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umagazine 澳大新語

澳大之大：
大樓、大師、大博、大雅
UM's 4Gs :
Great Buildings, Great Professors, Great Knowledge, Great Character

新研發技術
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葡文系學生出路各不同
中葡雙語助事業更上層樓

How Portuguese Language Skills Benefit UM Graduates' Career Development

Spring/Summer 2017 umagazine

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編者的話 Editor's Words

「大學之道在明明德，在親民，在止於至善。」自古以來，教育最大的責任是要培養學識淵博，品格高尚的學生。澳大作為最高學府，當要承擔教育人才的使命。今期封面故事，我們採訪了老師、學生，暢談他們對大學教育理念的看法，另外，趙偉校長也撰文闡釋大學教育的目的。

今期我們訪問的學生當中有葡文系畢業生，在事業上均表現出色，更利用葡語的優勢令事業更上層樓；也有在科研上取得重大突破的中華醫藥研究院和科技學院師生，他們皆是反映澳大教育理念良好實踐的例子。

我們還專訪了對澳門歷史素有研究的葡文系老師Jorge Cavalheiro、研究獲哈佛大學青睞的澳大濠江學者李家明博士、獨當一面的全職藝術家鄧國豪校友，還有兩位走進澳門社群，協助澳門中學培養數學和生命科學種子的梁應德教授和王雅凡教授。

學院專欄邀請了土木及環境工程系教授兼教務長阮家榮介紹甚麼是結構健康監測，社會科學學院歷史系教授李憑分享其對拓跋部落的深入研究。

'The way of great learning consists in manifesting one's virtue and enlightening other people so as to achieve perfect goodness in society.' Since the beginning of history, the greatest purpose of education has always been to nurture virtuous students with profound knowledge. As a higher education institution, UM has the responsibility to produce outstanding professionals for society. In this issue's cover story, we interview faculty members and students about their views on UM's educational philosophy. Rector Wei Zhao also wrote an article about the purpose of university education.

We also interview several graduates of the Department of Portuguese, who have made significant progress in their careers with the help of Portuguese language skills, as well as faculty members and students from the Institute of Chinese Medical Sciences and the Faculty of Science and Technology, who have made breakthroughs in their research. They are good examples of what can be achieved with the implementation of UM's educational philosophy.

Other UM members who are featured in this issue include Jorge Cavalheiro from the Department of Portuguese, who is an expert on the history of Macao; Dr Lei Ka Meng, a Macao Fellow at UM who has been invited by Harvard University to be a visiting scholar; UM alumnus Tang Kuok Hou, a full-time artist whose works have a unique style; as well as Prof Leong Ieng Tak and Prof Wang Yafan, who serve the local community by helping secondary school students discover their talents in mathematics and life sciences.

In the Faculty Column, Yuen Ka Veng, registrar and a professor from the Department of Civil and Environmental Engineering, explains structural health monitoring, while Prof Li Ping from the Department of History shares his research findings on the Tuoba tribe.

張惠琴 Katrina Cheong

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澳大新語 是澳門大學之官方刊物，每年出版兩期，旨在報導教學、科研及大學發展的最新動向。
umagazine is a biannual publication of the University of Macau. It aims to provide information on the latest development of the university in teaching, research and other areas.

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Spring/Summer 2017 《ISSUE 16 第十六期》

澳大之大：大樓、大師、大博、大雅

UM's 4Gs: Great Buildings, Great Professors, Great Knowledge, Great Character

文 Text｜張愛華 Ella Cheong

圖 Photo｜編輯部 Editorial Board

梅貽琦先生說過：「大學之大，非大樓之大，乃大師之大。」澳門大學憑藉建造新校園的契機，在2014年全面遷入佔地1平方公里，比老校區面積大約20倍的新校園。因著這個千載難逢的機遇，澳大從世界各地招攬了眾多國際知名的大師，每年更邀請諾貝爾獎得主、圖靈獎和菲爾茲獎得主到來演講，讓學生可以面對面聆聽大師之言。此外，澳大還推行「四位一體」新教育模式，培養學生自知和自信的良好品格。

今期封面故事，我們探討澳大在教育路上，如何不斷反思、探索和創新，達到培養在專業學術追求上達致「大博」，在人生價值和品格追求上達致「大雅」的跨學科人才的教育目標。

Mr Mei Yiqi once said: 'The greatness of a university lies not in great buildings, but in great professors.' In 2014, the University of Macau (UM) relocated to a one-square-kilometre new campus that is approximately 20 times the size of the old campus. Seizing the unprecedented opportunity brought by the new campus, UM successfully recruited many world-renowned scholars in different fields. In addition to recruiting high-calibre professors, the university also regularly invites intellectual titans, including recipients of the Nobel Prize, Turing Prize, and Fields Medal, to give lectures on campus in order to broaden students' horizons. In addition, the university has implemented a '4-in-1' model of education to help students develop self-knowledge and self-confidence.

In this issue's cover story, we discuss how UM produces students with multidisciplinary talent who work to develop 'great knowledge' and 'great character' by continuously reflecting, exploring, and innovating.

築巢引鳳 匯聚人才

Create Better Conditions to Attract the Best People

標誌性建築 —— 圖書館
The university library, a landmark on campus.

澳門大學自2014年遷入新校園後，擁有了設備完善的校園硬件（大樓），更招聘了眾多優秀的大師，同時引入新的教育體系，實踐教育抱負。究竟澳大如何利用新的環境，新的教育理念培養人才？

UM's relocation to the new campus in 2014 not only allowed the university to pursue its educational goals in a better environment, but also gave the university an advantage in recruiting high-calibre faculty. How does UM take advantage of the new environment and new educational philosophy to produce outstanding graduates?

大樓林立

在國家和澳門特區政府的支持下，澳大在2014年遷入由澳門特區法律實施管轄、位於廣東省珠海市橫琴島的新校園，全面引入亞洲最具規模和最完整的住宿式書院系統，並實施「四位一體」教育模式，以體驗式、全方位、多角度手段培養具有國際視野的優秀人才。新校園佔地一平方公里，比舊校園大約20倍，擁有60多幢建築物，讓澳大可以更好地施展教育抱負，推行新的教育模式。

Great Buildings

Thanks to the great support of the central government and the Macao government, UM in 2014 relocated to a new campus which covers one square kilometre, is about 20 times the size of the old campus, and has more than 60 buildings. Moreover, the new campus is physically located on Hengqin Island, Zhuhai, Guangdong province, but is under the jurisdiction of the Macao Special Administrative Region. After moving to the new campus, UM established a complete residential college system, which is also the largest such system in Asia. This residential college system and the unique '4-in-1' education model enable the university to provide a multifaceted education to students so they can grow into well-rounded people with a global mindset.

澳大在原有的人文學院、工商管理學院、教育學院、法學院、社會科學學院、科技學院和中華醫藥研究院的基礎上，設立健康科學學院，並邀請生命科學領域頂級美籍華人科學家鄧初夏教授出任院長。健康科學學院在科研大樓內設立與研究範疇相匹配的研究中心和研究所，分別是：癌症中心、生殖發育及衰老中心、轉化醫學研究所。目前正在籌備澳門大學精準醫學研究和培訓中心，以及計劃成立傳染病中心。

科研大樓內設有兩個國家重點實驗室，分別是中藥品質研究國家重點實驗室和模擬與混合信號超大規模集成電路國家重點實驗室。兩個國家重點實驗室的研究達到世界最尖端的水準。中藥國家重點實驗室獲國家科技部批准為第一所中醫藥領域的國家重點實驗室，已發表逾600篇具影響力的高端論文。北京大學、台灣大學、香港大學和澳大四校共建中華創新藥物研究中心亦設於該實驗室內。微電子國家重點實驗室的芯片設計在國際舞台建立了一定的知名度和影響力，特別在低功耗高能效模數轉換器領域。澳大在只接受有芯片測試驗證結果集成電路領域最權威的IEEE固態電路的期刊和會議的論文發表量國際排名第二，領先於眾多國際著名大學和企業。

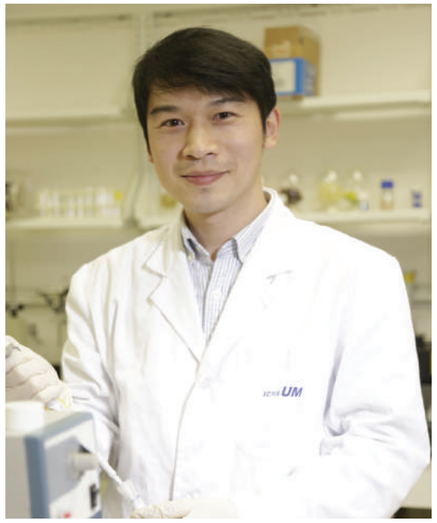
中華醫藥研究院博士生魏金超說：「2015年，中藥品質研究國家重點實驗室搬到新校區之後第一年，整個團隊取得了很好的研究成果，相較於我們離開老校區2013年那年整整多了一倍的產出。」

模擬與混合信號超大規模集成電路國家重點實驗室副教授麥沛然說：「論及科研氣氛、硬件水平，澳大絕不遜於國外一流大學，不少研究人員更擁有靈活頭腦、創意思維，具備從事科研的素養。實驗室在過去幾年積極發展，還引入了化學和生物的技術，我們希望在微電子的基礎上，可以交叉發展出更具影響力的研究成果。」

With the move to the new campus, the university relocated the various existing faculties, including the Faculty of Arts and Humanities, the Faculty of Business Administration, the Faculty of Education, the Faculty of Law, the Faculty of Social Sciences, the Faculty of Science and Technology, and the Institute of Chinese Medical Sciences (ICMS). In addition, UM established a new faculty after relocation to the new campus, namely the Faculty of Health Sciences (FHS), with Prof Chuxia Deng, a leading Chinese American scientist in the field of life sciences, serving as the dean. Located in one of the Research Buildings, the FHS has several research centres and institutes focused on different areas of research, including the Cancer Centre; the Centre of Reproduction, Development & Aging; and the Institute of Translational Medicine. Currently it is preparing for the establishment of a research and training centre in precision medicine. There are also plans to establish a centre for contagious diseases in the future.

The two state key laboratories, namely 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), are also located in the Research Building. The research conducted in these two state key laboratories has reached the highest professional standards in the respective fields. The QRCM Lab was the first state key laboratory in the field of Chinese medicine approved by the Ministry of Science and Technology. So far, staff from the laboratory have published over 600 influential academic papers. The research centre for innovative drugs based on traditional Chinese medicines, jointly established by Peking University, Taiwan University, the University of Hong Kong, and UM, is also located in the QRCM Lab. The chips designed by the AMS-VLSI Lab now enjoy a good international reputation and impact, especially in the field

兩個國家重點實驗室均設於科研大樓內，目前正在籌組第三個國家重點實驗室。
The two state key laboratories are both located in the Research Buildings. A third state key laboratory is currently under preparation.



魏金超
Wei Jinchao

大師雲集

澳大擁有實力雄厚，來自全球的國際師資團隊，其卓越的學術和科研成就獲得國際的認可。這批頂尖的師資團隊中包括有國家973首席科學家、計算機科學家趙偉教授和倪明選教授，微電子專家馬許願教授、材料科學專家程海東教授、計算機智能系統研究專家陳俊龍教授，癌症研究專家鄧初夏教授，中國文學研究泰斗楊義教授等來自全球各個不同範疇的領軍人物。

此外，澳大還邀請了不同領域的知名專家學者擔任住宿書式書院院長，分別有電漿物理權威劉全生教授、文學家鍾玲教授、比較教育及學生事務專家余小明博士、歷史學家龐百騰教授、材料力學專家葉銘泉教授、語言學家許德寶教授、音樂家湯柏燊教授、新聞法律與新聞道德教學研究學者梁偉賢教授、結構力學專家姚偉彬教授。在院長們的帶動下，各個書院形成了各自不同風格的書院文化。

除了招聘到大師的加盟，澳大還定期邀請世界級的學者蒞臨演講，2014年至今，已有超過10多位諾貝爾獎得主、圖靈獎以及菲爾茲獎得主

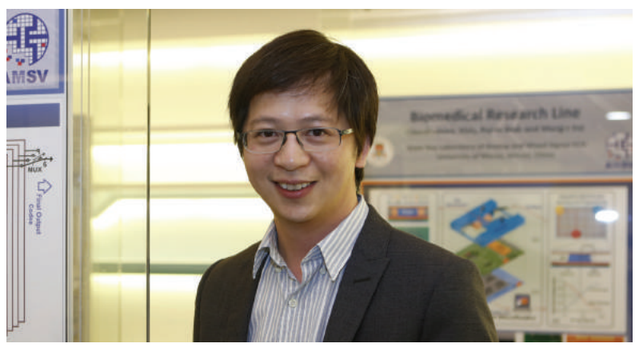
of low-power, high-performance analog-to-digital converters. UM now ranks No 2 in the world in terms of the number of papers published in the *IEEE Journal of Solid-State Circuits* (JSSC) and at the IEEE International Solid-State Circuits Conference (ISSCC), ahead of many world-renowned universities and enterprises. The IEEE JSSC and the IEEE ISSCC are the most renowned in the field of integrated circuits and only accept results with successful measurements from fabricated silicon chips.

'In 2015, one year after our state key lab moved to the new campus, our team achieved very good results,' says Wei Jinchao, a doctoral student from the ICMS. 'Our research output more than doubled that in 2013, the year we left the old campus.'

Prof Elvis Mak from the AMS-VLSI Lab says, 'UM is as good as any first-rate overseas university, whether in terms of research ambience or research facilities. Many of our researchers have a nimble mind, creative ideas, and all the other qualities required for conducting high-quality scientific research. Over the past few years, our lab has progressed quickly. We have introduced chemical and biological technologies. We hope to build on what we have achieved in microelectronics and produce multidisciplinary research results with greater impact.'

Great Professors

UM boasts a strong faculty team composed of internationally-recruited scholars who have gained international recognition for their academic and research achievements. Many of the faculty members are leaders in their areas of expertise, including Prof Wei Zhao and Prof Lionel Ni, both computer scientists and chief scientists for projects under the National 973 Programme; Prof Rui Martins, an expert on microelectronics; Prof



麥沛然教授
Prof Elvis Mak

澳大擁有一批大師級學者
UM boasts a team of world-class scholars

來到澳大，包括有楊振寧教授、莫言教授、邱成桐教授、森重文教授、Mario Capecchi教授、Ada Yonath 教授、Aaron Ciechanover 教授、Carl Edwin Wieman教授、Robert F Engle 教授、Joseph E Stiglitz教授等，與師生交流學術界最前沿的研究趨勢和新發現。

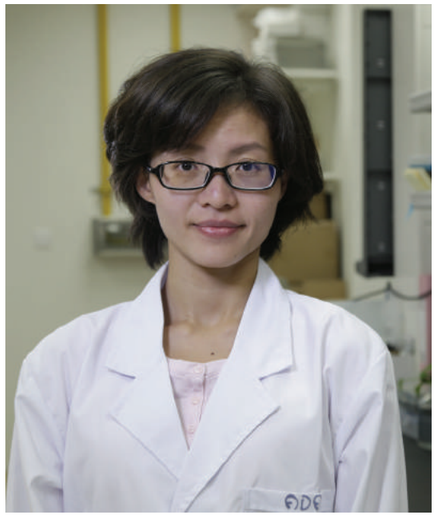
王衡馨是鄧初夏教授的博士後研究員，當年她來澳大工作，就是因為知道鄧初夏教授是一位非常有名的癌症研究學家，希望來到澳大加入他的團隊工作。她說：「在這兩三年間，我學到了很多有關癌症，特別是乳腺癌的研究知識，還有從鄧教授身上得到很多寶貴的經驗，當中包括怎樣發展自己的職業生涯。」

中國文學博士生符愔暢的論文導師是中國文學研究泰斗楊義教授，被學術界譽為「21世紀中國最優秀的文學史家之一」和「當今中國最有創造力和影響力的學者之一」。符愔暢說：「楊教授影響我最大的是他嚴謹的治學態度和思維方式。他說世界上甚麼難事只要認真看待就不怕，只要有認真的態度，甚麼事情也可以完成。」

Haydn Chen, an expert on materials science; Prof Philip Chen, an expert on intelligent computer systems; Prof Chuxia Deng, an expert on cancer research; and Prof Yang Yi, a leading authority in Chinese literary studies.

UM has also invited renowned experts and scholars in different fields to serve as masters of its residential colleges. These include Prof Liu Chuan Sheng, an authority on plasma physics; Prof Chung Ling, a renowned writer; Dr Peter Yu, an expert on comparative education and student affairs; Prof David Pong, a veteran historian; Prof Yip Ming Chuen, an expert on the mechanics of materials; Prof De Bao Xu, a renowned linguist; Prof Kevin Thompson, a renowned musician; Prof Kenneth Leung, an expert on communication law and ethics; and Prof Iu Vai Pun, an expert on structural mechanics. Under the leadership of these masters, the colleges have established their own unique cultures.

In addition to recruiting masters in various fields, UM also regularly invites world-renowned scholars to give lectures on campus. Since 2014, more than ten recipients of the Nobel Prize, Turing Award, and Fields Medal have gaven lectures at UM to share the latest research trends and new discoveries. These guests have included Prof Chen-Ning Franklin Yang, Prof Mo Yan, Prof Shing-Tung Yau, Prof Mori Shigefumi, Prof Mario Capecchi, Prof Ada Yonath, Prof Aaron Ciechanover, Prof Carl Edwin Wieman, Prof Robert F Engle, and Prof Joseph E Stiglitz.



王衡馨博士
Dr Wong Hang Heng

大博大雅

澳大既有「大樓」和「大師」，還建立新的教育體系。澳大在2014年全面引入亞洲最具規模和最完整的住宿式書院系統，與學院相輔相成，通過推行融合專業、通識、研習和社群教育的「四位一體」的體驗式教育模式，以全方法，多角度培育多元人才。教師除了在課堂授課外，亦在課堂外參與學生活動，關心學生，與學生交流，全面達到育人的目的。正如趙偉校長所言：「希望通過書院制度的社群教育模式，致力於培養學生的自知和自信，因為這兩者才是創造力的本源。澳大學生在畢業時不但擁有廣博的知識（大博），也兼具高潔的思維和儒雅的行為（大雅）。」

曹光彪書院院生馮嘉俊四年來，非常投入校園的生活，不斷參加書院內外的各類型活動，增長見識，廣結人脈。他認為：「書院提供和同學的相處機會，彼此關係更加親密，學生住在書院，更可以享受校園生活。」

Wong Hang Heng is a postdoctoral research fellow who works with Prof Chuxia Deng. She chose to join UM because she knew Prof Deng to be a renowned expert on cancer research, and she hoped to join his team. 'Over the past three years, I have learned a lot about cancer research, especially research on breast cancer,' says Wong. 'I have also learned a lot of valuable experience from Prof Deng, including how to develop my career.'

Fu Yinchang, a doctoral student of Chinese literature, studies with Prof Yang Yi, a leading authority on Chinese literary studies who is hailed as one of China's best literary historians in the 21st century and one of the most creative and influential scholars in contemporary China. 'What I have learned the most from Prof Yang are his meticulous attitude towards academic research and his way of thinking,' says Fu. 'He often tells me that nothing is difficult to the person with the right attitude. With the right attitude, one can accomplish anything.'

Great Knowledge and Great Character

In addition to 'great buildings' and 'great professors', UM has also established a new educational system. In 2014, UM began implementing a complete residential college system, which is also the largest such system in Asia, to complement the academic faculty system. The university hopes that the residential colleges and faculties can combine to serve as the vehicles for implementing the '4-in-1' education model, which consists of discipline-specific education, general education, research and internship education, and community and peer education, so as to provide a multifaceted education to students. Apart from classroom instruction, faculty members also participate in student activities outside the classroom. As Rector Wei Zhao often says, 'Through community and peer education implemented through the residential college system, we hope to help our students develop self-knowledge and self-confidence, because these are the source of creativity. We want our graduates to possess not only extensive knowledge (great knowledge) but also a noble mind and cultured behaviour (great character).'

Rex Fung, a member of Chao Kuang Piu College, has been an active participant in campus activities over the past four years. 'I have participated in various activities both inside and outside our residential college. They have broadened my horizons and helped me make new friends,' he says. 'The college provides opportunities for us to spend time with other students so we can become closer to each other. Living in the college allows us to enjoy campus life more.'

陳宇丹
Sophie Chen

劉宏成
Liu Hong Cheng

馮嘉俊
Rex Fung

符愔暢
Fu Yinchang

滿珍紀念書院院生陳宇丹認為書院的音樂氛圍提升了她的音樂素養，「我們的書院院長湯柏燊教授是一位世界級的音樂大師，他在書院打造了非常濃厚的音樂文化氛圍，提高了我的審美能力和道德修養，對我以後人生發展有很大幫助。」

鄭裕彤書院院生劉宏成說：書院非常重視閱讀，打造了濃厚的文學氣息，「通過閱讀文學作品，可以提升學生的審美能力，從而培養大雅的品格。當個人氣質提升後，待人處事會更加好，你的朋友和身邊的人也會覺得不錯，而且興趣和學習也會提高趣味。」

Sophie Chen, a member of Moon Chun Memorial College, believes that the musical ambience in the college has improved her own taste in, and knowledge of, music. 'Our college master Prof Kevin Thompson is a world-class musician,' says Chen. 'He has fostered a very good musical ambience in the college, which taught me how to appreciate the beauty of music and other art forms, and I think this will in turn have a very positive influence on my character development.'

Liu Hong Cheng, a member of Cheng Yu Tung College, says, 'Our college attaches great importance to helping us cultivate a reading habit. We are encouraged to read literature to improve our appreciation of literary works. Literature can help foster great character traits, and when you have great character traits, you know how to better handle interpersonal relationships, which will benefit those around you. It will also increase your interest in studies.'

住宿式書院其中一座大樓
One of the residential colleges

澳大推行「四位一體」教育模式
UM implements a '4-in-1' model of education

大學教育的目的

The Purpose of University Education

文 Text｜趙偉校長 Rector Wei Zhao

圖 Photo｜編輯部 Editorial Board

澳大致力培養學生的自知和自信
UM aims to help students develop self-knowledge and self-belief

最近幾年，大學排名滿天飛。我們正好藉此機會，重新討論一個老問題：大學教育的目的是甚麼？

一方面，科技的發展使人類進入了一個美妙而又令人生畏的新世界；另一方面，教育工作者卻從傳統價值觀中找到了啟迪，幫助學生應對不可預知的未來。亞洲國家對教育興邦的道理篤信不疑，不惜大力投資打造世界頂尖大學。為了追求學術卓越，它們採用了不同的模式。

In an age when news of higher education is dominated by headlines of institutional rankings, it is perhaps a good time to pose the question: what is the purpose of university education?

Paradoxically, as technology ushers in a brave yet formidable new world, we see a new relevance in our old values, as educators face the challenge of preparing our students for an unpredictable future. Asian countries have an abiding faith in education, investing heavily in building 'world-class' universities. In doing so, they are chasing different models for academic excellence.

葫蘆畫瓢難題叢生

在眾多亞洲國家中，有些選擇了複製世界著名大學的模式。效仿頂尖大學無可厚非，但照葫蘆畫瓢依舊會難題叢生。比如史丹福大學的創業文化舉世聞名，其之所以蓬勃發展，全因鄰近全球創業投資的大本營，只要有好的創意，資金便會隨之而來。

哈佛大學傳奇校長查爾斯・艾略特有這樣的真知灼見：偉大的大學必定獨具特色；任何優秀的大學必須從「種子」成長而來，「而非外國院校的複製品」。

在中國內地，隨著經濟從低技術出口轉型為以創新為主導，頂尖的大學肩負起振興經濟的重擔。但經濟創新是否單靠培育科技型人才？事實上，大家可能已經注意到，創造經濟奇蹟的往往是那些勇於冒險的人。

思考現代大學意義

失敗並不可恥。正如溫斯頓・邱吉爾所說：成功就是歷經一次又一次的失敗而不灰心，這就是典型的西方人對待失敗的態度。有些亞洲人臉皮薄，懼怕失敗的心理深植文化之中。令人驚訝的是，中國人正在打破這種傳統。那些信念堅定、敢於冒險的中國人，為國家經濟飛躍提供了動力，造就了中國相比鄰近國家的優勢。

Cloning Presents Its Own Challenges

In many Asian countries, some have chosen to 'clone' the world's leading universities. There is nothing wrong with copying the best. But borrowing wholesale presents its own challenges. Stanford University's world-famous startup culture, for example, thrives because of its proximity to a venture capital community ready to bankroll innovative ideas.

Harvard's legendary president Charles Eliot was correct in saying that any great university is great in its own ways, and that any good university should grow from 'seed', and 'not be a copy of foreign institutions'.

In mainland China's case, its top universities are charged with the burden of revitalising its economy, as the age of low-tech export yields to the age of innovation. But is economic innovation just a matter of training technologically-savvy graduates? Economic miracles, you might have noticed, are often performed by those with the courage for risk-taking.

Rethink the Purpose of the Modern University

In the West, failure doesn't stigmatise. Winston Churchill's statement that 'Success is stumbling from failure to failure without loss of enthusiasm' typifies this attitude. In thin-skinned Asia, we have a cultural fear of failure. Surprisingly, China is defying this tradition; its edge over its neighbours is in the ranks of self-believing risk-takers who power its economic great leap forward.

One such self-knowing risk-taker is Jack Ma. Mr Ma is no technology wizard. But what he lacks in technological knowledge, he more than makes up for

大學承擔著激發學生潛能的特殊使命
A university's special mission is to bring out the best in students

亞洲國家近年大力投資教育培育人才
In recent years, Asian countries are investing heavily in education

馬雲就是這樣一位有自知之明、敢於冒險的人物。他並非技術精英，但他眼光銳利，能洞察先機，敢於憑直覺押注商機，這足以彌補其技術知識不足的短板。

如果說馬雲代表著甚麼，那他代表的就是經歷連串失敗後所取得的成功：高考兩次失利、求職處處碰壁、創業也一波三折，甚至傳聞他被哈佛大學拒絕錄取。

很多西方人認為中國人不過是不知羞恥的抄襲者，卻忽略了中國人獨特的過人之處，那就是洞察良機的慧眼和不畏風險的雄心。中國人有膽識，適應力強，並且深諳「出奇制勝」之道。

如今全球大學排名成為公眾熱議的話題，我們卻認為更有必要汲取古代先賢智慧，重新思考現代大學的意義。

培養學生自知自信

我們澳門大學決心致力於培養學生的自知和自信，因為這兩者才是創造力的本源，而在現代大學教育中往往被忽視。幫助學生認清自我、認識自我，這一提法並不新鮮。新鮮的是，在大學教育中構建一個「生態體系」將之落實，該體系包括全面建立有益學生自我發展的書院制度。亞里士多德曾告誡我們：「認識你自己。」中國家喻戶曉的智者老子，也有一句警言：「知人者智，自知者明。」大學應以人為本，因此承擔著激發學生潛能的特殊使命。而要想發揮潛能，必先自知、自信。

in being able to sniff out opportunities and betting on his hunches. If he represents anything, he represents the success of serial failures: failing his College Entrance Examinations twice, being turned down for jobs multiple times, his business ventures succeeding only on the third try. He had the dubious distinction of being rejected by Harvard as many as ten times.

Many in the West dismiss the Chinese as shameless copycats. But they fail to see that unique Chinese genius: the nose for opportunities, and the stomach for taking risks. They are bold, resilient leapfrog artists of the first order.

At a time when the universities global rankings leaderboard is on the lips of the public, we decided to rethink the purpose of the modern university—by heeding the words of our sages.

Self-knowledge and Self-belief

We decided to aim at helping students to acquire self-knowledge and self-belief, realising that it is the fountainhead of creativity often overlooked by modern universities. Helping people to acquire self-knowledge is not new. What is new, in our case, is building an ecosystem that realises the ideal, including an extensive residential college system that is friendly to the development of the self. Aristotle exhorted us to 'Know thyself'. Laotzu, China's oft-quoted sage, reminded us that 'Knowing others is wisdom. Knowing oneself is enlightenment.' As a people-centred place, the university's special mission is to bring out the best in students. But this attainment presupposes self-knowledge and self-belief.

At first blush, the age of innovation is incompatible with the ancient pursuit of self-knowledge. But we soon realise that while knowledge itself may become obsolete, self-knowledge is an ever-flowing stream of innovativeness. That is the renewed relevance of ancient wisdom.

乍看之下，認識自我的古老智慧與追求創新的時代似乎格格不入，但是我們很快就會發現，知識或許會過時，但深刻的自我認識卻將是創造力的不竭源泉。這就是古老智慧對當今的啟迪。

身處在因各種衝突而分裂的世界中，「認識自己」更是一項道德義務。寬容的態度是受過良好教育的標誌，寬容即包容多樣性和接納差異，對待遠至中東、近在身邊的人與事，都能如此。對自己有清醒認識的人通常更能包容，鮮少與他人發生衝突。

幫助學生認識自己

作為教育工作者，我們有責任幫助學生先認識自己，而非急於改變世界或者評判他人。大學應著眼於未來。智慧機器或許威脅到很多人的飯碗，但在培養人才方面，機器永遠不能取代人類。因此有必要營造教育環境，讓學生認識自我，培養創新人才。

經過專業教育、通識教育、研習教育、社群教育而培養出的新世紀畢業生，不僅專業根基深厚，而且知識面廣博。前兩種教育是傳統的學習，而後兩種是通過實踐學習。正是因為接受了這些教育，畢業生才能在這個競爭激烈的時代發現自身的價值。大學培養學生不同於企業生產產品。大學重視學生的個性發展，而不是像麥當勞那樣按照標準化流程製作漢堡包。大學若不想被時代淘汰，就要培養學生立足於未來的能力，帶領他們走出熟悉的「安全區」，讓他們做好冒險的準備。

莎士比亞很早就曾斷言：性格決定命運。大學的作用在於塑造學生的性格，讓學生認識自我，培養學生的求知慾和冒險精神，從而擁抱廣闊的世界。科技時代的繁榮與古老智慧並不相悖，現代科技如能吸取先賢智慧的精粹，二者定能碰撞出新的火花。

In a world torn apart by conflict, 'knowing thyself' is also a moral imperative. The hallmark of the educated is tolerance—a willingness to embrace diversity and differences, whether in the Mid-East or closer to home. Those who know themselves are less prone to intolerance and needless conflict.

Help Students Know Themselves

As educators, we have a duty to see that students first get to know themselves before they rush to change the world or judge others. The university's domain is the future. Smart machines may threaten to displace humans from many occupations. But there is one area in which machines can never replace humans---the nurturing of individual talent. That is why creating conditions that promote creative talent through self-knowledge is a paramount concern.

The ideal 21st century graduate has both broad and deep knowledge, with discipline-specific education, general education, research and internship education, and community and peer education. The first two are conventional learning, the last two are learning by doing. It is in doing that we discover our true worth in a competitive century. Universities, unlike businesses, cater to individuality, not to the standardisation of product the way MacDonald's handles its hamburgers. The best way to future-proof the university is to future-proof our students by bracing them for risk-taking, shoving them out of the safety of the familiar.

As Shakespeare long ago realised, character is destiny. We are in the business of character-building, putting students in touch with themselves, embracing the wider world, while keeping them hungry for learning and risks. The age of technology should develop a new romance with ancient wisdom. It thrives on it, not in spite of it.

大學必須營造有利於學生成長的教育環境
A university must create a learning environment that is conducive to the students' personal growth

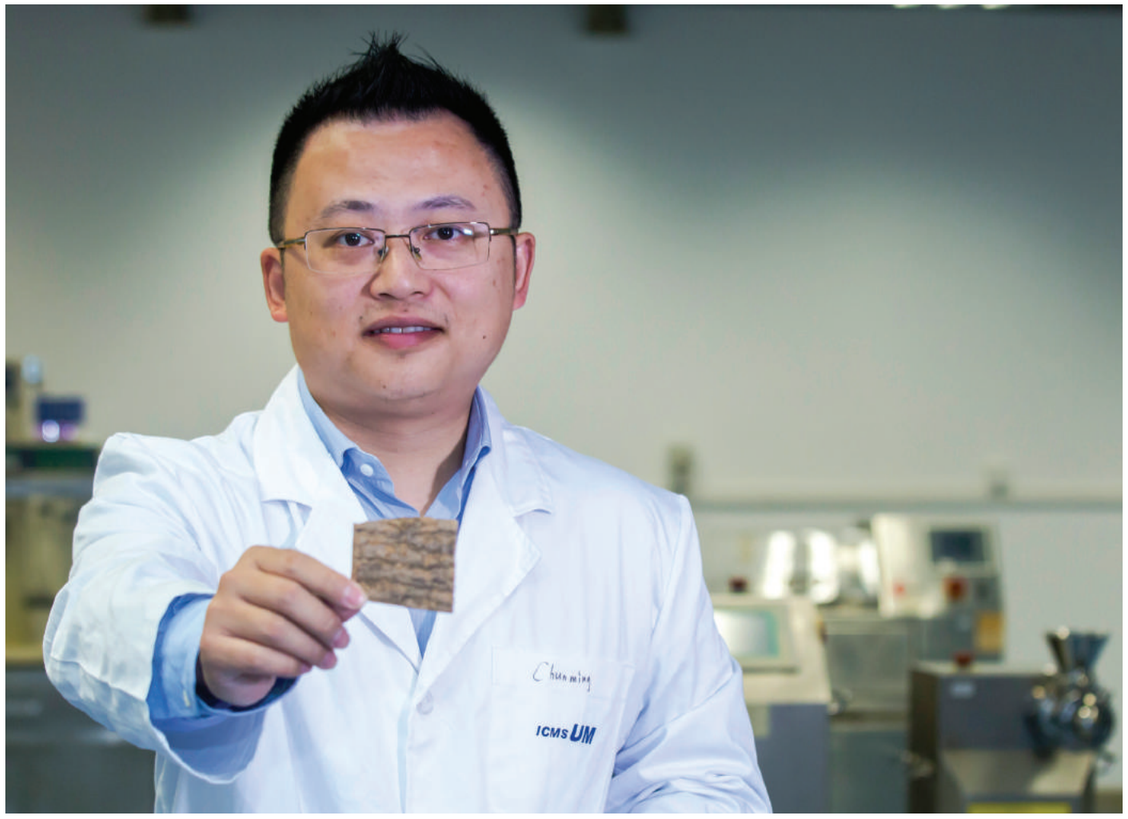
短片：澳大之大
Video: UM's "4G"

新研發技術 杜仲令皮膚再生

Technological Breakthrough at UM From Tree Bark to Skin Regeneration

文 Text｜黃首豪 Saohou Wong

圖 Photo｜李思、部分相片由受訪者提供 Manuel Reis, with some provided by the interviewee



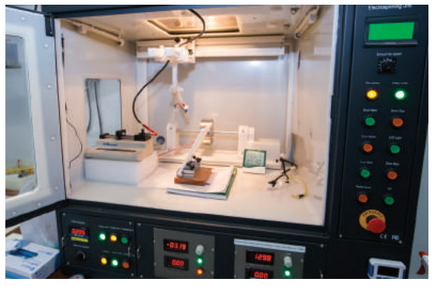
王春明教授
Prof Wang Chunming

澳門大學中華醫藥研究院和中藥質量研究國家重點實驗室是澳大重要的研究基地，在中藥質量與國際化產品研發中，中華醫藥研究院致力以五個要求作為發展要點，分別是有效性、安全性、穩定性、可控性及系統性，國際化的研究團隊基於這五項發展思路進行產品研發，成就及進展受到國內外高度評價。

樹皮修補人皮

你想過樹皮可修補受損的皮膚嗎？中華醫藥研究院、中藥質量研究國家重點實驗室研究團隊依據中醫中藥的經典理論，結合現代生物化學和藥理學知識，對一系列具有活血化瘀、通筋舒絡的中藥材開展藥物篩選，最終發現杜仲含有特殊的多糖成分。這類成分自身並不促進細胞生長，但卻可以與人體內專門促進血管新生和成熟的生長因子「交朋友」，從而以「智能響應」的模式，幫助破損的皮膚組織再生。

發起這項研究課題者、中華醫藥研究院助理教授王春明之前在海外一直從事生物大分子與組織修復的研究，對中藥和天然資源的活性分子頗感興趣。他表示，當初給自己的研究團隊一個富有挑戰性的題目，就是以「樹皮修補人皮」，研究團隊花了兩個月的時間做資料搜集，找出15種活血化瘀、通筋舒絡的中藥進行檢測，不過研究未如想像般理想。王教授回憶：「學生花了一年半的時間研究，研究了12種中藥都沒有取得成果，負責檢測的博士生還跑來我的辦公室哭著說想放棄，不過當我們研究到第13種中藥時，終於取得突破。」



生產杜仲敷料的儀器
The equipment used to make EU-based wound dressings

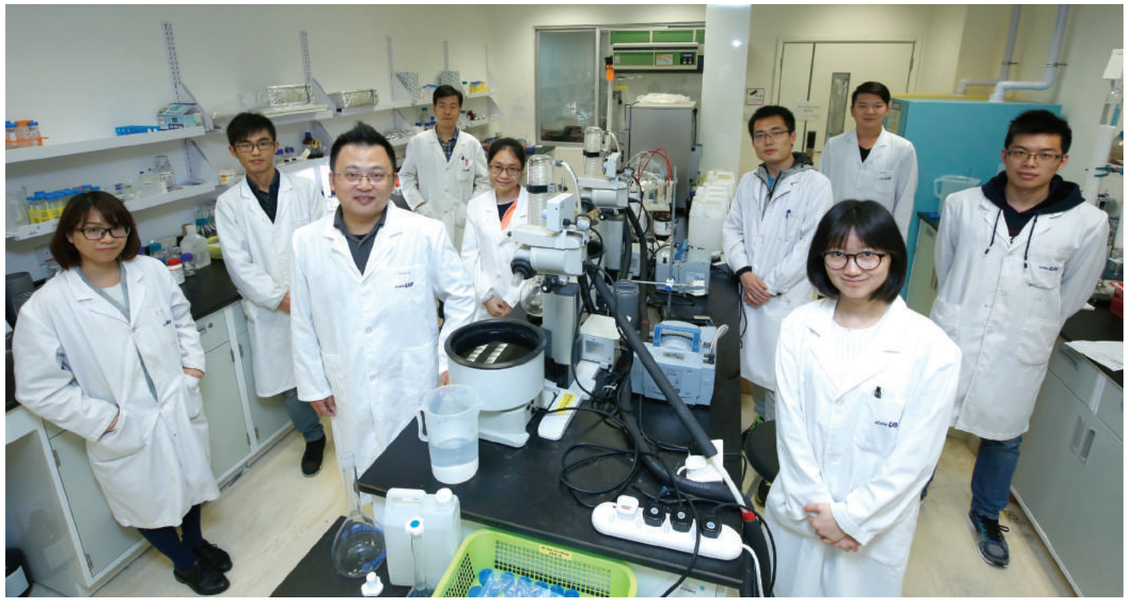
The University of Macau's (UM) Institute of Chinese Medical Sciences (ICMS) and State Key Laboratory of Quality Research in Chinese Medicine (SKL-QRCM) are important research institutes at UM. By following five standards, namely effectiveness, safety, stability, controllability, and systemisation, the international research team has not only made considerable progress in quality assurance and research and development activities, but has also earned accolades both at home and abroad.

Repair Human Skin with Tree Bark

Did you know that tree bark can be used to repair damaged skin? Based on classical theories of traditional Chinese medicine as well as modern biochemical and pharmacological evidence, the research team from the ICMS and the SKL-QRCM screened various Chinese herbs that are believed to relieve blood stasis and meridian obstruction by promoting blood circulation. The team found that the bark of Eucommia ulmoides (EU, commonly known as the hardy rubber tree) contains special molecules known as polysaccharides (a string of sugar molecules). These molecules in themselves do not promote cell proliferation, but they can help damaged skin tissue regenerate in a 'smart response' mode by 'making friends' with the growth factors in our body that are responsible for promoting the formation and maturation of new blood vessels.

Wang Chunming, an assistant professor from the ICMS, initiated this research project. Before joining UM, Wang focused on studies of biological macromolecules and tissue repair at overseas institutions, with a particular interest in the bioactive molecules in Chinese medicines and natural sources. Wang set his research team a challenging task: developing a way to repair human skin with tree bark. His team then spent two months collecting data. Eventually they found 15 Chinese herbs that were believed to relieve blood stasis and meridian obstruction by promoting blood circulation and tested them one by one, but none of them showed a satisfactory biochemical effect. 'One day, one of my PhD students who was responsible for the testing came to my office. He cried and told me he wanted to discontinue this study, because he and the other students had spent a year and a half studying 12 Chinese herbs without getting anywhere,' recalls Prof Wang. 'But we finally achieved a breakthrough with the 13th herb.'

The herb that brought the breakthrough is EU, which is sweet in flavour and mild in nature. According to *Shennong's Classic of Materia Medica*, it is mainly used to 'treat lower back pain, improve the digestive



研究杜仲敷料的團隊
The research team that developed EU-based wound dressings

王教授所說的藥材就是杜仲。杜仲味甘，性溫，據《神農本草經》記載：「杜仲主治腰脊痛，補中益氣，堅筋骨，強志。」《本草綱目》記載「潤肝燥、補肝虛、能補腎」，有助治療腰膝痛。澳大的研究團隊發現，從杜仲中抽取的三號多糖（EUP3）分子，經生化及小鼠實驗證明，具有非常有趣的效用。首先，與想像中的「強力藥丸」不同，EUP3可是一個非常安靜的分子。它在非損傷環境下，並不會對人體細胞有太大作用。但是，一旦創傷發生，EUP3彷彿是「火警響應」一般，立刻結合有促進血管新生和成熟的生長因子，大大穩定、延長和提高這類生長因子的作用，改善組織缺血狀況，促進組織再生。傳統治療傷口的做法，會利用外來生長因子打進人體讓皮膚復原，不過這些不屬於人體的生長因子，在體內很容易降解，而王教授的研究團隊認為，皮膚的缺損部位其實並不缺這些生長因子，只是它們游離和容易流失，難以發揮功效。「我們的研究概念是利用類似皮膚組織結構的生物組織，模擬皮膚修復過程中生長因子發揮作用的機制，這是我們抽取杜仲多糖的初衷。」他解釋：「皮膚的癒合過程中，一種名為糖胺聚糖（GAG）的成分可以富集和促進生長因子，起到關鍵作用，而杜仲多糖雖然不是GAG，卻可以彌補和替代GAG的作用，有助傷口修復。相對現時實驗室合成或生物敷料，杜仲多糖具有獨特的生物活性，又或許可避免外源因子帶來人體產生不良反應的機會。」

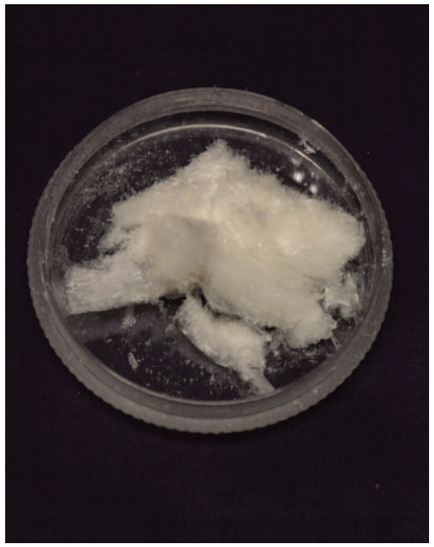
system and immune system, strengthen muscles and bones, and enhance mental strength.' According to the *Compendium of Materia Medica*, EU can 'nourish the liver and kidney and treat back and knee pain.' UM's research team found through biochemical and vivo experiments that a type of polysaccharides extracted from EU, known as the EUP3, have very interesting medicinal effects. First of all, EUP3 do not act like powerful pills, as was previously imagined. Rather, they are quiet molecules that do not exert an obvious effect on human cells in a non-traumatic environment. However, in the case of a trauma, EUP3 immediately spring into action, in the same way fire fighters respond to a fire alarm. They bind and assemble growth factors that are responsible for promoting the formation and maturation of new blood vessels. By significantly stabilising, prolonging, and enhancing the effect of these growth factors, they improve tissue ischemia and promote tissue regeneration. The traditional way of treating a wound is by injecting exogenous growth factors into the human body to help skin regenerate, but these growth factors do not belong to the human body and therefore degrade quickly in the body. Moreover, Prof Wang's team believes that there is no lack of these growth factors at the injury site of the skin. However, these growth factors easily diffuse and degrade. 'The idea is to use biological tissue that is structurally similar to skin tissue and then mimic the mechanism through which skin repairs itself with growth factors. That's why we tried to extract polysaccharides from EU,' says Prof Wang. 'In the wound healing process, glycosaminoglycans (GAGs) play a key role in enriching and promoting growth factors. Although EUP are not the same as GAGs, they can act as GAGs to help heal wounds. Compared to the synthetic or biological wound dressings currently used in many labs, EUP have a unique biological activity, which might help to reduce the chance of adverse reactions caused by exogenous growth factors.'

讓人工敷料更像皮膚

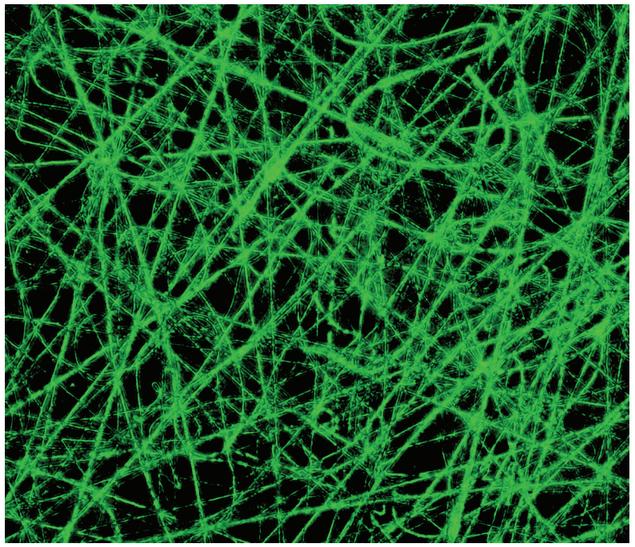
皮膚傷口要癒合，需要經歷三個階段，分別為發炎期、增生期和成熟期。白血球會在受損的皮膚聚集，吃掉壞死的組織並分泌促進癒合的分泌物，因此傷口會出現紅腫發炎現象；其後，隨著白血球的活動量增加，傷口開始長出表皮、新的血管，傷口也開始縮小；最後傷口結疤，膠原纖維自行有規則地排列，多餘的新血管開始萎縮，傷口癒合。

Make Synthetic Wound Dressings More Like Human Skin

A wound healing process consists of three phases, namely the inflammatory phase, the proliferation phase, and the maturation phase. White blood cells congregate at the site of the damage and 'eat' damaged tissue cells by engulfing them, while simultaneously releasing substances to promote healing. As a result, the wound becomes red, swollen, and inflamed. After that, with the increased activity of white blood cells, vascular endothelial cells form new blood vessels. Concurrently, epithelial cells proliferate and 'crawl' atop the wound bed, providing cover for the new tissue. The size of the wound also decreases. In the end, a scab forms, and originally disorganised collagen fibres rearrange themselves. Redundant new blood vessels begin to contract and the wound heals.



杜仲多糖外觀
EUP



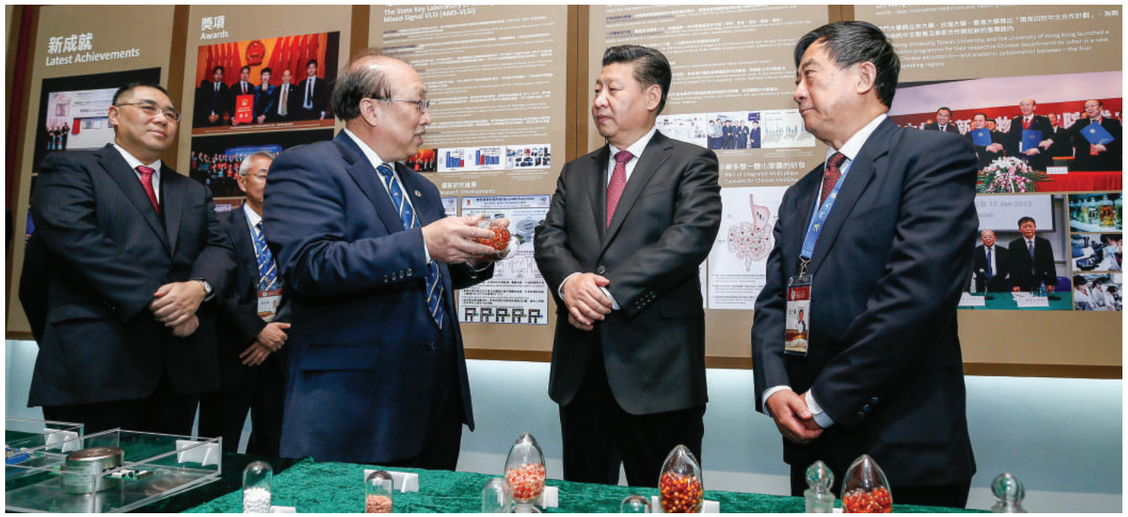
顯微鏡下含杜仲多糖的靜電紡絲纖維
Electro-spun fibres that contain EUP under a microscope

對於大面積皮膚受傷或傷口不易癒合的患者來說，為了加速傷口癒合，減低感染的機會，可以利用自己皮膚進行植皮手術幫助傷口癒合，但植皮很可能造成更多傷口或難看的疤痕，而人工敷料則可以保持傷口濕潤，加速傷口癒合，減少疤痕形成。現時臨床使用的人工敷料原料抽取自人體、動物的皮膚組織或膠原蛋白合成，不過成效會因生物相容性、傷口情況而有快慢之分，澳大研發、抽取杜仲多糖而成的人工敷料，基於取自天然草本成分，有效加快傷口癒合。

目前，該團隊正結合先進的材料學加工手段和中藥製劑工藝，以靜電紡絲技術將該成分製成具有納米圖案化設計的新型智慧敷料。王教授表示：「杜仲多糖的敷料現在仍處於動物實驗的階段，當實驗應用到臨床後，杜仲多糖可以加入到任何人工敷料中，使人工敷料更像人的皮膚，其生長因子可使人體啟動自己的修復功能，加快傷口癒合，同時減低可能出現的不良反應。」

Patients suffering from extensive skin injury or stubborn wounds can help the wounds heal faster and reduce the chance of infection by undergoing a skin grafting surgery using their own skin. However, a skin grafting surgery may cause new wounds or leave unsightly scars. This is where synthetic wound dressings come in. They keep a wound moist, accelerate healing, and leave fewer scars. The synthetic wound dressings currently used in clinical treatment are mostly made from tissue or collagen extracted from human skin or the skin of other animals. But the speed with which the dressings take effect varies from person to person depending on biological compatibility and the severity of the wound. UM-developed synthetic dressings are made from EUP. The natural herbal ingredients effectively accelerate the wound healing process.

Currently, the team is working to develop new smart EUP-based wound dressings with nano-patterned design through electrospinning, a fascinating fibre fabrication technique, by combining advanced materials science and TCM-based preparations techniques. 'EUP-based dressings are still in the animal testing stage,' says Prof Wang. 'When they pass clinical testing, we can weave EUP into any synthetic dressings to make them more like human skin. The growth factors can prompt the human body to kick-start its own repair process to accelerate wound healing and reduce the chance of adverse reactions.'



趙偉校長（左一）和王一濤院長（右一）向習近平主席介紹多態膠囊
Rector Wei Zhao (1st from left) and Prof Wang Yitao (1st from right) tell President Xi Jinping about the multi-phase capsules

短片：樹皮修補人皮—澳大新技術促醫藥發展
Video: Repairing Human Skin with Tree Bark

新研發技術：固液多態一體化膠囊
New Technology: Multi-phase Capsules

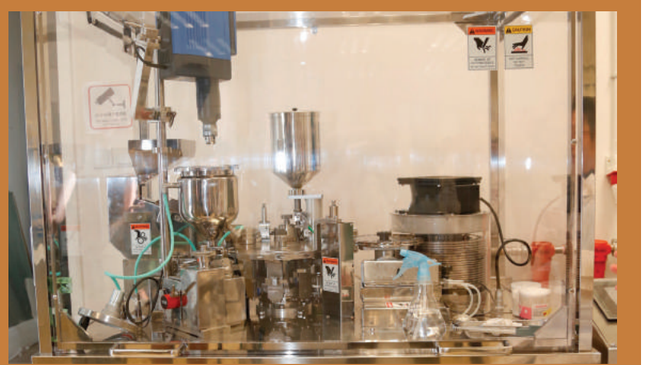
多態膠囊
Multi-phase capsules

EU-based wound dressings are developed by the ICMS's centre for preparation engineering. Under the leadership of Prof Wang Yitao, director of the ICMS, the professors and doctors at the centre work together to develop innovative TCM-based drugs and health products, in an effort to promote the development of the Chinese medicine industry in Macao. Another noteworthy achievement of the centre are the multi-phase capsules, made with a UM-developed multi-phase capsule filling machine. In 2014, President Xi Jinping visited UM and listened to Prof Wang explain how the multi-phase capsule filling machine worked. President Xi was very pleased with UM's progress in Chinese medicine research. During his visit, President Xi expressed his hope that the ICMS would make new contributions to the implementation of China's innovation-driven development strategy.

杜仲敷料是中華醫藥研究院（ICMS）製劑工程中心團隊精心烹製的「菜餚」之一。在院長王一濤的帶領下，該中心多名全球招聘的教授和博士分工合作，聚焦創新中藥與健康產品研發，為澳門發展中醫藥產業出力。中心一項值得關注的研究成果是「固液多態一體化膠囊」，多態膠囊由澳大自主研發的多態一體化膠囊填充機生產，是ICMS研究中的一個亮點。2014年國家主席習近平到訪澳大，曾聽取王一濤院長介紹多態一體化膠囊填充機。當時習主席對澳大中藥研究進展感到十分高興，並希望ICMS為國家實施創新驅動發展戰略作出新的貢獻。

Multi-phase capsules combine water-soluble and fat-soluble ingredients from traditional formulae. Conventional wisdom in Chinese medicine holds that a treatment needs to have different ingredients to achieve the best result. That's what multi-phase capsules do. One multi-phase capsule combines two different ingredients. To put it simply, taking one multi-phase capsule would achieve the same effect as drinking a large bowl of Chinese herbal soup. The advantage of taking a multi-phase capsule is that it can control where and how fast the medicinal substances are released in the body so as to make sure the potency is not wasted on the non-targeted parts of the body. The process of making the multi-phase capsules is better suited to the multi-ingredient nature of Chinese medicines in that it prevents the loss of medicinal substances like volatile oil. The result is a greater degree of precision, controllability, and stability.

多態膠囊利用新型的填充技術，把水溶性和脂溶性的經典藥方集合為一體，實現藥輔合一的功效。在傳統的中藥智慧中，中藥需要各種不同的成分組成，而多態膠囊可以把兩種不同的成分濃縮在一顆藥丸中，達到最佳效果，簡單說就是吃一顆藥丸就不用喝一大碗中藥湯。多態膠囊的好處是可以控制藥力在體內的代謝和分佈，不易在身體其他部分損失。在製備過程中，多態膠囊更符合中藥多組分的特點，避免了在加工過程中如揮發油等物質的流失，使得製備過程更加精確、可控和穩定。



澳大自主研發的多態一體化膠囊填充機
The multi-phase capsule filling machine developed by UM

葡文系學生出路各不同 中葡雙語助事業更上層樓

How Portuguese Language Skills Benefit UM Graduates' Career Development

文 Text｜張愛華、黃首豪、校園記者梁曉菁 Ella Cheong, Saohou Wong, UM Reporter Ginnie Liang

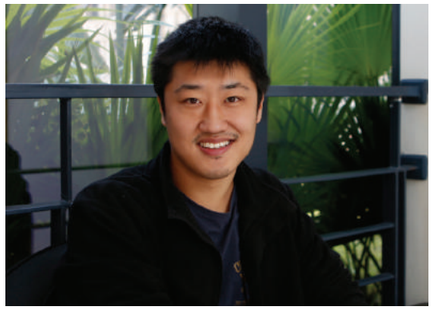
圖 Photo｜張愛華、黃首豪、李思、部分由受訪者提供 Ella Cheong, Saohou Wong, Manuel Reis, with some provided by the interviewees

澳大葡文系是繼葡萄牙和巴西以外最大的葡語系。隨著澳門特區政府對培養中葡雙語人才的重視，報考澳大葡文系的學生也越來越多，在讀書時期已得到大量翻譯實踐機會，畢業後更利用中葡雙語的優勢在事業上闖出名堂；有部分校友更去到葡語系國家發展，開創一番事業。

為莫桑比克總統做翻譯

在2016年中國－葡語國家經貿合作論壇（澳門）第五屆部長級會議（以下簡稱中葡論壇），澳大派出了52名精通葡語的本科及碩士生協助翻譯及接待工作，把課堂上學習到的葡語應用在工作崗位上。來自北京、修讀葡萄牙語言及文化—應用語言學碩士課程的張辰，大學畢業後曾到巴西從事過翻譯工作，先後輾轉去過四個葡語國家包括葡萄牙、巴西、安哥拉和莫桑比克，在當地做過建築、機械、農業、商務等工作，更曾經幫過莫桑比克總統做翻譯，張辰說：「為總統作翻譯反而比較輕鬆，因為大家都是說些客套話，只有部長級的會議才要翻譯實際內容。」

豐富的工作經驗背後，張辰認為自己在工作上遇到瓶頸：「工作一段時間後，我覺得自己的知識需要再提升，便決定到澳大深造。」張辰認為翻譯是需要經過專門的訓練和具備專業的知識，他舉例說：「澳門有很多懂得中葡雙語的土生葡人，但要當即時傳譯卻不是很多人能做到。師傅領進門，修行在個人，翻譯要靠自己的努力去提升經驗才能越做越好。」



張辰認為翻譯要不斷努力提升才能越做越好
Zhang Chen believes that a translator needs to constantly perfect her skills

The Department of Portuguese at the University of Macau is the largest Portuguese department outside of Portugal and Brazil. As the Macao SAR government attaches more and more importance to producing professionals proficient in both Chinese and Portuguese, the number of students applying to UM's Department of Portuguese is also increasing. Students enrolled in the Department of Portuguese not only have abundant opportunities to practice their translation and interpreting skills; they also enjoy an advantage in career development after graduation. Some alumni from the department have even pursued successful careers in Portuguese-speaking countries.

Translating for the President of Mozambique

In 2016, UM sent 52 undergraduate and postgraduate students who are proficient in Portuguese to assist with translation and guest reception at the Fifth Ministerial Conference of the Forum for Economic and Trade Cooperation Between China and Portuguese-speaking Countries (Macao). The experience provided the students with an opportunity to practice what they learned in the classroom in a real-life setting. Zhang Chen, a student from Beijing who graduated from the Master of Arts Portuguese Language and Culture – Applied Linguistics programme worked as a translator in Brazil after graduation. Apart from Brazil, he has also worked in three other Portuguese-speaking countries, namely Portugal, Angola, and Mozambique, in construction, machinery, agriculture, and business. At one time, he worked as an interpreter for the president of Mozambique. 'Translating for the president was actually easy, because they basically just exchanged pleasantries,' he says. 'Translating for the ministerial conference was a different matter because there were more than pleasantries involved.'

As he gained more and more work experience, Zhang felt he reached a plateau. 'After working for a while, I felt the need to upgrade my knowledge, so I decided to pursue further studies at UM,' he says. Zhang believes that it takes specialised knowledge and professional training to produce a competent translator. 'For example, there are many Macanese in Macao who speak both Chinese and Portuguese, but very few can work as competent simultaneous interpreters. The teacher can impart all the skills, but it's up to the student to perfect those stills. When it comes to translating, you will only get better if you keep improving your skills and gain more experience. '

During the Sino-Portugal forum, Zhang was responsible for receiving the delegation from the Republic of Guinea—Bissau. 'Some members of the

在中葡論壇上，張辰負責幾內亞比索代表團的接待工作，他回憶說：「當時有代表團成員生病，我要幫他們去醫院掛號，畢竟大部分醫生都不懂葡語，要幫病人與醫生作翻譯，這個經驗挺難得。」

課程幫助瞭解自己

葡文系應屆畢業生溫詠珊認為葡語是認識葡語文化的工具，她覺得簡單幾句的翻譯都可以讓她有成功感：「從大一開始，教授就給我們參與葡語活動的機會，例如到葡韻嘉年華、藝墟、採訪葡國人等，從中接觸到葡語文化和跟葡語國家的人溝通。」溫詠珊去年也有參與中葡論壇，負責接待安哥拉的官員，她在課堂上學到的口譯在論壇上大派用場：「因為大部分專業名詞已經學過，今次能讓我從容應付工作。不過有一次一位國內商人拉著我要我幫他與安哥拉官員作翻譯，雖然只是簡單幾句話，不過成就感很大。」

溫詠珊認為葡文系課程雖然沒有專門的翻譯學位，不過課程的設計讓她可以涉獵不同的領域，包括翻譯、教育、文學等，「讓我可以瞭解自己的興趣再去發展事業。」

溫詠珊在中葡論壇負責接待安哥拉的官員
Wan Weng San receives government officials from Angola during the Sino-Portugal forum

張辰曾到過四個葡語國家工作
Zhang Chen has worked in four Portuguese-speaking countries

delegation got sick, so I had to escort them to the hospital and translate for them, because most doctors didn't understand Portuguese. For me, it was a very special experience,' he says.

Well-Designed Courses Help Discover Interests

Wan Weng San, a Class of 2017 graduate from the Department of Portuguese, believes that Portuguese language is a tool which enabled her to learn more about the Portuguese culture. 'Even just translating a few phrases would give me a sense of achievement,' she says. 'We have been given opportunities to participate in Portuguese-language activities since the first year. For example, we have attended the Lusofonia Festival and the Art Fair. We have also interviewed people from Portugal. Through these activities, I had the chance to speak with people from Portuguese-speaking countries and learn more about their cultures.' Wan also attended the Sino-Portugal forum last year. In receiving government officials from the Republic of Angola, her interpreting skills came in handy. 'I had learned most of the technical terms, so I was able to perform the task effortlessly. I remember one businessman from mainland China asking me to interpret for him and a government official from Angola, and I did. Although they only exchanged a few sentences, it still gave me a great sense of achievement.'

Wan says that although the Department of Portuguese does not offer a degree programme in translation studies, the well-designed curriculum still allows her to be exposed to different areas of the language, such as translation, education, and literature. 'This allows me to discover my interests first before deciding which career path I want to follow,' she says.

學葡語帶來成就感

曾於澳門高美士中葡中學任教葡萄牙語十年，現職教育暨青年局語言推廣中心代主任的黃崢志是澳大葡文系首屆畢業生。大學四年，他獲益最大是開拓了思維與眼界，「中學時自己太著重於記憶以至於變得不求甚解，而葡文系不僅著眼於語言學習，還重視開拓學生的視野，老師靈活和開放的教學方式，對自己的思維方式產生很大的影響。」

在中學的時候，黃崢志就讀澳門一所中文學校，沒有學過葡語，而且成績中等，屬於不起眼的學生。進入大學後，在老師和同學的鼓勵和激發下，由零開始努力學習，很快便能跟上課程，「葡語令我的信心大增，畢業後，我也因為葡語的關係，受到上司的賞識和提拔。」

多年葡語教學經驗令黃崢志體會到作為葡語教育工作者的價值和樂趣，「在整整14年葡語學與教的歲月裡，葡語跟我密不可分。葡語帶給我的是自我實現，在學業上和事業上的成就感，更令我體會到只要把一件事情做好就是專家這個道理。」現在他轉職到教育暨青年局語言推廣中心工作，希望以自身的能力，在不同層面上為澳門的葡語推廣做更多的工作。

葡語為黃崢志開拓思維與眼界
Learning Portuguese has broadened Wong Chang Chi's horizons

Sense of Achievement from Learning Portuguese

Wong Chang Chi is among the first cohort of graduates from the Department of Portuguese. He taught Portuguese in the Luso-Chinese Secondary School of Luís Gonzaga Gomes for ten years. Currently, he is the acting director of the Language Promotion Centre under the Education and Youth Affairs Bureau (DSEJ). He feels the greatest gain from his four years at UM is that the experience helped broaden his horizons. 'In middle school, I was too focused on rote learning to truly understand the deep meaning. The Department of Portuguese not only provides language instruction, but also helps broaden the students' horizons. The flexible and open teaching method has had a great influence on my way of thinking,' he says.

Wong studied in a Chinese middle school that did not offer Portuguese courses. It was only after he joined UM that he started to learn Portuguese from scratch. With the encouragement and help of his teachers and fellow students, he quickly caught up with the rest of the class. 'Learning Portuguese has greatly boosted my self-confidence. After I started working, I won approval of my boss and got promoted because of my knowledge of the language.'

With many years of experience in learning and teaching Portuguese, Wong is keenly aware of the value and joy of being a Portuguese language instructor. 'I have spent 14 years learning and teaching Portuguese,' he says. It has become an important part of my life. Portuguese has brought me self-actualisation, a sense of achievement, and the realisation that an expert is simply someone who focuses on doing one thing really well.' Now working in the DSEJ's Language Promotion Centre, he hopes to do more to promote Portuguese in Macao.

Starting a Business in Angola

António Ip graduated from UM in 2009. After graduation, he and his girlfriend (now his wife) both received job offers from a company in Angola. So they decided to pursue a career there. In 2014, four years after their arrival in Angola, Ip opened a restaurant with his friends.

When they first arrived in Angola, the country had just entered a truce, with full-scale reconstruction underway. But this also brought many career opportunities for them. Thanks to their knowledge of Portuguese language, they quickly gained trust from local companies, and successfully built professional experience and networks.

葉進洲認為澳大葡文系學生對環境的適應力較強
António Ip believes UM students are very adaptive to change

安哥拉創業

葉進洲在2009年畢業，畢業後，在一次機緣巧合下，他與同班同學兼女朋友（現在的妻子）獲安哥拉的一間公司聘請，決心到當地開拓事業。工作四年後，他在2014年與朋友合作創業，冀在安哥拉的餐飲界創一番事業。

離開澳門遠赴陌生國度，與葉進洲原本想追求平凡生活的夢想有巨大反差，他說：「我剛到安哥拉時，這個剛停戰的國家到處都是百廢俱興，但也為我和女朋友帶來很多的發展機會。由於熟悉葡語的關係，我倆在當地更能贏得公司信賴，我們還利用自己的語言優勢，不斷積累經驗和人脈。」

葉進洲肯定葡語對其事業發展的幫助，「學葡語是正確的選擇。澳門現時選擇讀葡語的人都是真心想利用葡語的優勢來發展事業。全球以葡語為母語的人數超過兩億，但是精通三門語言的卻很少，因此，這類人才發展空間很大。」

葉進洲說：「澳大葡文系學生的優勢是對環境的適應力較強，大學裡面有很多實習機會，能夠幫助學生更加容易融入工作環境。」他鼓勵學生不妨走出澳門，看看外面的世界。對於未來，他打算在事業穩定之後把澳門的人才帶到安哥拉發展，也會給予學弟妹一些經驗和工作機會。

Ip believes that Portuguese language skills have benefited his career development. 'I made the right decision to study Portuguese,' he says. 'Many people in Macao choose to study Portuguese because they genuinely hope to use their knowledge of the language to take their careers to the next level. Over 200 million people in the world speak Portuguese as their mother tongue, but only a handful are proficient in three languages. This means there is a world of opportunities for people who can speak three languages.'

'UM students are very adaptable to change, which is their advantage,' he says. 'The university offers many internship opportunities to help students adapt to their work environment faster.' He encourages students to travel abroad and see the outside world. He hopes to invite talented people, including current UM students, to join his company after he establishes himself in Angola.

葉進洲於安哥拉開設餐館
António Ip's restaurant in Angola

Working in Market Development in Portuguese-speaking Countries

Yu Cong obtained her bachelor's and master's degrees from the Department of Portuguese. She is currently working in a state-owned electrical power company in Beijing as the Manager and Translator for Portuguese-speaking Countries, and is responsible for market development in those countries. Because of her work, she often needs to meet ambassadors, attachés, and other government officials from Portuguese-speaking countries. 'I feel very lucky that the internship experiences I had while studying at UM helped me quickly adjust to my work environment, and allowed me to effortlessly handle the company's relationships with various stakeholders, including key government officials,' she says. 'When I just graduated from UM, the biggest challenge for me was not about language; the biggest challenge for me was to learn everything about the industry from scratch. That is a lot to learn. And it is what I will be working to improve in the future.'

莫桑比克副外長和莫桑比克駐華大使率團參觀于聰(右二)的公司時，由她擔任中葡翻譯
Yu Cong (2nd from right) translates for Mozambique's vice minister of foreign affairs and cooperation and Mozambique's ambassador to China during their visit to the company

從事葡語國家市場開發工作

于聰在葡文系本科和碩士畢業後，進入北京一家大型電力央企擔任葡語國家國別經理兼翻譯，從事葡語國家市場開發工作，會經常接觸葡語國家的大使參贊及國家政府人員。她說：「很幸運我在澳大讀書期間積累的實習經歷讓自己快速適應工作環境，從容應對各方關係的協調及政府及高端領導間的溝通。剛畢業時，對我來說最大的挑戰就是語言以外，我需要從頭學習這個行業領域的技術和業務知識，那是有一個龐大的知識系統，這也是我今後工作的重點努力方向。」

于聰當年選擇來澳大，主要是看到中葡雙語人才的發展前景，「中國與葡語國家的聯繫越來越緊密，澳門作為橋樑紐帶，舉辦中葡論壇，為國家各個行業的國企和民企帶來更多經濟效益和發展機遇。隨著對葡語國家發展機遇的重視提升，中葡雙語人才隨之迎來更多的機遇和選擇，葡文系畢業的內地生在國內的發展也佔有很強的優勢。葡語讓我既可以結合興趣還可以做許多有意義的事，通過葡語國家，我開始和世界的其他角落有了更多的溝通和聯繫，視野也更加廣闊。」

The main reason Yu chose to study at UM was because she foresaw that people who can speak both Chinese and Portuguese would be in great demand. 'With the ties between China and Portuguese-speaking countries growing increasingly close, Macao as a bridge of communication is bringing more and more economic benefits and opportunities for both state-owned enterprises and private enterprises in different industries,' she says. 'As people become more and more aware of the opportunities in Portuguese-speaking countries, people who are proficient in both Chinese and Portuguese will have even more opportunities and choices. Mainland students who graduate from the Department of Portuguese also enjoy a strong advantage when they return to mainland China for career development. For me personally, Portuguese allows me to do many things that both interest me and are meaningful. Through Portuguese-speaking countries, I am beginning to have more communication and contacts with the other parts of the world, which has broadened my horizons.'

短片：學葡文首選澳大的理由
Video: Why UM Is Our Top Choice for Learning Portuguese

短片：由零開始學葡語
Video: How I Learned Portuguese from Scratch

短片：在安哥拉創業的校友
Video: UM Alumnus Starts a Business in Angola

對東方文化情有獨鍾 專訪葡文系Jorge Cavalheiro

A Westerner's Love Affair with Eastern Cultures Interview with Jorge Cavalheiro from the Department of Portuguese

文 Text｜林祖兒 Judite Lam

圖 Photo｜張愛華，部分由受訪者提供 Ella Cheong, with some provided by the interviewee

昔日澳門新馬路
Avenida de Almeida Ribeiro in the old days

對很多人來說，可能歷史既是乏味又沉悶的學科，但澳門大學人文學院葡文系José Jorge Simões Cavalheiro卻對歷史情有獨鍾。他在澳門生活超過40年，講得一口流利廣東話、見證了澳葡時期、澳門回歸中國主權、旅遊博彩業蓬勃以及近年澳門特區政府大力培育中葡雙語人才的政策。他熱愛東方文化，學廣東話、聽廣東歌、研究道教、儒學、佛學，更非常融入本地生活。回首過去，他對澳門這個小城感觸良多：「我在瞭解澳門歷史文化和中國的過程中，越來越喜歡這座城市。」

從葡國到澳門

在資訊急速發展的年代，人們每日彷彿活在競賽的起跑線上，工作、讀書、進修、消遣充斥人生的每分每秒。可是當你每天展望將來的時候，有否曾思考和認識你的「過去」？Cavalheiro這位長滿白鬍子的葡萄牙人花了大半生鑽研過去的澳門和東方文化，探究歷史與自己的關係，剖析身邊的事物和環境的意義。

History may be a boring subject for many people. But not so for Mr Jorge Cavalheiro from the Department of Portuguese, Faculty of Arts and Humanities, University of Macau. For Cavalheiro, nothing is more fascinating than history. Having lived in Macao for more than 40 years, Cavalheiro speaks fluent Cantonese. Over the past five decades, he has witnessed the major milestones of the city, including the Portuguese rule of Macao, the handover of Macao's sovereignty to China, the rapid development of the tourism and gaming industries, and the Macao SAR government's rigorous efforts to train bilingual professionals proficient in both Chinese and Portuguese. Driven by a love of Eastern cultures, Cavalheiro taught himself to speak Cantonese. He also listens to Cantonese music, studies Taoism, Confucianism, Buddhism, and actively mingles with local people. Looking back, Cavalheiro says, 'The more I know about the history and culture of Macao and China, the more I like this city.'

From Portugal to Macao

In this fast-paced information age, everyone seems to be living their lives as if they are in a never-ending race, with every minute filled by work, study, or hobbies. But when you are busy envisioning the future every day, do you ever pause to understand your past? Cavalheiro certainly does. Indeed, he has spent the better half of his life studying the history of Macao and Eastern cultures in order to understand their relevance to his life.

In the 1960s, Macao was a Portuguese territory, a tranquil, laid-back small town characterised by traditional houses. At the time, Cavalheiro's father migrated to Macao from Portugal with his family because of work. Later, they moved into a government-provided house near Kun Iam Tong (also known as Pou Chai Sim Iun). For the young Cavalheiro who had never before been exposed to Eastern culture, Macao was completely different from Portugal. His heart was bursting with curiosity about everything around him.

Cavalheiro frequented Kun Iam Tong as a teenager because he was fascinated with the traditional Chinese architectural style of the Buddhist temple and the cultural reality inside it. He talked to the monks there and worked hard to learn Cantonese. Gradually he learned the pronunciation and meaning of every item in the temple as well as the religious meanings of the various rituals. Even today, he still visits the temple often to relive his childhood memories. 'The temple still looks the same,' says

1960年代的澳門是葡萄牙的殖民地，是一個佈滿林林總總舊式民房，寧靜悠閒的小城。當時Cavalheiro的父親因工作由葡萄牙遷居澳門，帶同家人一起來到澳門定居，住進位於觀音堂（即普濟禪院）附近由政府提供的住房。對從未接觸過東方文化的Cavalheiro來說，與葡萄牙的生活相比，澳門是一個截然不同的城市，因此，他對身邊各式各樣的事物都充滿著好奇。

Cavalheiro自小在觀音堂出入，經常遊走這富有佛教特色的廟宇，他對觀音堂中國傳統特色的裝潢以及宗教祭祀甚感興趣。為了深究其文化底蘊，他開始跟僧侶們溝通，並努力學習廣東話，慢慢學會每樣物件的讀音和意思。時至今日，他經常到觀音堂，重拾童年回憶，他笑言：「觀音堂仍然保留它原有的風貌，那些祭祀、供奉的觀音菩薩像、石桌都完好無缺。起初我對這些東西一無所知，感到十分陌生。但當瞭解它們背後的故事和史料之後，現在我很熟悉它們。這裡是我長大的地方，現在我們一起慢慢變老了。」

另一個Cavalheiro常去的地方是紅街市，雖然他住在澳大，但他每週還堅持到位於市區的紅街市一趟，除了買東西之外，最重要是探望少年時的老朋友。他會用流利的廣東話跟他們打招呼、寒暄。因為懂廣東話，令這位擁有西方面孔的葡萄牙人順利成章融入了澳門社會。

專注中西文化研究

儘管Cavalheiro在澳門完成中學後回葡萄牙升讀大學，但他對澳門車水馬龍的橫街小巷，售賣地道小食的特色店舖念念不忘。1984年，Cavalheiro重新踏足澳門這遍土地，驚覺澳門的轉變遠超他所想。他說：「澳門的變化比我想像中大，因為經濟的急速發展，導致很多舊式店舖關閉，我感到很可惜。事實上，澳門有它獨有的特色，但由於現今社會趨向全球化，所以現在澳門整體的生活與其他地方差異不大。」

Cavalheiro. 'The stone table and the statues of Kun Iam, buddhas and bodhisattvas are still perfectly intact. At first I knew nothing about these things, so they didn't mean anything to me, but after I learned the stories behind them, I felt I knew them well. This is where I grew up, and now we are growing old together.'

The Red Market is another place frequented by Cavalheiro. Although he lives on the UM campus, he visits the Red Market every week to do grocery shopping and visit childhood friends. He would chat with his old friends in fluent Cantonese, the mastery of which has helped him integrate into Macao society.

An Avid Learner of Eastern and Western Cultures

After graduating from high school in Macao, Cavalheiro returned to Portugal to pursue higher education. But he often thought of the busy streets and alleys in Macao as well as the eateries selling authentic local foods. In 1984, he returned to Macao, only to find that the city had changed beyond recognition. 'The changes that occurred in the city during my absence were far greater than I had imagined. Many old shops were forced out of business as a result of the rapid economic growth, which was a shame,' says Cavalheiro. 'Actually, Macao has its unique characteristics, but amid the trend towards globalisation, the way of life in Macao is now not much different than that in other parts of the world.'

觀音堂是Cavalheiro經常到的地方
Cavalheiro has been a frequent visitor to Kun Iam Tong since childhood

Cavalheiro珍藏不少澳門歷史資料
Cavalheiro has many precious historical records about Macao

為了維護澳門本土的獨有文化特色，他開始專攻澳門歷史、中國歷史、中國文化、中國哲學、葡語、葡萄牙文化等。在澳大的學術氛圍下，助長他研讀澳門歷史和中國文化，出版了多份關於澳門演變的中西文化史以及澳葡教育文化的文章，當中也探討葡語在澳門政府公務上所扮演的角色和推動葡語教學的重要性。

知往鑑今護本土文化

在澳葡時代，來自西方國家的外國人被澳門得天獨厚的地理位置所吸引，紛紛來澳定居，造就澳門中西文化交融的局面。隨著澳門回歸中國，葡萄牙人和土生葡人陸續離開澳門，賭權開放，旅遊業興起，Cavalheiro說：「澳門給旅客印象多以賭城為主，但其實澳門有很多獨有的文化景觀值得去探尋。作為澳門的一分子，我認為有必要去維護澳門的文化遺產，包括建築、傳統習俗、宗教禮儀、商店等等，因為這些文化遺產有其代表性，象徵著澳門獨一無二的文化特徵。」

To preserve the unique cultural characteristics of Macao, Cavalheiro began to study the history of Macao; the history, culture, and philosophy of China; as well as the language and culture of Portugal. He has published some articles on the above subjects. Some of them discuss the role of the Portuguese language in Macao government affairs and the importance of promoting Portuguese language education.

Preserving Local Culture

During the Portuguese period of Macao, many foreigners from the West migrated to Macao for its advantageous geographic location. The influx of Western immigrants eventually turned the city into a melting pot of Eastern and Western cultures. After the handover of the sovereignty over Macao to China, many Portuguese and Macanese in Macao left the city. Later, the gambling monopoly was ended, and the tourism industry began to take off. 'Tourists mostly think of Macao as a gambling city, but actually there are many unique cultural landscapes in Macao that are worth visiting,' says Cavalheiro. 'As a Macao resident, I think it's important to preserve the cultural heritage of Macao, including old buildings, traditional customs, religious etiquette, and old shops, because these are the unique cultural symbols of Macao and they are what make Macao different.'

澳門昔日街景
A photo of old Macao

三輪車是從前澳門人最常用的交通工具
Rickshaws used to be the most common means of transport for Macao residents

懂葡語助瞭解澳門歷史

由於澳門的中葡文化歷史因素，澳門作為中國與葡語系國家的橋樑有明顯的優勢。除了與葡萄牙建立長年的合作關係外，澳門早與葡語系國家有廣泛和密切的聯繫，例如在貿易、經濟、金融、商業、旅遊等方面都扮演著重要的角色。Cavalheiro認為學生們懂葡語除了有助瞭解澳門的歷史之外，還可以推動中國與葡語國家的發展，拓闊國際視野。他說：「學生修讀葡語不僅只局限去認識葡萄牙文化，還能去到其他葡語系國家如巴西、安哥拉、莫桑比克等地發展。澳大現在開辦更多語言的翻譯課程，經過嚴格挑選的師資隊伍以及教程資源的提升，相信能令學生們盡展所學。」

Knowledge of Portuguese Language Aids Understanding of Macao's History

Because of Macao's historical connection to Portugal, it enjoys an unparalleled advantage in fulfilling the role as a 'bridge' between China and Portuguese-speaking countries. Besides Portugal, Macao has long-standing relations with other Portuguese-speaking countries as well and plays an important role in the areas of trade, economy, finance, commerce, and tourism. Cavalheiro believes that knowledge of the Portuguese language not only can help students better understand the history of Macao; it can also promote the development of collaboration between China and Portuguese-speaking countries. 'Students who understand Portuguese not only can learn more about Portuguese culture; they can also explore opportunities in other Portuguese countries such as Brazil, the Republic of Angola, and Mozambique,' he says. 'UM now offers translation courses in a greater variety of languages, taught by a select faculty. This, and the constantly improving teaching resources, will certainly help students achieve their full potential.'

為了推動澳葡兩地的發展，澳門特區政府近年在規劃中制訂葡語專業人才培訓計劃，進一步培養葡語專業人才。Cavalheiro喜見葡語在澳門越來越受重視，他說：「葡語是中葡關係發展的重要溝通媒介，特別是想要瞭解澳門歷史，對認識澳門過去的史料有很大的幫助，因為以前很多文獻和法律都以葡語為主，所以懂葡語能追溯城裡早已被遺忘的人、事、物。」

澳大葡文系擁有文化背景多元的教師團隊，在雄厚的師資力量配合下，將開辦更多完善的中葡雙語課程，讓學生能鞏固中葡語言基礎及得到全面發展。Cavalheiro認為，澳門具有學習葡語的良好環境，透過課程，澳大將培育更多中葡雙語專才。畢業後，學生能拓展多項中葡合作領域，立足澳門，將視野拓展到海外，促進中國與葡語系國家的多元發展。

To promote the joint development of Macao and Portugal, the Macao SAR government formulated a plan for training Portuguese language professionals. Cavalheiro is pleased to see that the Portuguese language is receiving more and more importance in Macao. 'The Portuguese language is an important medium of communication in the development of the Sino-Portugal relations. It is very helpful for understanding Macao's history, because much historical literature and many laws were mainly written in Portuguese. Knowledge of the language can help rediscover people, events, and objects from the past that have long been forgotten.'

With a culturally diverse faculty team, the Department of Portuguese is planning to open more bilingual courses in the future to help students improve their Chinese and Portuguese language skills and to achieve well-rounded development. Cavalheiro believes that Macao has a good language learning environment for Portuguese learners, and through these courses UM will be able to produce more bilingual professionals proficient in Chinese and Portuguese. After graduation, students can explore different areas of collaboration to promote the joint development of China and Portuguese-speaking countries.

Cavalheiro 教學認真受學生歡迎
Cavalheiro is a dedicated teacher and is much liked by his students

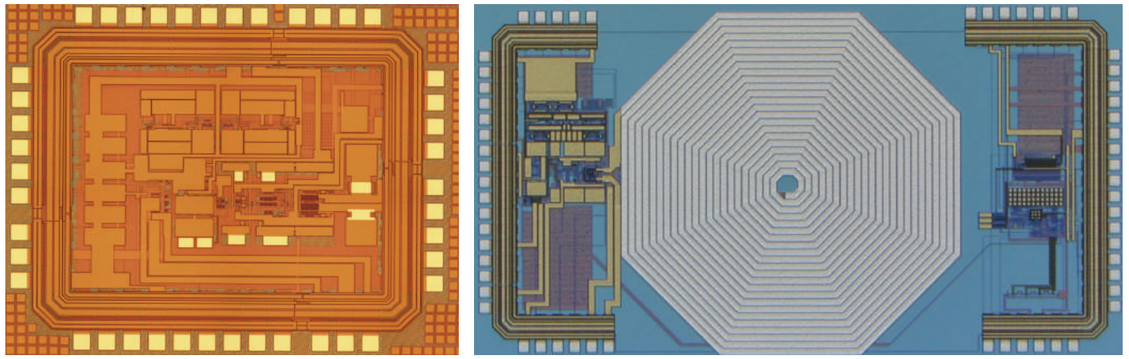
短片：Jorge Cavalheiro — 走出去回看澳門
Video：Looking Back at Macao – An Interview with Jorge Cavalheiro

獲哈佛大學青睞
澳大濠江學者李家明博士

Visiting Scholar at Harvard:
UM's Macao Fellow Dr Lei Ka Meng

文 Text｜庄瑜婷、資深校園記者蟻俊龍 Cravina Chong, Senior UM Reporter John Ngai

圖 Photo｜譚金榮、張愛華、部分由受訪者提供 Eric Tam, Ella Cheong, with some provided by the interviewee



澳大芯片技術處世界前沿
UM is now a world leader in the field of chip technologies

在澳門土生土長的李家明博士在澳門大學完成電機及電子工程學士以及電機及電腦工程博士學位，並憑出色的科研成就獲聘為澳大濠江學者。今年獲邀到哈佛大學擔任訪問學者，在研究路上加以精進，冀以研究成果貢獻世界、回饋澳門社會及母校的栽培。

Dr Lei Ka Meng, who was born and raised in Macao, obtained a bachelor's degree in electrical and electronics engineering and a PhD degree in electrical and computer engineering from the University of Macau (UM). Because of his outstanding research achievements, Dr Lei was recruited by UM as a Macao Fellow after graduation. This year he has been invited by Harvard University to be a visiting scholar.

大二立志從事科研

李家明博士2012年在澳大獲得電機及電子工程學士學位，同時是澳大榮譽學院（HC）的首屆畢業生。由於他在研究方面的出色表現，他於本科畢業後直接獲澳大錄取為博士研究生。

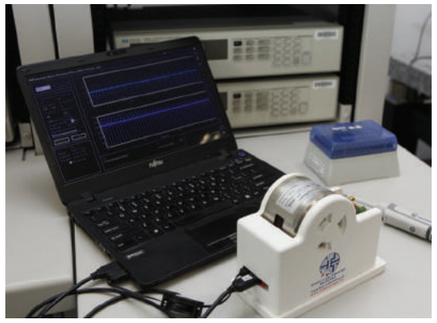
澳大嶄新的教學模式對李博士的研究起了很大作用。作為首屆HC畢業生，他表示HC所提供的「榮譽生研究經驗建立計劃」讓他及早為以後的研究生涯定下目標和計劃。此計劃給予HC學生一個跟隨所屬學院的教授從事研究工作的機會，李家明在裡面參與了「模擬與混合信號超大規模集成電路國家重點實驗室」的頂尖研究項目，為他在科研路上打下了堅實的知識基礎和累積了寶貴的經驗。

「在大二時有幸能參與重大研究項目，發現將微電子的技術應用在生物研究上還有很大發展空間，於是決定以此方向發展。那一年可說是我人生的轉捩點。雖然研究不時會遇上挫折，

Deciding to Become a Researcher in Sophomore Year

Dr Lei received his bachelor's degree in electrical and electronics engineering from UM in 2012. He was also among the first cohort to graduate from the UM Honours College (HC). Because of his outstanding performance in research, he was admitted to the university for PhD studies directly after graduation.

Dr Lei has benefited greatly from the university's new educational model. As one of the first graduates of the HC, he says that an HC programme which is designed to help students gain research experience encouraged him to set his career goals. The programme provides each student with the opportunity to conduct research under the guidance of a professor from his or her faculty. Through this programme, Dr Lei was able to participate in some of the best research projects of UM's State Key Laboratory of Analog and Mixed-Signal VLSI (AMS-VLSI Lab). These projects helped him develop a solid foundation in scientific research and allowed him to gain hands-on experience that would later prove invaluable.



用於定點診斷的CMOS核磁共振系統，大大降低傳統生物檢測的成本和時間。
A CMOS nuclear magnetic resonance system for point-of-care diagnosis can significantly reduce the cost and time of traditional biological diagnostic tests

更要經常通宵達旦去完成研究項目，但我很享受當中的過程。當你見到自己的研究成果被認同時，那種喜悅是言語無法形容的。」

研究降檢測成本時間

李博士現正研究的「先進微流體及集成電路技術的並行核磁共振平台」能大大提升核磁共振實驗的操作效率和成效，並廣泛應用到生物檢測技術，例如用在血液和蛋白質的分析檢測，並能大大降低傳統生物檢測的成本和時間。他解釋說：「市面上的檢測方法一般需要一些大型的儀器，並且涉及到大量人手和時間，有了這項核磁共振技術後，將儀器的體積大幅縮小，成本從五、六十萬澳門元降低到三、四萬澳門元。而且不一定在大醫院，即使是較偏遠或落後地區的小型診所也能負擔得起，希望此技術能普及至世界各地。」

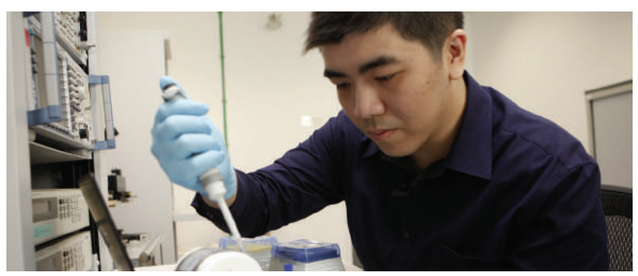
剛巧哈佛大學也正進行一項相似的研究，李博士因而受到哈佛的青睞，獲邀於今年下半年到哈佛擔任訪問學者，為期兩年。被問到今次要到世界頂尖的大學做研究會否很緊張，他鎮定表示不會緊張，「多年來在澳大的歷練和高水平的科研使我保持正面的心態面對這些機會和挑戰，唯獨要多準備，多看相關研究的文獻。」

Dr Lei says he was very fortunate to have the opportunity to participate in important research projects during his sophomore year at UM. Through those projects he realised there was enormous untapped potential in applying microelectronics technology to biological research, which ultimately led to his decision to pursue a career in this field. 'That year was a turning point in my life,' says Dr Lei. 'Although I encountered many challenges in research and often had to work all night to complete those projects, I enjoyed the process very much. No words can describe how happy I am to learn that my research findings are recognised by others.'

Research to Lower Cost and Time of Diagnostic Tests

Dr Lei is currently working on his research project, a parallel nuclear magnetic resonance (NMR) platform combining advanced microfluidic, magnetic-sensing and integrated circuits technologies, which can significantly increase the efficiency and effectiveness of NMR experiments. The technologies can be applied to biological diagnostic tests, such as blood and protein tests. They can effectively reduce the cost and time of traditional diagnostic tests. 'The current diagnostic tests usually require the use of large devices and a lot of manpower and time. With the NMR technique, we no longer need to use large devices for diagnostic tests and can bring down the cost from between MOP 500,000 and MOP 600,000 to between MOP 30,000 and MOP 40,000,' he says. 'In addition, this technique allows diagnostic tests to be done outside hospitals. Even clinics in remote and backward regions can afford it. I hope this technique will be promoted to all parts of the world.'

It so happens that some researchers at Harvard University are conducting a similar project. Learning of Dr Lei's research, Harvard invited Dr Lei to be a visiting scholar for a two-year term, starting from the second half of 2017. When asked whether he is nervous about conducting research at a world-class university, Dr Lei says he feels very calm. ' I have learned how to maintain a positive attitude towards opportunities and challenges after many years of experience conducting high-quality research at UM,' he says. 'I will read more related research documents to prepare myself for it.'



李家明博士的研究能大大降低傳統生物檢測的成本和時間
Dr Lei Ka Meng's research can help to significantly reduce the cost and time of traditional biological diagnostic tests

澳門大學模擬與混合信號超大規模集成電路國家重點實驗室師生於美國三藩市舉行的國際電機電子工程師學會（IEEE）第64屆國際固態電路研討會（ISSCC）發表研究成果。今年澳大共有六篇論文被會議接納，為論文數量發表最多的頂尖大學之一，反映澳大近年在亞洲地區微電子領域中之領先地位。
Faculty members and students from the AMS-VLSI Lab present their research findings at the 64th IEEE International Solid-State Circuits Conference held in San Francisco, United States. Six papers from UM were accepted at this year's conference, placing the university among the institutions with the most papers presented at the event. This shows international recognition of UM's leading position in the field in Asia.

研究獲國際肯定

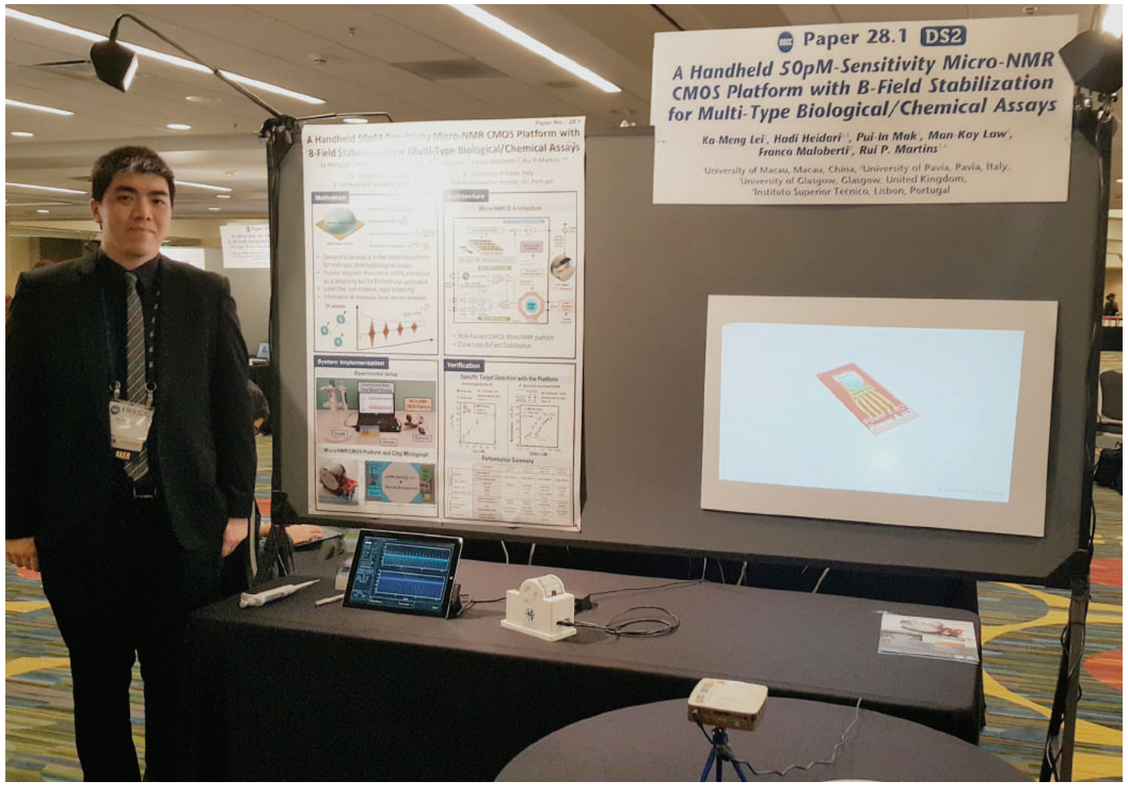
今年2月，李博士獲國際電機電子工程師學會（IEEE）固態電路學會頒發「博士生成就獎」，該獎項頒發給固態電路領域的傑出研究生。他將在其博士論文的基礎上完成一本研究書籍，將由國際科學技術界最大出版社Springer出版並於今年發表。

李博士出色的研究能力在本科時已獲得業界認同。他本科時的其中一項研究成果在SCI期刊發表，另一篇論文則在2013年亞洲高質量電子設計研討會上獲最佳論文獎。在攻讀博士期間，他主力研究用於定點診斷的CMOS核磁共振系統，這是一個新的跨學科研究領域，為通過手提設備對生物目標進行智能偵測提供了可能，研發成果分別獲知名期刊《IEEE 固態電路期刊》、《Lab on a Chip》、《Analyst》和IEEE國際固態電路研討會、IEEE 亞洲固態電路研討會以及國際化學與生命科學之微型系統會議發表。

Gaining International Recognition

In February 2017, Dr Lei received the prestigious Predoctoral Achievement Award from the Solid-State Circuits Society of the Institute of Electrical and Electronics Engineers (IEEE), which is given to outstanding postgraduate students in the field of solid-state circuits. Lei's PhD thesis will be expanded into a research book to be published in 2017 by Springer, the world's largest science publisher.

Dr Lei's research capacity has been recognised since he was an undergraduate student. One of his research projects during that time led to a paper published by an SCI-indexed journal. Another of his papers received the Best Paper Award at the Asia Symposium on Quality Electronic Design 2013. During his PhD studies, Dr Lei focused on a new multi-disciplinary direction, a CMOS NMR system for point-of-care diagnosis, which makes possible intelligent detection of biological targets on a handheld platform. The related findings have been published in well-known journals, namely *IEEE Journal of Solid-State Circuits*, *Lab on a Chip*, and *Analyst*, as well as presented at the IEEE International Solid-State Circuits Conference (ISSCC), IEEE Asian Solid-State Circuits Conference (ASSCC), and the International Conference on Miniaturised Systems for Chemistry and Life Sciences.



李家明博士在IEEE固態電路學會現場展示其研究成果
Dr Lei Ka Meng presents his research results at the IEEE International Solid-State Circuits Conference

2015年11月舉行的IEEE亞洲固態電路研討會上，李家明發表了一篇論文，並在學生設計比賽單元展示其作品並獲傑出設計獎，之後，他獲邀將論文向《IEEE固態電路期刊》特刊投稿。2016年2月，他在IEEE國際固態電路研討會(ISSCC)上發表了與帕維亞大學學者共同研發的成果，並獲得絲綢之路獎，該獎項專門頒發給亞洲、澳洲及太平洋地區的傑出學生。此外該成果還獲選在會議上進行現場展示，這是首次有來自內地、香港和澳門地區的成果在該會議上獲現場展示，相關的論文獲選為會議的「技術熱點」之一。由於他在會議上的傑出表現，獲邀向《IEEE固態電路期刊》全文投稿。

In November 2015, Dr Lei presented a paper at the IEEE ASSCC. He also demonstrated his work in the Student Design Contest and received the Distinguished Design Award. Subsequently, he was invited to submit his work to a special issue of the *IEEE Journal of Solid-State Circuits* (JSSC). In February 2016, Dr Lei presented work developed with collaborators from the University of Pavia, Italy, at the IEEE ISSCC and received the ISSCC Silkroad Award, which is given to outstanding students from Asia, Australia, and the Pacific region. In addition, this work was selected for live demonstration during the conference. It was the first time that a work from Macao, Hong Kong, or mainland China had been selected for live demonstration at the ISSCC. The related paper was also selected as one of the ISSCC Technical Highlights of the conference. Because of his excellent performance at the conference, Dr Lei was later invited to submit a full-length paper to a special issue of the JSSC.

感恩澳大豐富資源

如果校園是大學的「大樓」和基石，那麼老師就是大學的「大師」和靈魂所在。李博士在本科時就認識到他的啟蒙老師、微電子專家麥沛然教授，「他是我的良師益友，一直引導著我的成長，他對研究的那份專注和熱誠也一直感染著我。另外我很欣賞他會與學生一起去解決問題，即使犧牲很多休息時間也在所不計。」

澳大在科研和學術研究上也投入了豐富的資源，對投身研究的學生給予了巨大的支持。李博士表示，「在讀博士期間並沒有做過任何全職或兼職工作。有澳大的研究資助和獎學金令我能夠專注於研究工作。」他補充，澳大予以每位從事學術研究學生一份大致相當於全職收入之資助，因此他不用擔心經濟上的壓力。

澳大科研大樓為從事研究的師生們提供了完善和高水準的硬件設備。在軟件上，澳大亦設立了濠江學者計劃，鼓勵並培養本地有潛質的年輕學者從事學術研究和科研工作，給予資助以支持他們發展學術事業。李博士也是因為得到了計劃的支持才得以前往哈佛。他說：「在哈佛完成研究工作後希望回澳大從事教職。始終我在澳門出生、長大，家人朋友都在澳門。我希望將來能夠發表更多出色的論文，在研究上有更好的成果，以報答澳大對我一直以來的悉心栽培。」

Grateful to UM for Abundant Resources

If the foundation of a university is its campus, then the soul of a university must be its faculty members. Dr Lei met his mentor, Prof Mak Pui In, when he was an undergraduate student. 'Prof Mak is not only my teacher; he is also my friend. He has been guiding me since the beginning. His dedication to research and his passion have had a great influence on me,' says Dr Lei. 'He is willing to spend a lot of his personal time solving problems together with his students. I admire him for that.'

UM devotes considerable resources to research and provides great support for student researchers. 'When I was a PhD student, I did not have a full-time or part-time job,' says Dr Lei. 'UM's research funding and scholarships allowed me to focus on research.' He adds that UM provides students who are involved in research activities with financial support equal to the salary of a full-time job, in order to spare them financial worries.

In addition to providing state-of-the-art research facilities for faculty members and students, UM has also launched the Macao Fellow Programme to encourage talented young scholars from Macao to participate in research. Participants in the programme will receive sponsorship to develop their academic careers. Dr Lei's research activity at Harvard is supported by the programme. 'I hope to return to UM to teach after completing my research at Harvard, because I was born and raised in Macao and my family and friends are all here,' he says. 'I hope to publish more papers and achieve better results in research as my way of repaying UM.'

李家明博士獲IEEE固態電路學會頒予「博士生成就獎」後，與恩師麥沛然教授（右）及副校長（研究）馬許願教授合照。
A photo of Dr Lei Ka Meng with Prof Mak Pui In (right) and Vice Rector (Research) Prof Rui Martins after Dr Lei received the Predoctoral Achievement Award from the IEEE Solid-State Circuits Society

短片：澳大濠江學者參與哈佛研究
Video: UM's Macao Scholar Participates in Harvard Research

澳大博士生赴牛津研究伊波拉病毒

UM Doctoral Student's Ebola Drug Design Project at Oxford

文 English text｜余偉業 Kelvin U　　中文翻譯 Chinese Translation｜蘇恩霆 Anthony Sou

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圖 Photo｜蔡俊祥、部分由受訪者提供 Hasen Cai, with some provided by the interviewee

伊波拉病毒自2014年在西非爆發以來，已造成10,000人死亡。澳門大學科技學院博士研究生Faraz Mohammadali Shaikh在英國牛津大學人類基因學威爾康信託中心（WTCHG）實習期間，研發出可以令伊波拉病毒失去穩定性的化合物。Shaikh說：「可以參與該研究項目，研發藥物終結伊波拉病毒傳染，我覺得很有意義。」

與牛津研究團隊合作

為期六個月的實習，Shaikh參與了伊波拉病毒藥物設計項目。該項目由牛津大學結構生物學分部主任David Stuart教授負責。該世界級研究小組一直專注於研究不同大小的病毒其結構與功能之間關係的複雜問題，通過創新實驗和計算技術去解決病毒受體的相互作用和病毒組裝的難題。

Shaikh研究針對伊波拉病毒藥物設計的計算方法，通過計算機模擬和基於片段的分子對接，探討原子層面的病毒活動，尤其是病毒如何進入宿主細胞，同時研究能有效抑制病毒附著和細胞膜融合的方法。研究目的是找到有希望研發成針對伊波拉病毒藥物的化合物。

驚人的學習成果

伊波拉是一種致命病毒，會引起嚴重的病毒出血熱，致死率極高。在四個月內，Shaikh參與的研究團隊通過電腦分析對九百萬種化合物進行篩選，希望找到能與伊波拉病毒結合從而使其失去穩定性的化合物。「我在牛津大學的時間不多，所以必須分秒必爭。我們找到一些能和伊波拉病毒結合的化合物。我列表裡的四種化合物被牛津購買，令我覺得很驕傲也很高興。每種化合物的成本各不相同。所有化合物的總成本大概是一千美金。」

Shaikh在牛津取得的成果遠遠超出其想像。一開始，Shaikh只想看看牛津研究團隊是如何開展研究工作的。後來他自己的研究工作進展的很順利，而且從中獲得一個新發現。「我們還確定了和伊波拉病毒醣蛋白結合的化合物的晶體結構。

The outbreak of Ebola in West Africa has claimed more than 10,000 lives since 2014. Faraz Mohammadali Shaikh, a doctoral student from the University of Macau (UM) Faculty of Science and Technology (FST), has developed compounds that destabilise Ebola during his recent internship at the Wellcome Trust Centre for Human Genetics (WTCHG), University of Oxford, United Kingdom. 'It's motivating to be part of the project and chart a path to end this epidemic,' he says.

Work with Oxford Research Group

During his six-month internship, Shaikh participated in a drug design project against the Ebola virus. This project was headed by Prof David Stuart, director of Oxford's Division of Structural Biology. The world-class research group at the division is focused on using innovative experimental and computational techniques to solve the complex problems of structure-function relationship of viruses of different sizes, as well as the puzzles of virus-receptor interactions and virus assembly.

Shaikh's job was to work on the computational methods for designing drugs against Ebola. He used computer simulations and fragment-based molecular docking to explore viral activity – in particular how the virus enters the host cell – at the atomic level, and to investigate ways to effectively inhibit virus attachment and membrane fusion. The goal of this research project is to identify chemical entities as potential candidates for developing drugs against Ebola.

Stunning Learning Outcome

Ebola is a highly virulent pathogen which can cause a severe haemorrhagic fever with a high death rate. In four months, the research group scanned 9 million compounds through computational analysis in order to obtain compounds that

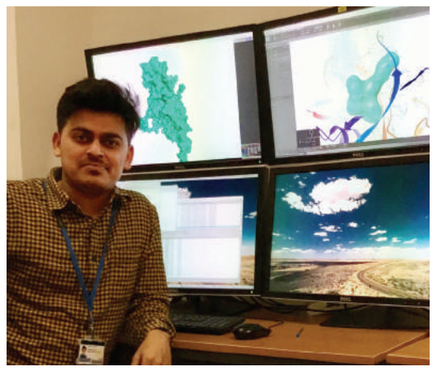
Shaikh在英國牛津大學人類基因學威爾康信託中心進行實習
Shaikh does his internship at WTCHG

Shaikh與導師蕭詠然教授
Shaikh and his PhD supervisor Siu Weng In

使伊波拉病毒醣蛋白失去穩定性會導致病毒無法繼續在細胞內複製。降低醣蛋白的穩定性可以防止病毒與核內體膜融合。目前我們正在整理相關研究成果，預期將於一些具有影響力的期刊上發表。我們會繼續研究，直到研發出針對伊波拉病毒的藥物。」

牛津之路

問及如何獲得在牛津大學實習的機會，Shaikh表示，這不是一場競賽。他與Stuarts教授和Yvonne Jones教授共同參加了面試。「面試持續了大概30分鐘，問題與我之前的經驗和計算機藥物設計技能有關。一切都進行得很順利。」



Shaikh參與針對伊波拉病毒的藥物設計
Shaikh works on his Ebola drug design project at Oxford

can bind to Ebola and destabilise Ebola in thermos-stability assay. 'I didn't have much time at Oxford and the clock was ticking, so I proceeded everything in one shot. We've got some compounds that work. And I'm so proud and thrilled that four compounds from my list were purchased by Oxford from the same private company. The cost of each compound differs. All compounds cost around 1,000 USD in total,' says Shaikh.

What Shaikh achieved at Oxford far exceeded his expectations. In the beginning, Shaikh just wanted to see how the Oxford research group executed their work. Then he performed his task very well and contributed to a new discovery. 'We have also got the Crystallography structure of compound bound to Ebola glycoprotein,' he says. Decreasing the stability of GP the inhibitor could prevent the fusion of the virus with endosomal membranes. We are currently finalising the results and will publish a paper in some good impact journals for this collaboration between UM and Oxford. We will keep working on Ebola until we get something.'

Way to Oxford

As to how to get accepted by Oxford, Shaikh hints that it is not about competition. He attended an interview with Prof Stuarts and Prof Yvonne Jones. 'It lasted about 30 minutes, with questions related to my previous experience and computational drug design skills, and that is it. Fortunately, things went smoothly,' Shaikh says.

Solid Research Experience at UM

Shaikh attributes the internship to his PhD supervisor Siu Weng In, an assistant professor from the Faculty of Science and Technology. 'It is Prof Siu

澳大紮實的研究訓練

Shaikh表示能獲得牛津實習機會，全靠其導師、科技學院助理教授蕭詠然。「因為蕭教授，我才能去牛津實習。她給了我很多寶貴的意見，對我的學習和生活都很有幫助。無論我身在何處，她都給予悉心指導。」此外，蕭教授的計算生物學的背景也令他受益匪淺。蕭教授在德國薩爾蘭大學獲得博士學位後加入澳大，帶領一個生物資訊學的研究團隊。「她工作和上課的方式都讓我深受啟發。每一天和研究團隊一起工作，讓我離自己的目標越來越近。」

Shaikh承認任何教授送學生去其他地方學習超過半年的時間都是一件挺冒險的事情。「因這會導致她原先計劃和我一起進行的研究項目無法如期完成。但是，蕭教授很樂觀，對我在牛津的研究工作也一直很支持。」或許，正是這樣充滿啟發和人性化的學術氛圍令Shaikh能夠保持熱情，不斷超越自我。「蕭教授經常鼓勵我多接受挑戰，她在算法和分子對接領域的專業知識讓我在澳大的第一年獲得很紮實的訓練。這些都對我在牛津的研究工作有很大影響。沒有蕭教授，這一切都不可能發生。」

與澳大一起成長

之前當Shaikh思考是否要修讀博士學位的時候，他正處於人生的十字路口。他面臨的選擇很多。最終，他決定留在澳大學習，因為他覺得澳大是一所發展很快的大學。他喜歡和一個新團隊從頭做起，「我不想半路加入一個成熟的團隊。我喜歡和團隊其他成員共同成長。我將把在牛津學到的東西應用到我在澳大的工作中。」

「澳大對每個學生的能力做了全面分析，我們有很多機會將自己的想法付諸實施。而且，只要項目運作順利，就會獲得大學的大力支持和豐富資源。這些都令澳大成為一個發展迅速的大學。在短短一年半時間內，我親眼目睹了大學的進步。如果將來有機會，我希望可以在澳大從事結構生物資訊學的研究。”

who bridged me there. She has given me a lot of constructive advice that has benefited both my life and my studies. She has been guiding me no matter where I am,' says Shaikh. Also, Prof Siu's strong background in computational biology often benefits him. After obtaining her PhD degree from Saarland University in Germany, Prof Siu joined UM and has since led a research group in bioinformatics. 'The way she works and instructs inspires me. Each new day working with the group takes me one step closer to my goal – improvise something that matters.'

Shaikh admits that it is quite risky for professors to send their students abroad for more than half a year. 'That might delay the research project she has planned with me. And yet, Prof Siu is optimistic, supportive and contented with whatever I work on in the lab there.' Probably, thanks to such an inspirational and friendly ambience at UM, Shaikh has been able to maintain his enthusiasm and exceed his own expectations. 'Prof Siu often encourages me to take more challenges and her expertise in algorithm and molecular docking offers me a very solid training in the first year at UM. And that has had a great impact on my research visit to Oxford. Without my professor, it would not have happened,' he says.

Grow with UM

Shaikh was at a crossroads in his life when he considered studying for a doctoral degree. Choices were many. In the end, Shaikh decided to study at UM as he sees UM as a growing university. He prefers to be with the team where he needs to do a lot of setup tasks. 'I don't want to work for a well-established group. I want to progress with the team. I'll apply what I have learned from Oxford to my work here.'

'UM has made a comprehensive analysis of the capability of each student. We are always given the opportunity to execute whatever projects we have in mind. Also, we'd gain a lot of support and resources from UM as long as the project runs well. That actually makes UM a fast-growing university,' says Shaikh. 'In just one and a half years, I've seen a lot of progress achieved here. Should the opportunity arise, I hope to be part of UM in the future for any projects on structural bioinformatics.'

短片：澳大學生到牛津參與伊波拉病毒研究
Video: UM Student Joins Drug Design Project Against Ebola at Oxford

尋找被遺忘的角落

校友鄧國豪眼中的澳門

Searching for Overlooked Landscapes

Macao Through the Eyes of UM Alumnus Tang Kuok Hou

文 Text｜張愛華、校園記者歐陽嘉韻 Ella Cheong, Laraine Ao Ieong

圖 Photo｜張愛華、部分由受訪者提供 Ella Cheong, with some provided by the interviewee

畢業於澳門大學社會學系的本地藝術家鄧國豪，他作品的主題多以觀察社會角度尋找大家未被發掘的有趣事物，如人造光源、生活互動變化等，他說這都是因為大學四年在社會學和人類學方面的教育中得到的靈感和啟發。大約一年前，不想過朝九晚五工作的他毅然辭職，走上全職藝術家之路，他笑說：「前路雖然難行，但也想趁年輕去做自己想做的事。」

Tang Kuok Hou is a local artist and an alumnus of the University of Macau's Department of Social Sciences. His works mainly deal with interesting but offbeat subjects such as artificial light sources, which he says are inspired by his education in sociology and anthropology. About a year ago, tired of his nine-to-five lifestyle, he quit his job and became a full-time artist. Asked what prompted him to make that decision, he says, 'I knew the road ahead was not going to be easy, but I just wanted to do what I was passionate about while I was still young.'

反思人與自然的關係

鄧國豪現時的工作室位於澳門藝術花園的大樓內，這裡屬於澳門第一座專為澳門藝術創作而設的藝術創作與展銷大樓，已吸引了50多位本地藝術家駐場，鄧國豪是其中少數以全職創作為主的駐場藝術家。他的工作室面積不到100平方呎，他說空間雖少，但卻無礙他的創作，因為他的創作空間是在整個社會。

Rethink Human-Nature Relationship

Tang's current studio is located in Macao Art Garden, the city's first venue dedicated to local artistic creation and exhibition. So far nearly 50 artists have established studios there, and Tang is one of the few full-time artists among them. Tang's studio is less than 100 square feet, but he says it does not hinder his creative process, because the entire society actually serves as his studio.

澳門高中畢業後，鄧國豪考入台灣銘傳大學數位媒體設計系，在台灣的兩年逐漸覺得設計不是他最終想做的工作，於是返回澳門並考入澳大社會學系。他坦言社會學的課程令他能以不同的角度看待社會，亦對社會的可能性有更多的想像，「從大學開始，我開始對生活提問，思考人與社會之間有甚麼關係？」

過去幾年，鄧國豪一直以人造自然景觀為創作題材，「景觀本來是為人而創造，但如果被創造的空間沒有和人產生互動的時候，我就會開始思考空間原本的意義。」通過日常的觀察，他留意到城市的環境其實是人造自然景觀的一種，也是人「馴化」自然環境所產生出來的結果。「例如正常的光合作用是早上才會進行，但連晚上也會進行的就只有城市。但我們不能因此認為光害就是完全的破壞，如果晚上沒有燈光照亮城市而維持運作，城市的生活機能就會停頓。」

他說：「社會學教會了我們用批判的角度思考，但同時也要用一個中立的角度去解釋事物依然存在社會上的原因。」他的一系列作品，包括《馴化》、《連》等，將其在社會學中習得的理論，如關於城區的發展、對社區的想像，以視覺化呈現出來。「在澳門當中專注於地景拍攝的人並不多，因此本地觀眾對此類題材會比較陌生，而目前收藏我的作品大多數都是外國人比較多。」

攝影作品《馴化》
Tang's work *Acclimation*

攝影作品《連》
Tang's work *Line*

After graduation from high school, Tang was admitted to the Department of Digital Media Design at Ming Chuan University in Taiwan. But after spending two years in Taiwan, he realised that design was not a career path he wanted to follow. So he returned to Macao to pursue a degree in the Department of Sociology at UM. The programme in sociology taught him to look at society from different perspectives and prompted new ideas about how he might depict society with his camera. 'Ever since my college days, I have been raising questions about life, such as what is the relationship between man and society?' he says.

Over the past few years, artificial landscapes have been the main subject of Tang's works. 'Landscapes were created for humans, but if the created space fails to interact with humans, I would start to think about the original meaning of space,' he says. His daily observations led him to the realisation that the urban environment is actually a kind of artificial landscape, and is also the result of man' acclimatisation to the natural environment. 'For instance, photosynthesis normally only occurs during the day. Cities are the only place where photosynthesis also occurs at night. But we should not think of light pollution only in terms of its damage. If there were no lights to illuminate the city at night, the various functions of a city would come to a halt,' he says.

Sociology teaches critical thinking, but it also provides objective knowledge about the persistence of social norms and forms. Many of Tang's works, including *Acclimation* and *Line*, are visual representation of the theories he has learned in sociology. 'There aren't many photographers in Macao who focus on landscapes, so the local audience isn't very familiar with this subject. Currently the collectors of my works are mostly foreigners.'

用批判的角度思考

鄧國豪的創作甚有個人特色，他透過鏡頭嘗試將都市的刻板印象消解、解構，再將人、社群、地方、自然與記憶重新連結及建構起來。他的作品不是普通的攝影，而是融入了他對社會的觀察，可以說，他的每一個作品都是一次對社會學的調查。除了《人類觀》外，他的其它作品完全看不到人的存在，但可透過線索，例如建築、於晚上包圍著城市的人造光源等，間接找到人的存在。「我的世界裡雖然看不到有人，但通過有人存在的痕跡，重新發掘人與城市之間的互動。我主要是不想直觀地說出人對自然的影響，而是通過畫面元素重新發掘日常當中我們如何影響自然，如何與自然進行互動。這方式像是偵探尋找線索一樣，很有趣。」

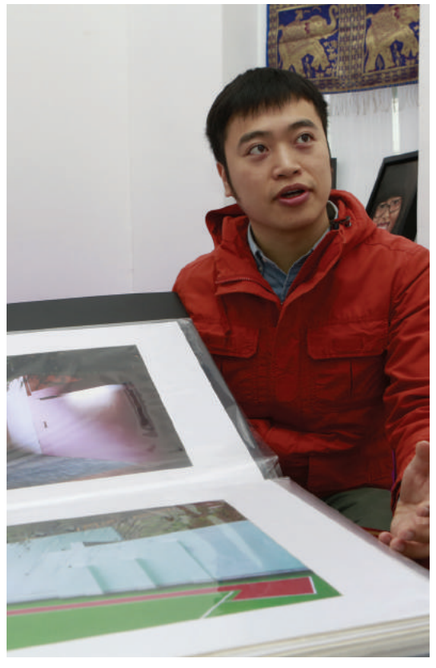
鄧國豪認為其作品得以能完整地表達，最要感謝社會學系的教授，特別是副教授Peter Zabielskis和助理教授呂家玟，「我在課外經常找老師討論不同的觀點，他們會點評我的作品

Think Critically

Tang's works have a unique style. He attempts to deconstruct people's stereotyped impressions of cities and then reconstruct that impression by reconnecting people, community, places, nature, and memory. His works are not merely documentary photographs; they reflect his observations and interpretations of society. Indeed, each work is a field study in sociology. Apart from *Human Scenery*, his works are completely devoid of human presence. But there are always clues, such as buildings and artificial light sources, that point to human activity. 'Although you can't find humans in my works, you will discover the interaction between humans and the city through these subtle clues,' he says. 'I don't want to show humans' impact on the natural environment in an explicit way. I want the audience to discover on their own how humans affect and interact with nature in the same way a detective pieces together clues to solve a case. I think it's more interesting that way.'

鄧國豪的作品並非單純的攝影作品，而是融入他對社會的觀察。圖為其作品《人類觀》
Tang's works are not merely documentary photographs; they reflect his interpretations of society. Pictured is his work *Human Scenery*

Tang is grateful to his professors from the Department of Sociology, especially Associate Professor Peter Zabielskis and Assistant Professor Lu Chia-Wen. 'I would often discuss questions with my professors after class, and they would comment on my works and offer very good suggestions,' he says. 'Since my college days, Peter and I have been discussing the different viewpoints in sociology, and he has also taught me many valuable life lessons. These discussions have inspired my works and made me see life in a different way.'



鄧國豪的成長經歷一直影響著他的創作
Tang's works are greatly influenced by his childhood experiences

並提出很好的指導建議。由大學到現在，Perter一直有跟我討論不同的社會學觀點及處世的道理，對我的創作和人生很有啟發。」

賭場外的城市

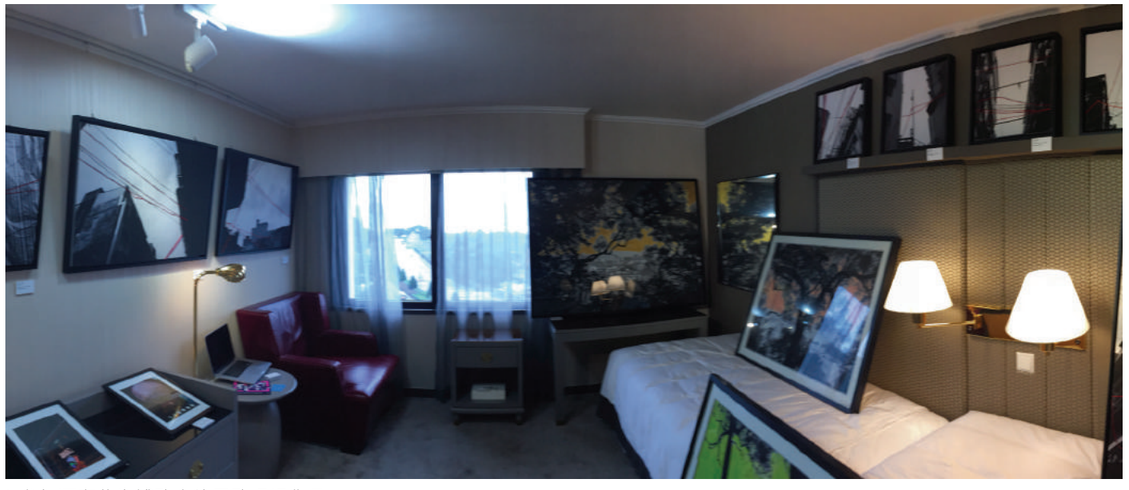
除了社會學背景為他提供創作的方向外，鄧國豪自身成長經歷也一直影響著他的創作。他自小住在高士德區的唐樓，鄰居關係密切。但自澳門經濟起飛，社區急速發展後，大量勞工的遷入，令他自覺鄰居的關係失去了原本的親密。回憶兒時每當自己抬頭都是佈滿天線的天空，如今天線的景像已經所剩無幾，他其中的一輯作品《連》中的天線一方面反映社區的變化，一方面也透視出人際關係的日漸疏離。他說：「社區的不斷重整，令到人際互動變得越來越格式化，轉變成慣性的冷漠。透過這些作品，外國人可從中發現澳門除了賭場竟然有這種舊城建築，而我更想讓人們通過作品去瞭解澳門社會的變遷和人們之間慣性的冷淡。」

Beyond the Casinos

Apart from his background in sociology, his childhood experiences are also an important influence on his works. He grew up in a tenement in the Horta e Costa District where people enjoyed close relationships with their neighbours. But the fast economic growth in Macao led to a large influx of labourers and a rapid expansion of housing estates, which in turn caused such close neighbourly relationships to dissipate. Tang still remembers looking up, as a child, and seeing the sky crisscrossed with power lines, a scene he rarely sees now. The power lines in his work *Line* shows the changes in the residential communities and the ever-distant relationship between people. 'With the constant restructuring in the housing estates, human interaction is becoming more and more a matter of going through the motions. And gradually, coldness becomes the default way in which people treat each other. I hope my works can help foreigners understand that apart from casinos, there are also these kinds of buildings in the old part of the city. More importantly, I want to help people understand the changes in the Macao society and the cold way in which people habitually interact with each other,' he says.

大學時期的作品，於2015年澳大傳播週與牛房倉庫合辦的攝影展覽上展出。
Tang's works during his college years. They were exhibited in 2015 in a photography exhibition co-organised by UM and Ox Warehouse

Before becoming a full-time artist, Tang worked as a part-time artist's assistant in college, during which time he actively participated in art exhibitions and competitions both at home and abroad. After graduation, he held a clerical job for a year, but then decided to quit to become a full-time artist. 'I only live once. To me, spending eight hours every day in the office doesn't seem like a sensible way to spend this once-only life,'



參加酒店藝術博覽會的展覽現場作品
Tang's works exhibited at a hotel art fair

還未成為全職藝術家前，鄧國豪曾經在大學的課餘時間擔任藝術家助理和積極參加海內外的藝術展覽及比賽，畢業後曾從事文員工作，但一年後他決定辭職，走上全職藝術家之路，「生命有限，每日被關在辦公室八小時對我來說並不太理智。」他寄語學生儘早發掘自己的志業，「志業可令你獲得更多的樂趣，也是人生中可以長期經營的活動，它未必成為你的全職，但你亦可以藉著它成為你的第二事業。」

he says. He encourages students to discover their vocations as early as possible. 'Finding your vocation will make you happier. Your vocation may not become a full-time job, but it can become a second career that you can work on for the rest of your life.'

短片：澳大校友鄧國豪以攝影之眼觀察社會
Video: UM Alumnus Tang Looks at the World Through Camera

鄧國豪小檔案

1989年於澳門出生。2010年肄業於台灣銘傳大學數位媒體設計系，2015年澳門大學社會學系畢業。至今已參加過30餘次本地及海內外藝術展覽，以及舉辦過兩次個人展覽，作品曾入選澳門視覺藝術年展、法國PX3攝影比賽，以及獲得何鴻燊博士基金會藝術獎等。作品被澳門藝術博物館、澳門東方基金會、澳門創意空間等收藏。代表作品有《連》、《人類觀》及《光合作用》。

個人網站 Personal website：
www.tkhmacau.com

About Tang Kuok Hou

Tang Kuok Hou was born in Macao in 1989. He studied at the Department of Digital Media Design, Ming Chuan University, in 2010, and graduated from UM's Department of Sociology in 2015. He has participated in more than 30 art exhibitions both at home and abroad. He has also held two solo exhibitions. His works have been selected for Macao Annual Visual Arts Exhibition, the Prix de la Photographie, Paris (P×3), and the Dr Stanley Ho Foundation Art Award.

His works are currently housed in various institutions, including the Macao Museum of Art, Macau Orient Foundation, and Creative Macau. His representative works include *Human Scenery*, *Line*, and *Photosynthesis*.

澳大走進中學 培育科學種子

UM Cultivates Young Science Talent in Secondary Schools

文 Text｜李巧雲，校園記者關詠瑜、譚濤 Albee Lei, UM Reporters Christy Kuan & Terence Tan

圖 Photo｜張愛華、何杰平，部分由受訪者提供 Ella Cheong & Jack Ho, with some provided by the interviewees

澳門大學除了致力提供以學生為本的教育、具影響力的重點研究，也一直持續提供促進社區發展的服務。科技學院助理教授梁應德和健康科學學院助理教授王雅凡便將服務社會的熱誠帶到培養澳門中學生之中，盡己之力激發學生的興趣，發掘人才，推動澳門教育的發展。

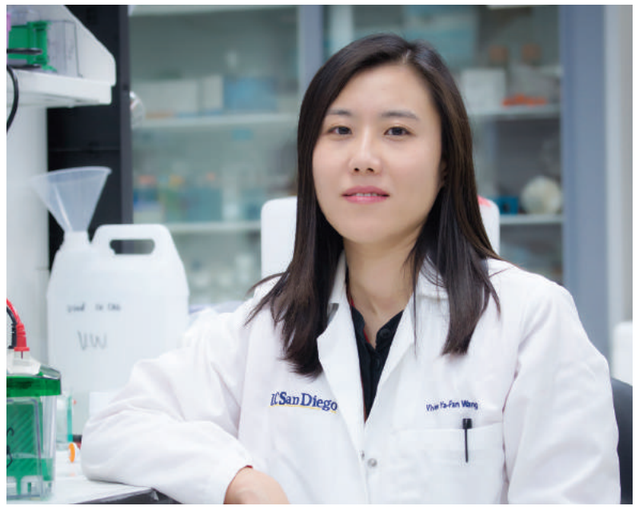
Besides educating students and initiating influential research projects, the University of Macau is also dedicated to serving the local community. Leong Ieng Tak and Wang Yafan, assistant professors from the Faculty of Science and Technology and Faculty of Health Sciences, respectively, have turned their passion for serving the community into a sense of responsibility to nurture young scientists in local secondary schools.

堅持不只為情懷

梁應德教授輔導澳門中學生奧數已經堅持了長達23年之久。他在1994年入職澳大後，便開始負責IMO（國際數學奧林匹克）的相關事務。從缺少參賽學生到自己培訓、再到和中學合作定期訓練一路走來，梁應德教授所培養獲獎的學生越來越多，最近有學生還在賽事中奪金，為澳門拿下自1990年參賽以來首面金牌，他的心態卻從未變過：「我在澳門出生長大，很希望自己能做些事讓澳門教育做得更好。大學能夠給平台幫助到年輕人，培養出人才也讓我覺得很有滿足感。」

去年參與澳大和培正中學合辦的科普講座，是王雅凡教授走進中學課堂的契機。如今到培正中學為初一學生上生命科學課成為她每個週六的例行工作。澳大平時的研究教學已十分忙碌，教授還貢獻業餘時間培養中學生，這股精神令人敬佩。王教授笑著說：「我其實也是培正畢業，能有這個回報母校的機會讓我十分開心。與活潑好問的中學生相處也使我很快樂，這反而是一個舒壓的過程。」

梁應德教授
Prof Leong Ieng Tak

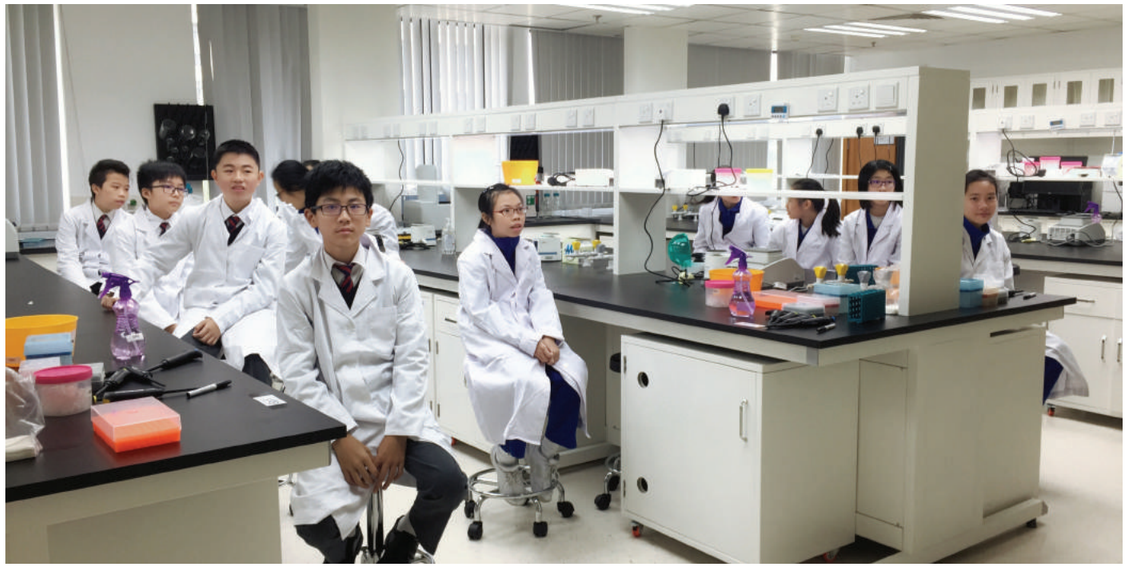


王雅凡教授
Prof Wang Yafan

Persistent Not Only Because of Passion

Prof Leong has been training local students for Macao Mathematics Olympiad for 23 years. After joining UM in 1994, he became the person in charge of local matters related to the International Mathematics Olympiad (IMO). At first, there were not enough students to participate in the IMO, so Prof Leong trained students by himself. Later, as more and more students started enrolling in the competition, Leong began to conduct regular training sessions in collaboration with local secondary schools. Over the years, he has nurtured many award-winning students. Recently, a student he coached won a gold medal in the IMO, which is Macao's first gold medal at this competition since 1990. 'I was born and raised in Macao, so I want to do something to enhance the quality of education in Macao,' says Prof Leong. 'The university provides a platform for young people to develop their talent. I feel very happy to have produced talented students.'

Prof Wang Yafan last year participated in a science popularisation seminar co-organsied by UM and Pui Ching Middle School. That was the first time she lectured to secondary school students. Now she goes to Pui Ching every Saturday to give life sciences lessons to form-1 students. Asked why she is willing to give lessons to secondary school students during her free time when she already has a busy work schedule at UM, she says, 'I myself am a graduate of Pui Ching Middle School, so I feel very happy to be able to give back to my alma mater. I enjoy the company of energetic and curious students. It actually helps me de-stress.'



王雅凡教授所教的中學生到澳大實驗室學習
The secondary school students taught by Prof Wang study in a lab at UM

培養的是興趣

說到培養，不少人的腦海總會浮現出枯燥的題海和讓人不明所以的知識點。王教授解釋說：「初一中學生平均年齡也就十二、三歲，我不可能很深入地去闡釋生命科學。我最重要的是以簡單有趣的方式讓他們明白或是好奇而問出下一個『為甚麼』，提升他們對科學的敏感程度。興趣對一個人未來要做的事很重要。」她坦言自己也是有了興趣才能從容面對研究中的不順利並一直堅持下去。

那麼參加奧數培訓的學生應該是為了比賽吧？梁應德教授笑著說：「我們培養不是以拿獎為目的，雖然這會是很多人的目標。我希望能培養他們從科學角度出發的思考方法，對數學感興趣。利用培訓時間讓他們多見些題目，鼓勵參賽，但不是狂練。他們代表澳門外出交流也可以增長見識。」兩位教授都認為，教育並不能立竿見影，但一定會對學生產生影響，也許是多年後才能顯現出來，抑或觸類旁通，在別的方面都有幫助。

Cultivating Students' Interest in Science

When talking about the prospect of nurturing students, most people would think of boring test questions and incomprehensible theories. 'The form-1 students I teach are usually between 12 and 13 years old, so I cannot teach them very difficult knowledge in life sciences,' says Prof Wang. 'Instead, I use simple and fun activities to stimulate their curiosity about science and prompt them to raise their own questions. It is very important to develop a strong interest before starting a career in the field.' She adds that it is her passion for science that has kept her going when faced with difficulties.

What about the students that receive training for the IMO? Surely they participate in the competition to win, right? 'Winning is not our first priority, although this could be the goal for many people,' says Prof Leong. 'I hope to teach the students to think scientifically and to increase their interest in mathematics. During the training, I expose them to various kinds of test questions and encourage them to apply for the competition, because I feel the experience itself can help broaden their horizons, but I do not force them to do practice questions over and over again.' Both Leong and Wang agree that education does not always produce immediate results, but it will certainly have a positive influence on the students in the long run. Sometimes it may take years for the effect to manifest itself. Sometimes, the effect may even spill over into other areas of the students' life.

星星之火

大家都說教育要從小做起，中學的基礎教育確實重要。梁教授回憶十幾年前仍為一個很有數學天賦卻因家庭條件而放棄讀書的學生感到惋惜：「今時不同往日，如今政府資源多，教學方法也在改良。我們都是澳門的一分子，理應去服務社會的不同學校，訓練學生，發掘人才。這是對大學資源的更好利用，是對澳門有利的事。」王教授也分享說：「我那時大三才有機會進入實驗室，而現在的中學生都有機會來澳大親身接觸，這是培養興趣很好的機會。作為老師我除了做好大學本職工作外，也需要從不同渠道去服務回饋社會，而中學教育就是其中的一條路。能夠幫助澳門培養未來的人才，令我感到很有意義。」

星星之火，可以燎原。有時當下做的一些事，或許暫時還看不到成果。但那就像為一棵棵幼苗澆水施肥，假以時日，總有一天能綻放出美麗的花朵。

梁應德教授培養的學生在第56屆國際數學奧林匹克上奪金
A student trained by Prof Leong receives a gold medal at the 56th International Mathematical Olympiad

梁應德教授培養了不少數學幼苗
Prof Leong has nurtured many mathematically talented students

A Little Spark Can Kindle a Great Fire

Most people agree that education should start as early as possible. Therefore, the basic education provided by secondary schools is very important. Prof Leong recalls a case from over a decade ago where a mathematically talented student was forced to give up education because of financial reasons. 'Things are different today. The government now pours a lot of resources into education. Teaching methods are also being continuously improved,' he says. 'Both of us are members of the Macao community, so we feel it's our duty to serve the community by educating students and helping them discover their talent. This is a better way to use the resources provided by the university, and it also benefits the development of Macao.' Prof Wang says that she did not have the opportunity to use a laboratory until her third year in college, while secondary school students today can use the labs at UM. 'This provides a very good opportunity to cultivate their interest in science,' she says. 'Besides fulfilling my duty as a faculty member at UM, I feel the need to give back to society through different channels, and teaching secondary school students is one of them. It is a very meaningful job because I can help to nurture students that will become the pillars of Macao.'

A little spark can kindle a great fire. Sometimes the effort we make to do something may not produce immediate results, but just like a well-attended seed will blossom into a beautiful flower, so too will the effort bear fruit over time.

短片：澳大教授走進中學培育科學種子
Video: UM Professors Popularise Science in Local Secondary Schools

甚麼是結構健康監測?

What Is Structural Health Monitoring?

文 English Text｜阮家榮 Kelvin Yuen　　中文翻譯 Chinese Translation｜陳靜 Ruby Chen
圖 Photo｜譚金榮、部分由阮家榮提供 Eric Tam, with some provided by Kelvin Yeun

隨著經濟科技的迅速發展，基礎設施的規模也越來越大。例如，現今的摩天大樓可以高達一千米。此外，新發明的材料和新型結構構件也使結構行為更加複雜。傳統的人工檢測不僅成本高，而且有種種局限性。例如，用於確定混凝土抗壓強度的非破壞性檢測方法雖然被普遍採用，但卻只能測定局部範圍的抗壓強度。由於技術成本原因，很難對大型建築物的所有位置都進行檢測。另一方面，一些先進技術可以檢測到建築物極其微小的振動反應。這種振動的強度弱至10^{-5}g或10^{-6}g，也就是重力加速度的百萬分之一。但是，這種檢測並不容易，因為這樣的反應非常隨機。

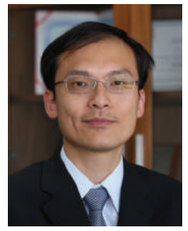
結構健康監測

結構健康監測是用於診斷建築物健康狀況的自動化策略。最近幾十年引起各界極大興趣。尤其值得一提的是，過去10年間，由於感應技術和數據採集系統的迅速發展，這個領域也有了重大進展。結構健康監測主要有四個目的：（1）確定建築物是否有結構性損壞；（2）確定損壞的位置；（3）評估損壞的嚴重程度；（4）評估因為損壞而對建築物整體可靠性造成的影響。

Due to rapid economic and technological development, the scale of our infrastructure has increased dramatically. For example, skyscrapers can be almost one kilometre tall. Furthermore, newly-invented materials and structural member types complicate structural behaviour. Traditional types of human investigations are costly and they have various limitations. In particular, non-destructive testing methods for the determination of concrete compressive strength are popular, but they can be used to determine the concrete strength of a localised area only. For large-scale structures, it is difficult, if not prohibitive, to test all positions of the structure. More recently, other advanced technology allows the acquisition of the very tiny vibration response of structures. Such vibration is of the order of 10^{-5}g or 10^{-6}g, that is one of a million of the gravity acceleration. Nevertheless, the problem is very challenging because such response is very random.

Structural Health Monitoring

Structural health monitoring (SHM) is an automated strategy to diagnose if a structure is in its healthy state, and it has attracted tremendous interest in the last few decades. In particular, there have been important advancements in the past decade due to rapid development in sensor technology and data acquisition systems. There are four major goals in SHM: (1) to indicate if there is any damage to a structure; (2) to determine the location(s) of the damage(s); (3) to estimate the severity of the damage(s); and (4) to evaluate the reliability of the entire structure due to possible damages.



阮家榮是澳門大學科技學院土木及環境工程系教授兼教務長。2002年，他以兩年七個月時間獲得加州理工學院土木工程學博士學位。地震工程學之父G.W. Housner教授的第三代弟子。2010年，他成為澳大首位35歲前獲晉升為正教授的學者。

Prof Kelvin Yuen is the registrar and professor of civil and environmental engineering at the University of Macau. In 2002, he received his PhD in civil engineering from the California Institute of Technology (Caltech) after a study period of two years and seven months. He is an academic great-grandchild of Prof George W Housner, known as the father of earthquake engineering. In 2010, he became the first UM staff member to be promoted to the rank of full professor before the age of 35.

結構健康監測分為兩大類：靜態監測和動態監測。靜態監測通常是測量建築結構（例如橋）不同位置的應變，然後據此判斷其與正常熱膨脹之間的差值是否在可接受範圍之內。但是靜態監測的問題在於應變直接取決於施加於建築上的外力或激勵。因此，應變的值可能只能反應負載情況的變化，而非建築物的健康狀況。而且，應變測量值也只反映局部行為。

動態監測

動態監測的理念類似於中醫的把脈，不過難度卻大很多。動態監測不是評估建築物的振幅是否太大，而是確定振動的時頻性質。例如，敲擊一隻杯子會產生某個聲頻，這個聲頻並不會隨敲擊力度的改變而改變。但是，如果杯子上有道裂縫，那麼音頻就會改變。而且裂縫的位置、長度和深度都會對聲頻造成不同的影響。但是，結構健康監測的問題比這個要複雜的多，因為動態負載（地面運動、風負載、海浪、交通引起的負載）是隨機的，通常無法完全測量。此外，土木工程的規模很大，尤其是那些需要接受健康監測的建築物。

在動態結構健康監測系統中，感應器（通常是加速儀）是安裝在建築物不同位置的。由於典型結構的重要頻段介乎0.1Hz和20Hz之間，取樣頻率必須為100Hz或以上，才能對結構反應有足夠的描述。也就是每個位置每秒鐘要測量最少100次。

另一個困難在於需要確定的未知參數的數量非常大，因為土木工程（例如橋）是由很多組件構成的。我們必須要有同樣多甚至更多的方程式才能確定這些未知參數。在結構健康監測的問題上，這類方程式是從建築物的感應器上獲得的。在這個情況下，我們可能需要數量龐大的感應器，但是這樣會造成高昂的成本和極大的運算量。

There are two major approaches of SHM: static and dynamic. For static approaches, usually the strains of different locations of a structure (especially bridge) will be measured and they will be judged on whether or not they are unacceptably large compared with the normal thermal expansion. However, a major problem of this approach is that strains depend directly on the force or excitation exhibited to the structure. Therefore, the values of strains may reflect only the change of loading conditions instead of the health status of the structure. Furthermore, the strain measurements are also localised quantities.

Dynamic Monitoring

For the dynamic approach, the idea is similar to pulse checking but substantially more difficult. Instead of evaluating if the vibration magnitude of the structure is too large, this approach attempts to investigate the time-frequency content of the response. For instance, if one clicks a cup, a specific sound frequency will be generated and this frequency is insensitive to how hard the cup was hit. However, if the cup is cracked, the sound frequency will change. In particular, the location, and the length and depth of the crack, will result in different change of such frequency. Nevertheless, the problem in structural health monitoring is far more complicated because the dynamic loadings (ground motion, wind loads, sea wave, traffic induced loads, and so on) are random and usually cannot be measured. Furthermore, the scale of civil engineering structures is huge, especially for those necessary for the structural health monitoring scheme.

In the dynamic structural health monitoring system, sensors (usually accelerometers) are mounted at different locations on the underlying structure. Since the important frequency band of typical structures is from 0.1 Hz to 20 Hz, the sampling frequency will have to be 100 Hz or above in order to have sufficient description of the response, ie to measure 100 times or more within one second at each location.

Another difficulty lies with the large number of unknown parameters to be identified, since there are numerous components in civil engineering structures (such as, say, a bridge). We know that we need to have at least the same number of equations to solve the unknowns. In our problem of structural health monitoring, such equations are obtained from sensors located on the structures. In this case, we may need a huge number of sensors but this induces both cost and computational burdens.

實時結構鑑定

2015年10月23日，香港汲水門大橋遭到船隻碰撞，導致大橋被封1.5小時。由於汲水門大橋是通往赤鱲角機場的主幹道，這場事故造成了巨大的經濟損失。如果可以進行實時結構鑑定，就可以立刻確定大橋是否安全，而不用封橋之後請工程師進行檢測或其他線下結構鑑定計算。這種實時鑑定既能迅速確定建築物的安全狀況，又能將經濟損失降至最低。但是，實時結構鑑定是個非常具有挑戰性的問題。首先，土木工程結構的規模通常都很大，所以必須使用非常複雜的有限元素模型。其次，由於取樣頻率通常是數百赫茲，每秒鐘要將一個巨大的結構模型更新幾百次的難度有多大可想而知。

模型類別選擇

進行結構健康監測一定要選擇適當類別的模型。這一點非常重要。這個問題看似簡單，但實則不然。讓我們舉一個例子來解釋。假設甲同學在物理課上學到了F=ma這個公式。在實驗課上，他做了一些實驗，獲得了十個數據點。然後他通過EXCEL擬合直線獲得常量m，看這個常量是否和質量吻合。再假設乙同學只做實驗沒有上課，所以他並不知道F=ma這個公式。他用二階多項式在EXCEL擬合拋物線。結果他的數據擬合比甲同學的數據擬合好，因為拋物線為數據擬合提供更多靈活性。然後，丙同學也進行了數據擬合，但用的是九階多項式。結果怎麼樣？她的結果是零誤差，因為這個多項式擁有10個可調整係數，所以可以毫無偏差的穿過10個點。但是，九階多項式非常波動，絕不是有效的預測模型。這個故事說明了甚麼？說明我們不能僅僅根據擬合誤差來選擇模型類別。擁有太多可調整參數的模型在擬合數據的細節（包括噪音）方面很有用，但是卻會導致「過度擬合行為」。這類模型並不能對未來做出可靠的預測。

Beck和Yuen（2004）發表了首篇在結構健康監測領域中探討如何選擇模型類別的方法的論文。大量的未知參數、沒有激發測量值可參考以及土木工程結構的高度不確定性，使得這個問題在結構健康監測領域特別具有挑戰性。這篇論文對模型的複雜性加以量化，同時綜合考慮模型擬合能力及模型複雜性，對不同類別的模型進行優劣排序。模型擬合能力及模型複雜性的最佳切合點反映了模型的穩健性，而模型穩健性是衡量模型表現的關鍵指標，因為它代表模型在防止建模偏差和其他不確定性方面的脆弱度。該論文一經發表即獲得廣泛關注，甚至吸引了化學、物理、電機工程、教育測量、醫學和材料科學等其他各領域學者的關注。在美國土木工程師學會《工程力學期刊》歷史上發表過的幾千篇論文中被評為引用次數最多的10大論文之一。

Real-time Structural Identification

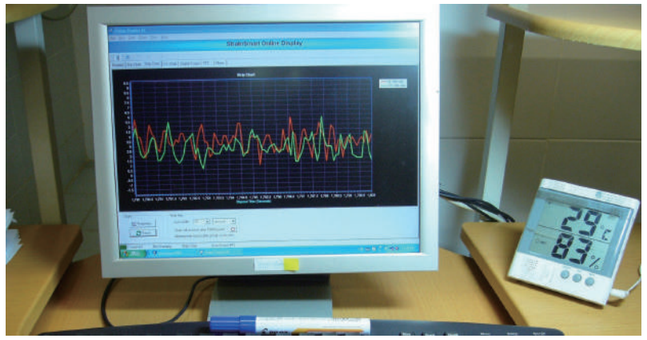
On 23 October 2015, a ship struck the Kap Shui Mun Bridge in Hong Kong. The bridge was closed for about 1.5 hours. Since it is a critical line to the Chap Lap Kok Airport, the economic loss of this incident was huge. Therefore, if a structural identification can work in a real-time fashion, it can help identify whether or not the structure is safe almost immediately, instead of closing the bridge and conducting an investigation by engineers, or by other offline structural identification calculation. This will be very useful from the point of both safety and economic concerns. However, real-time structural identification is a very challenging problem. First, the scale of civil engineering structures is huge so one can expect a very complicated finite element model is necessary. Second, since the sampling frequency is usually hundreds Hz, it is straightforward to imagine the difficulty in updating a huge structural model several hundred times every second.

Model Class Selection

One important problem is to select a proper class of models for the purpose of structural health monitoring. This sounds to be a simple problem but it is indeed much more difficult than it looks at first glance. For instance, let's consider a simple problem for the sake of explanation. Imagine a student, called student A, who takes a physics class and learns F=ma. In the laboratory section, he conducts experiments and obtains 10 data points. Then, he uses EXCEL to fit a line to obtain the constant 'm' to determine whether or not it matches with the mass. Unfortunately, student B does not attend the lecture, and therefore when he conducts the experiments he does not know the formula F=ma. He then uses EXCEL to fit a parabola, ie, second order polynomial. It turns out that his data fitting is better than student A because a parabola offers more flexibility to fit the data better. Then, student C does the same but with a ninth-order polynomial. Guess what? She got zero error because this polynomial, with ten adjustable coefficients, can go through all ten points exactly. However, a ninth-order polynomial is very bumpy and it is by no means a good model for prediction in this case. What can we learn from this story? We cannot select a class of models solely due to the fitting errors. In general, a class of models with too many adjustable parameters has great power in fitting the details of the data, including the noise, but this will lead to the so-called over-fitting behaviour. Such models are not reliable for future prediction.

Beck and Yuen (2004) presented the first paper to tackle the model class selection problem in the area of structural health monitoring. This problem is particularly difficult in this field due to the large number of unknowns, the unavailability of the excitation measurements, and a high level of uncertainty in civil engineering structures. In this paper, model complexity was quantified and the model class candidates are ranked according to the tradeoff between the model fitting power and its complexity, which is a measure of the model robustness. Model robustness is a very crucial indicator of the performance of a model class because it represents how fragile a model class is in resisting modelling errors and other uncertainties. This paper received tremendous attention, even from researchers in other areas such as chemistry, physics, electrical engineering, education measurements, medical science, and materials science. It was ultimately listed as one of the top ten cited papers among several thousand papers published in the long history of the *Journal of Engineering Mechanics* of the American Society of Civil Engineers.

作者曾對澳大舊校園東亞樓進行長達5年的全天候監測
The author once monitored the East Asia Hall on the old campus round the clock for about five years



東亞樓實時數據
Real-time data on the East Asia Hall

最近，我們在這個研究的基礎上，考慮一個更具挑戰性的問題，即如何實時選擇模型類別。這個問題很難，因為數據採集時間間隔通常是1/200或1/500秒。換言之，我們每秒鐘須完成200或500次的模型類別選擇和參數確定。該論文為建立可靠的實時結構健康監測系統奠定了重要的理論基礎。由於該論文的重要性，獲《計算機輔助土木和基建工程》期刊發表。該期刊在126份獲SCI/SCIE索引的土木工程期刊中排名第一。而該論文在同期發表於該期刊的120篇論文中引用次數排名第二。

舊校園東亞樓的監測

我們曾對舊校園的東亞樓進行長達5年的全天候監測。我們研究氣溫、濕度等環境因素對結構長期行為的影響。此外，我們還研究了幾次強烈颱風天氣下建築物的極端行為。我們參加了2009年的全國挑戰杯，為澳門獲得該比賽的首個一等獎。我們還獲邀對汀九橋實測數據進行分析。

Recently, we extended this work to consider a more challenging problem to select the model class in the real-time manner (Yuen and Mu, 2015). The problem is difficult because the data acquisition time interval is usually 1/200 or 1/500 second. In other words, we have to finish model class selection and parametric identification 200 or 500 times per second. This paper proposed an important foundation to build reliable real-time structural health monitoring systems. Due to its importance, it was published in the *Computer-aided Civil and Infrastructure Engineering* journal, which is ranked the top among 126 SCI/SCIE indexed civil engineering journals. More importantly, it was the second most cited paper among the over 120 papers published in the same period.

Monitoring of the East Asia Hall on the Old Campus

On the old UM campus, we monitored the East Asia Hall round the clock for about five years. We investigated how environmental conditions (temperature and humidity) affect the long-term structural behaviour (Yuen and Kuok, 2010). Furthermore, we also studied the extreme behaviour under a number of severe typhoons. We participated in the National Challenge Cup in 2009 and won the first-class award, which was the first time this award was won by scholars in Macao. We were also invited to conduct an investigation of the Ting Kau Bridge (Kuok and Yuen, 2016).

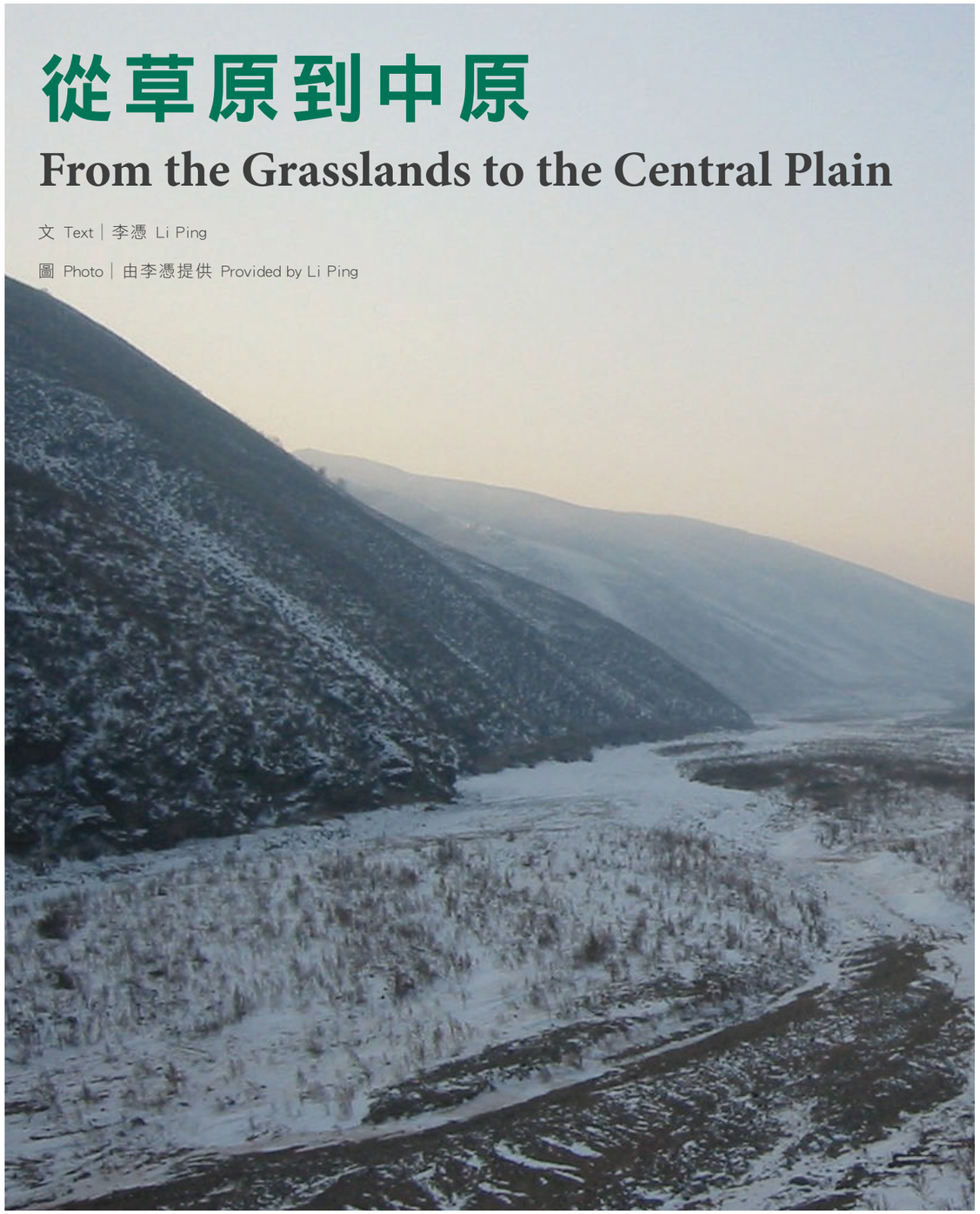
「學院專欄」內容僅代表作者個人意見
The views expressed in the Faculty Column are solely those of the authors, and do not necessarily reflect the views of the *umagazine* or UM.

從草原到中原

From the Grasslands to the Central Plain

文 Text｜李憑 Li Ping

圖 Photo｜由李憑提供 Provided by Li Ping



通往草原的白道
The White Road that leads to the grassland

李憑是澳門大學社會科學學院歷史系教授，兼任中國魏晉南北朝史學會終身榮譽會長。研究範疇涉及中國古代史和魏晉南北朝史，重要著作有《北魏平城時代》、《從草原到中原——拓跋百年》。

Prof Li Ping is a professor of the Department of History at the University of Macau. He is also the honorary life president of the Chinese Society of the Wei, Jin, Northern and Southern Dynasties. His main research interests include the history of ancient China and the histories of Wei, Jin, and Northern and Southern dynasties, with many important books published in the field, including *Pingcheng Era of the Northern Wei Dynasty*, and *From the Grasslands to the Central Plain—Tuoba in 100 Years*.

1,800年前，在大興安嶺和陰山之間的大草原上活躍著一支部落。這支部落是鮮卑族的支族，以拓跋為姓，依靠狩獵謀生。

天母相遇

在拓跋部落之內，口耳相傳著一則故事：一天，部落酋長詰汾正在追逐野獸，忽然看見一輛華麗的花車從天而降，徑直駛到他的面前停住。車簾拉開，下來一位美麗女子，許多侍女簇擁著她。詰汾感到萬分驚訝之際，美女卻先已開口說道：「我乃天女，受天帝之命與郎君相偶。」當晚兩人結為連理。第二天清晨，天女告訴詰汾，明年的此時她還會來到此地。說罷天女起身離去，如同一陣清風拂過。第二年的同一日期，詰汾先行到達往年相會的地方，天女果然也來赴約，拓跋部落中的許多群眾都來圍觀。詰汾見天女手上抱著一名男兒，心中疑惑。天女將男兒交給詰汾，對詰汾說道：「此兒是郎君之子，請善自撫養。今後當子孫相繼，世代為王。」天女說罷，趁著詰汾驚喜之間，轉身奔入人群之中。詰汾四處尋找，卻再也見不到了。

孕育拓跋文明的搖籃嘎仙洞
Gaxian Cave, the cradle of the Tuoba civilisation

About 1,800 years ago, on the grasslands between the Daxing'anling Prefecture and the Yin Mountains there thrived a hunting tribe named Tuoba, which was a clan of the Xianbei tribe.

Encounter with the Daughter of Heaven

Within the Tuoba tribe, there is a legend that has been passed down from generation to generation. According to the legend, one day, the chief of the tribe, Ji Fen, was chasing a beast, when suddenly an elaborately-decorated chariot descended from the sky and stopped in front of him. Out of the parted curtains of the chariot stepped a beautiful maiden surrounded by many maidservants. The dumbfounded Ji Fen heard the beauty say, 'I am the Daughter of Heaven, and I am here by the order of the God of Heaven to be your mate.' They spent the night together, and the next morning, the maiden told Ji Fen that she would return to the same spot on the same day the next year. With that, she rose and disappeared like a breeze. On that very day of the following year, Ji Fen arrived at the old spot first. The maiden kept her promise and returned too. Many people from the Tuoba tribe travelled to the spot to witness the reunion. Ji Fen was puzzled to see a baby boy cradled in the maiden's arms, but she handed the baby to him and said, 'This is your son, please take good care of him. Your son shall be the king and his offspring shall succeed him as the king.' With that, the maiden turned around and disappeared into the crowd, leaving the overjoyed Ji Fen looking everywhere in vain.

This legend may sound fantastical, but from an anthropological point of view, it is actually not as far-fetched as it sounds. It symbolises the inevitable change from intra-tribe marriage to inter-tribe marriage in primitive society. The story has stayed in people's memories as a

這則傳說聽似神奇，其實並不荒誕。從人類學看來，這是從氏族內部通婚轉變成為氏族之間通婚的典型事例，是原始社會時期人類婚姻形態的必經環節。天女相偶的故事，如神話般留存在人們的記憶之中，卻意味著這個部落的歷史上一場關乎生育健康以及社會結構改變的重大革新。於是，此後數十年間拓跋部迅速發展，壯大成為擁有20萬部眾的軍事部落聯盟。

建北魏王朝

天女所生的男兒長大成為勇士，後來果然被部眾擁立為王，他的名號叫力微。在力微的率領之下，拓跋部遷徙到黃河河套。西元258年，力微在河套以東的盛樂故城（位於今內蒙古和林格爾縣）聚眾祭天，建立邦國。此後，力微的子孫也相繼為王，並與中原漢族王朝一直保持和親關係。

西晉以後，中原地區陷入長達百年的分裂割據局面。拓跋部乘機向東南發展，挺進到雁門關以北，於398年在平城（位於今山西大同市）建立北魏王朝。力微的第六代孫拓跋珪成為北魏開國皇帝，號為道武帝。道武帝統治時期，平城拓展成為北方各族聚居的重鎮，人口達到150萬。

李憑教授在平城方山考察
Prof Li Ping conducts field research in Fangshan, north of Pingcheng

「大代萬歲」拓件——平城宮城文物
A relic from Pingcheng

piece of mythology, but in the history of the Tuoba tribe, it ushered in revolutionary changes in reproductive health and societal structure. Over the next decade, the tribe expanded rapidly and eventually became a military force with 200,000 members.

Founding the Northern Wei Dynasty

The son of the Daughter of Heaven grew up to become a warrior. Later he was installed as the king of the tribe, known as Li Wei. Under the leadership of Li Wei, the Tuoba migrated to Hetao, a region in the upper reaches of the Yellow River. In 258 AD, Li Wei held a Heaven Worship Ceremony in Sheng Le (present-day Helingeer County in Inner Mongolia), located to the east of Hetao, and established a state there. As foretold in the legend, Li Wei's offspring succeeded him as the king, and maintained marriage alliances with the Han states in the Central Plain.

After the Western Jin dynasty, the Central Plain fell into splintered parts and languished in disarray for over 100 years. The Tuoba tribe seized the opportunity to expand southeastward until they reached the north of Yanmengun. In 398 AD, the Tuoba established the Northern Wei dynasty in Pingcheng (present-day Datong city, Shanxi). Li Wei's sixth-generation grandson, Tuoba Gui, became the founding emperor of the Northern Wei dynasty, known as Emperor Daowu. During the reign of Emperor Daowu, Pingcheng became a major town in the north inhabited by various ethnic groups, with a population of 1.5 million.

道武帝之孫太武帝具有雄才大略，他繼承祖業，陸續攻滅黃河流域的割據政權，將北方大地統歸為一體。道武帝的第六代孫孝文帝是文治君主，他一方面堅持農業和畜牧業並重的生產機制，另一方面大刀闊斧地懲治貪污腐敗，將國家的實力發展到鼎盛狀態。孝文帝胸懷遠大的政治抱負，立志開拓更加宏偉的事業。494年，他率領百萬軍民從平城南下，遷徙到中原古都洛陽。這就是中國歷史上有名的孝文帝遷都事件。

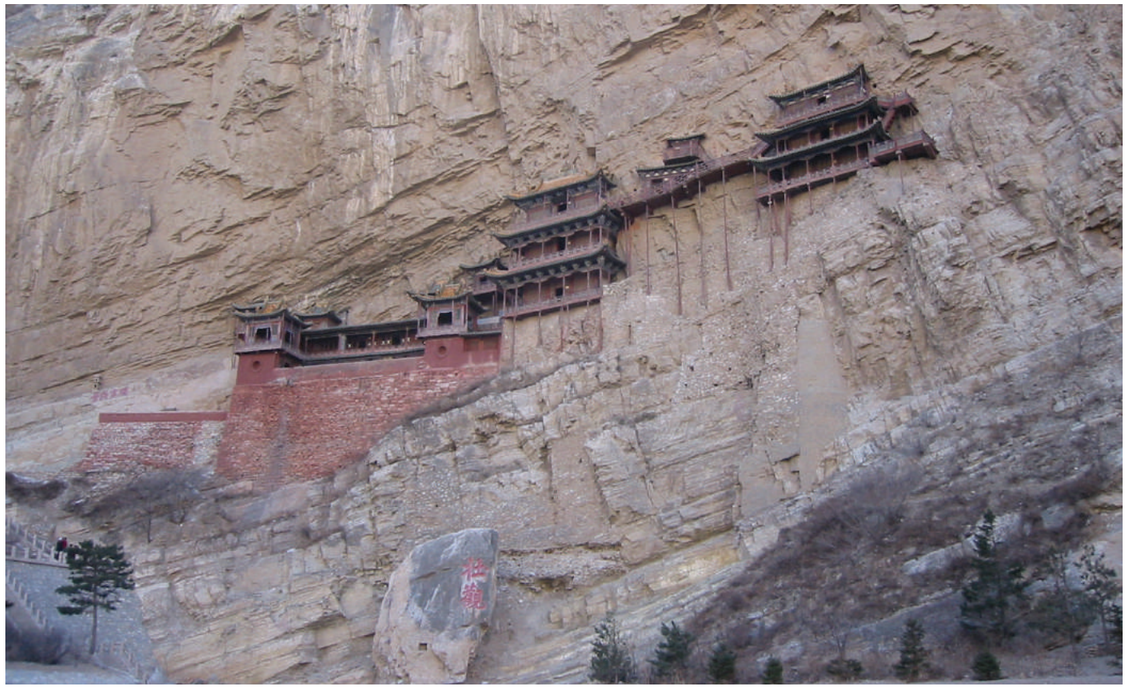
北魏南遷中原以後，孝文帝不但繼續推行政治、經濟和文化的改革，而且推崇傳統的華夏文化，致力於改善民族關係。孝文帝將各支部落的姓氏都改成為簡單的漢姓，又積極宣導語言、服飾以及籍貫方面的改革，以便調和各族人民的生活習俗，於是在廣闊的黃河流域掀起民族融合的高潮。

一場轟轟烈烈的民族融合運動，促進了中華民族的凝聚與發展。起源於大興安嶺北端嘎仙洞的拓跋部，與漢族和眾多兄弟民族一起，融入中華民族大家庭。就像神話中忽現忽隱的天女

Emperor Daowu's grandson, Emperor Taiwu, was a ruler of great talent and bold vision. He successfully conquered the many balkanized powers along the Yellow River, and unified the north of China. Emperor Daowu's sixth-generation grandson, Emperor Xiaowen, was a potentate with significant socio-political achievements. His dual emphases on agriculture and animal husbandry, and his resolute clamping down on corruption brought the country to the height of prosperity. In 494 AD, he moved the Northern Wei capital from Pingcheng to Luoyang.

After moving the capital to Luoyang, Emperor Xiaowen not only continued to push ahead with political, economic, and cultural reforms, but also became a strong advocate of traditional Chinese culture and implemented various policies to improve the relations between Xianbei and Han. He ordered that Xianbei surnames be changed to Han ones, and that Han clothing and language be used instead of Xianbei language and clothing.

穿越恒山的棧道
A plank road that runs through Mount Heng



位於山西渾源恒山山口始建於北魏的懸空寺
The hanging temple in Mount Heng, Shanxi. It was first built in the Northern Wei dynasty

那樣，來自草原的拓跋部奇跡般地出現在中原，隨後散佈在華夏大地，融匯入各民族之間。拓跋部的融入，為中華民族的肌體注入了新鮮血液，促進了中華文明的升華。中華民族的凝聚和中華文明的發展正是由許許多多像拓跋部這樣的部落陸續加入和貢獻自己而形成的，這些部落的名號雖然在現實中消失了，但是永遠留存在歷史記載中。

學術成果總結成書

從草原到中原，拓跋部數百年發展的過程已經成為陳跡，但是永遠熠熠閃光，給後人以深刻的啟示。作為拓跋部文明留下的結晶，石窟藝術、懸空寺建築以及貫通南北的白道，它們一直是令後人驚歎不已的瑰寶。受此感動，筆者滿懷景仰的心情，以數十年的精力從事拓跋歷史的研究，將其學術考證成果總結成為《北魏平城時代》一書。這部專著受到學術界的認可，到2014年已經印製第三版。

These measures promoted Xianbei's integration into the big Chinese family. By doing so, Emperor Xiaowen injected fresh blood into the Chinese body politic. The development of Chinese civilisation would not have been possible without the integration of the various tribes like the Tuoba. Although these tribes no longer exist, even in name, they will forever remain in the annals of history.

Turning a Decade of the Research into a Book

Stories of the Tuoba tribe have become distant history, but they will forever shine in our memory and inspire posterity. The cultural heritage left behind by the Tuoba, including the grotto art, the hanging temple, and the White Road connecting the north and the south, never ceases to amaze later generations. Inspired, I wrote a book titled, 'Pingcheng Era of the Northern Wei Dynasty', based on my more than a decade of studies of the history of the Tuoba. This book has received recognition from the academic community. Its third edition was published in 2014.

雲岡石窟大佛
The Buddha statue in Yungang Grottoes

雖然歷史距離我們遙遠了，但是對於現實依舊是有意義的，所以希望更多的人瞭解拓跋的研究。要達到這個目的，最好的辦法就是將研究成果通俗化。通俗讀本不僅應該文字暢達易懂，而且需要思想凝練，因此可以說，通俗化的過程其實也是對以往研究的嚴格審查。筆者最近又出版了與《北魏平城時代》配套的作品《從草原到中原一拓拔百年》，以通俗的筆觸將學術考證貫穿起來，以突顯天女、力微、道武帝、太武帝、孝文帝等為代表的拓跋百年歷史。實踐表明，從事科普創作也能產生社會效應，《從草原到中原一拓拔百年》於2016年年底被內地評選成為「中國影響力」書籍。

Although history happened in the distant past, it still has relevance today. That is why I wrote the book—I hope to help more people understand the history of the Tuoba. The best way to achieve this goal is to share my research findings in a way that can be easily understood by the mass audience. That requires expressing well-organised thoughts in simple, concise, and coherent language. So the process of popularisation is in essence a rigorous review of my previous studies. Recently, I published a new book, *From the Grasslands to the Central Plain—Tuoba in 100 Years*, as a complement to *Pingcheng Era of the Northern Wei Dynasty*. In this book, I try to tell the history of Tuoba in plain language, highlighting key historical figures such as the Daughter of Heaven, Emperor Daowu, Emperor Taiwu, and Emperor Xiaowen. My experience shows that popular social science books can also create a social impact. *From the Grasslands to the Central Plain—Tuoba in 100 Years* was named one of the influential books in China in late 2016.

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