核糖核酸（cDNA）。雖然這些凍乾的原毒液樣本經過長期冷凍儲存，但我們仍然能夠成功地將其毒液蛋白質的多聚腺苷酸信使核糖核酸（polyadenylated mRNA）復原。而通過這種技術得出的基因數據可用於科學研究與疾病治療。實驗中我們還發現，正如原毒液所展示，培植具有兩親合成縮氨酸的即時聚合酶鏈式反應（RT-PCR）產品會產生滯留效應。我們的結論是，爬行類動物毒液的信使核糖核酸（mRNA）保護是通過目前尚不明確的成分來實現的，而本實驗所採用的程序步驟有效地揭示了毒液腺的轉錄組。以這項創新發現為基礎，我們進一步從毒蜥毒液中分離出染色體脫氧核糖核酸（genomic DNA）。我們從墨西哥串珠蜥凍乾的毒液中成功克隆了全新的局部 12S 核糖體核糖核酸基因（partial 12S rRNA gene）。本研究是首次用爬行類動物毒液的單個樣本證明樣本中不僅含有該動物的毒液腺蛋白質組和轉錄組，而且亦含有該動物的基因組。這些發現為獲取分子數據提供了一種快速、非致命性、非侵入性的方法。這種方法不僅不會降低數據的科學穩健性，而且還提供了對同一個瀕危標本開展並連續重複研究的可能性。

基於毒液的縮氨酸發現方法已成為醫藥行業關注的領域，目前很多生物技術公司已看到源自各種動物毒液縮氨酸的巨大潛力，並開始思考如何從進化過程中所產生的選擇性和敏感性（表 1）裡尋找新的商機。《新科學人》期刊最近發表的一份報告稱，毒液研究已進入基因組時代；換言之，毒液研究已不再是過去那種從成千上萬有毒物質中篩選出潛在藥物的費時費力的工作，而是變成一個高通量的科研技術過程。也因此，毒液不僅成為一個明顯藥源，更成為醫藥業最熱的科研項目之一。

venom itself -- essentially using the venom as a surrogate venom gland tissue for this purpose. The process worked extremely well. We successfully cloned exendin-4 from Gila monster and also obtained the first genetic data on exendin-3 and their precursor from Mexican beaded lizard without sacrifice of endangered herpofauna. We showed that successful cDNA cloning could be achieved from lyophilised venom stored in a freezer for more than a year. Despite each of these preparations having been either taken or stored under what would be considered to be sub-optimal conditions, polyadenylated mRNA for the venom proteins was recovered in a form that facilitated RT-PCR and the genetic data generated by this technique could be useful for scientific and therapeutic purposes. In our laboratory, we have also found that incubation of RT-PCR products with synthetic amphipathic peptides produces the gel retardation effect as demonstrated here with crude venom. We conclude that nucleic acid (mRNA) protection in reptile venom is afforded by such as yet unidentified components and that the procedure employed in this study effectively unmasks the transcriptome of the venom gland. Following from this original discovery, we extended these studies to isolate genomic DNA from the helodermitid venom. The novel partial 12S rRNA gene for Mexican beaded lizard was successfully cloned from its lyophilised venom. This study is the first reported where a single sample of reptile venom has been shown to contain the animal's genome in addition to the venom gland proteome and transcriptome. Such findings offer a rapid, non-lethal and non-invasive approach to obtaining molecular data in a manner that does not compromise scientific robustness and that, additionally, offers the possibility of performing and serially-repeating such studies on the same individual endangered specimens.

The field of venom-based peptide discovery approach is of interest to the pharmaceutical industry as a number of biotechnology companies have already recognised the enormous potential inherent in peptides derived from many different kinds of animal venom, and have begun to exploit the selectivity and sensitivity fine-tuned by evolution (Table 1). A recent report published in *New Scientist* claims that venom research has entered the genomics age, turning the once-laborious job of sifting through toxic cocktails for potential cures into a high-throughput process. As a result, venoms have become an obvious source of drugs and have become one of the hottest commodities in pharmaceuticals.

最後，在結束本文之前，我希望通過介紹基於毒液縮氨酸藥物相關的研究，能夠幫助大家認識自然環境以及動物的價值。最近有一些報告指出，許多兩棲動物和爬行類動物的數量正在大幅下降，甚至瀕臨滅絕，而其中一個主要原因就是棲息地的毀滅。毒液領域的研究表明，自然環境以及生活在其中的動物是一個幾乎尚未被挖掘的醫藥活性劑寶庫，因此我們有責任立即採取行動，一同保護我們的自然環境和生活在其中的野生動物。

Finally, I hope that the venom-based peptide drug research can also make people aware of the value of our natural environment and its animals. Recent reports suggest that many amphibians and reptiles are undergoing range reduction and extinction, and one of the main reasons is habitat destruction. As the field of venom studies shows, the natural environment and its animals is one of the virtually untapped sources of new pharmacologically active agents; therefore we have the responsibility and immediate need to protect and conserve our powerful natural environment and its animals.

Nome	Peptide	Species	Target/related protein	Disease	Clinical stage
Synthetic/modified venom peptides					
Prialt (SNX-111, Ziconotide)	ω-Conotoxin MVIIA	<i>Conus magus</i>	Voltage-gated Ca ²⁺ channels Ca _v 2.2	Severe chronic inflammatory and neuropathic pain associated with cancer and AIDS	Granted FDA Approval (Dec. 2004)
AM336	ω-Conotoxin CVID	<i>Conus catus</i>	Voltage-gated Ca ²⁺ channels Ca _v 2.2	Severe chronic pain associated with cancer	Phase II
ACV1	α-Conotoxin Vc1.1	<i>Conus victoriae</i>	Neuronal Nicotinic Acetylcholine Receptors	Chronic neuropathic pain, and acceleration of recovery of injured neurons	Preclinical
Xen2174	χ-Conotoxin χMrIA	<i>Conus marmoreus</i>	Norepinephrine transporter (NET)	Nociceptive and neuropathic pain	Phase I
	ρ-Conotoxin ρ TIA	<i>Conus tulipa</i>	α ₁ -adrenoreceptor	Nociceptive and neuropathic pain	Preclinical
CGX-1160	Contulakin-G	<i>Conus geographus</i>	Neurotensin Receptor agonist	Short-term management of post-operative pain	Completed early Phase I
CGX-1007	Conantokin-G	<i>Conus tulipa</i>	NMDA receptors NR2B subtype	Nociceptive pain and control of seizures in intractable epilepsy	Phase II
TM-601	¹³⁵ I-Chlorotoxin	<i>Leiurus quinquestriatus</i>	Cl- Channel	Brain tumors	Phase II
TM-701	I-Chlorotoxin	<i>Leiurus quinquestriatus</i>	Cl- Channel	Chronic monotherapy and pharmaceutical sensitizer co-administered drug cocktails for cancer	Preclinical
Alfimeprase	Fibrolase	Southern copperhead viper (<i>Agkistrodon contortrix</i>)	Fibrin	Thrombolytic agent and catheter occlusion	Phase II
	Contortrostatin	Southern copperhead viper (<i>Agkistrodon contortrix</i>)	Integrin	Breast cancer	Preclinical
Exenatide	Exendin-4	Gila monster (<i>Heloderma suspectum</i>)	Glucagon-like peptide-1	Type-2 diabetes and related metabolic disorders	

表 1. 醫藥業研發的毒液縮氨酸（資料來源：Bogin 2005）
Table 1. Venom peptides developed by the pharmaceutical industry (Source: Bogin 2005)



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