

Autumn/Winter 2024 | Issue 30

澳大新語 UMagazine

傳承創新
澳大中醫藥研究

Innovating Through Tradition:
Chinese Medicine Research at UM



出版: 澳門大學	Publisher: University of Macau
總編輯: 張惠琴博士 執行編輯: 郭麗雅、葉浩男 翻譯: 謝宛菁、關詠琪 排版: 何杰平	Chief Editor: Dr Katrina Cheong Executive Editors: Gloria Kuok, Davis Ip Translators: Bess Che, Winky Kuan Designer: Jack Ho
顧問: 人文學院副院長、翻譯傳譯認知研究中心主任 李德鳳特聘教授 人文學院藝術設計中心主任 梁藍波特聘教授 社會科學學院傳播系副教授 Timothy Simpson 人文學院中國語言文學系榮休教授 鄧景濱	Advisors: Li Defeng, Associate Dean, Faculty of Arts and Humanities / Distinguished Professor and Director, Centre for Studies of Translation, Interpreting and Cognition Lampo Leong, Distinguished Professor and Director, Centre for Arts and Design, Faculty of Arts and Humanities Timothy Simpson, Associate Professor, Department of Communication, Faculty of Social Sciences Tang Keng Pan, Emeritus Professor, Department of Chinese Language and Literature, Faculty of Arts and Humanities
地址: 中國澳門氹仔大學大馬路 澳門大學行政樓(N6) G012室	Address: Room G012, Administration Building (N6), University of Macau, Avenida da Universidade, Taipa, Macau, China
電話: (853) 8822 8833 傳真: (853) 8822 8822 電郵: prs.publication@um.edu.mo	Tel: (853) 8822 8833 Fax: (853) 8822 8822 Email: prs.publication@um.edu.mo
印刷: 澳門豪邁實業有限公司	Printing: Hamah (Macau), Limitada
國際刊號: 2077-2491	ISSN: 2077-2491
部分圖片來自Shutterstock	Certain images are sourced from Shutterstock
《澳大新語》創於2009年，為澳門大學官方刊物之一，每年出版兩期，旨在展示澳門大學的創見和突破、報導教研和社會服務的最新發展和成果。	Published biannually since 2009, <i>UMagazine</i> is one of the University of Macau's official publications and aims to report innovative ideas and research breakthroughs of the University of Macau. It also showcases the latest developments and achievements of the university in teaching, research, and community services.



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UMagazine

編者的話

EDITOR'S WORDS

在澳門推動經濟適度多元化的今日，社會關注如何以中醫藥研發製造為切入點，促進大健康產業發展。今期《澳大新語》的「封面專題」聚焦澳門大學的國家重點實驗室、學院和研究院的研究人員對中醫藥領域關鍵科學問題的探索，展示他們如何將研究成果轉化為實際產品，並透過創新的跨學科研究推動中醫藥的國際化與現代化。

「專題探討」欄目邀請了五位獲澳大榮譽博士學位的國際知名學者，從科學、工程、經濟、語言、醫學及微電子學等角度，分析數字時代的教研創新之道。此外，適逢澳門特別行政區成立25周年，我們亦藉此機會向各位介紹澳大近年推動《憲法》與《澳門基本法》教育的成效。

本期還訪問了莫桑比克蒙德拉內大學校長、澳大法學院校友Manuel Guilherme Júnior，討論如何深化兩校教研合作，同時回顧他十餘年前在澳大求學的難忘時光。在另一篇專訪中，歷史系特聘教授林少陽闡述其對東亞現代思想史的研究，尤其是東亞傳統中「文」的概念及其在現代失落的原因。

在「學術研究」投稿專欄，澳大學者與我們探討曾創業者的辭職意向、CMOS技術於小型核磁共振掃描儀中的應用，以及中國與葡語國家的夥伴關係。刊末的「書院發展」欄目則帶領讀者走進馬萬祺羅柏心書院，了解書院如何構築詩意棲居的大美之境。

希望讀者能通過本期《澳大新語》更了解澳大的研究成果與教育成效，認識澳大專家學者和校友在各領域的創新貢獻。

張惠琴 Katrina Cheong

As Macao continues to diversify its economy, the role of Chinese medicine research and manufacturing in promoting the development of the 'big health' industry has attracted significant interest. The Cover Story section in this issue of *UMagazine* features University of Macau (UM) initiatives to address critical scientific challenges in Chinese medicine. The section highlights how researchers in UM State Key Laboratories, faculties, and institutes translate their research findings into practical applications and contribute to the internationalisation and modernisation of Chinese medicine through innovative interdisciplinary research.

In the Topic Insight section, five distinguished scholars who have received honorary doctorates from UM share their perspectives on teaching and research innovations in the digital era. Their insights cover a range of fields, including science, engineering, economics, linguistics, medicine, and microelectronics. In addition, to mark the 25th anniversary of the establishment of the Macao SAR, we review UM's recent achievements in education about the Constitution of China and the Basic Law of Macao.

We also had the opportunity to speak with Dr Manuel Guilherme Júnior, rector of the Eduardo Mondlane University (UEM) in Mozambique and an alumnus of UM's Faculty of Law. Dr Guilherme Júnior discusses initiatives to deepen collaboration in education and research between UEM and UM, while reminiscing about his formative years at UM over a decade ago. In another interview, Distinguished Professor Lin Shaoyang from the Department of History discusses his research on modern East Asian intellectual history, focusing particularly on the concept of 'wen' (文) in East Asian tradition and its decline in modern times.

In the Academic Research section, UM scholars explore a variety of topics, from the quitting intentions of former entrepreneurs to CMOS technology applications in compact MRI scanners and China's partnerships with Portuguese-speaking countries. Lastly, the RC Development section invites readers to discover Ma Man Kei and Lo Pak Sam College's unique approach to fostering a 'poetic dwelling with grand beauty'.

We hope this issue of *UMagazine* offers readers deeper insights into UM's research achievements and educational impact, while also showcasing the innovative contributions of UM experts and alumni across various fields.

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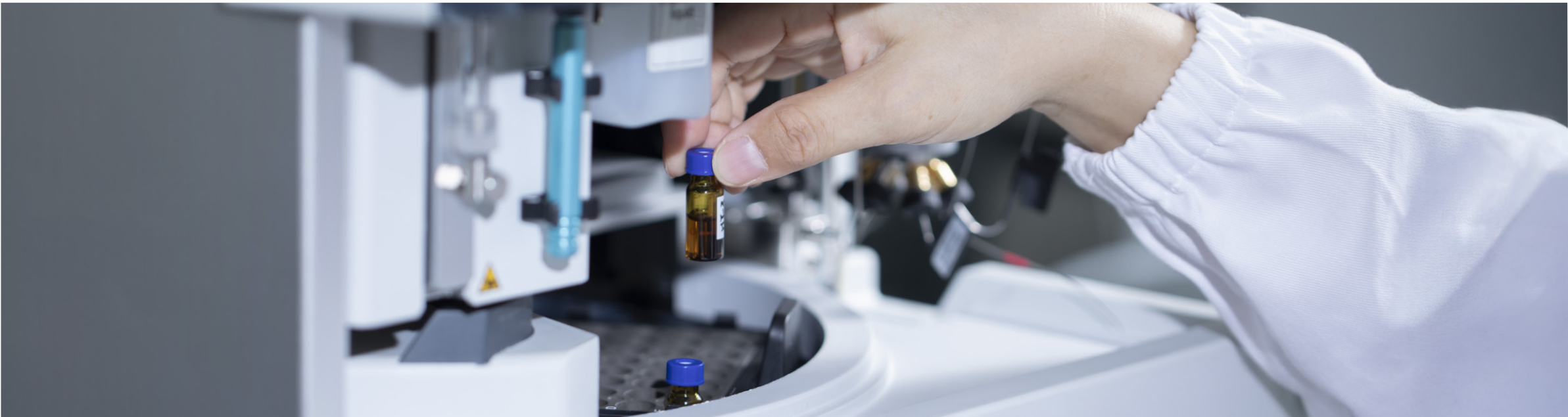
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第二屆澳門中醫藥與天然藥物國際研討會暨第二屆澳門藥學國際研討會於2024年10月在澳大開幕

The 2nd Macao International Conference on Chinese Medicine and Natural Products, along with the 2nd Macao International Conference on Pharmacy, opened at UM in October 2024.

促進中醫藥傳承創新

Innovating Chinese Medicine Through Tradition

文 / 葉浩男 · 圖 / 何杰平·編輯部

Chinese & English Text / Davis Ip · Photo / Jack Ho, Editorial Board

澳門大學多年來致力於推動中藥作用機制與質量研究，廣納海內外科學家參與研發與人才培育，促進澳門中醫藥產業發展和創新研究。

澳大藥理學與毒理學研究水平日益提高

在2024-2025年《美國新聞與世界報道》學科排名中，澳大在藥理學與毒理學領域位居全球第33位。該領域的相關研究主要由中華醫藥研究院暨中藥質量研究國家重點實驗室推動，澳大多個學術單位亦有所貢獻。

中藥質量研究國家重點實驗室主任兼研究院院長陳新特聘教授表示，實驗室擁有完善的研究與教育架構，近年來增設澳門中藥研發中心、澳門中藥檢測中心及藥品監管科學研究中心，並與澳大健康科學學院合作成立了藥物科學系。實驗室已為《美國藥典》、《中國藥典》和《歐洲藥典》制定10餘種中藥國際質量標準；實驗室成員榮獲

2016年國家科技進步獎二等獎及2021年世界中醫藥學會聯合會國際貢獻獎一等獎。實驗室亦在2022年獲澳門特區政府頒授專業功績勳章。

基於作用機制的中藥質量研究

陳教授指出，將現代生物醫學在內的最新科學技術融入中醫藥研究，闡釋中藥臨床療效的生物學機制及其物質基礎，並且建立基於作用機制的中藥質量研究體系，是促進中藥現代化、國際化和中醫藥產業高質量發展的可行路徑。基於這個理念，實驗室的建設以提高中藥臨床療效、保障中藥高質量應用為目標，通過深入研究中藥的藥效物質基礎與生物學機制，為中藥質量及安全性控制提供原創性成果，包括標誌物、技術及方法；同時，實驗室通過揭示中藥作用機制的科學內涵，推動中藥現代化、產業化及國際化，服務國家及澳門中藥產業發展。

陳教授進一步表示，實驗室建立生物學作用及機制導向的中藥質量標準研究，強調中藥中的活性成分與生物體反應的關聯，以確保質量標準能真實反映藥物的臨床療效。總括而言，實驗室的科研方向涵蓋以下重點領域：基於藥效機制的中藥質量研究、基於毒理機制的中藥安全性評價、基於新技術新方法的中藥質量評價、中醫藥成果轉化與監管科學研究。在疾病研究方面，實驗室聚焦於腫瘤及自身免疫性疾病、心腦血管疾病及神經退行性疾病，以及肝病及代謝性疾病。在交叉學科研究上，實驗室正在探索中藥先進生物活性材料、中藥合成生物學，以及人工智能在中醫藥研究中的應用。

中國科學技術協會在2020年發佈對科學發展具有導向作用的10大科學問題，其中之一是「調節人體免疫功能的中醫藥機制是甚麼」。重點實驗室瞄準這一重要研究方向開展系統性研究，揭示了一批中藥免疫調節作用的細胞及分子機制。其中，TNFR2信號通路作為腫瘤及自身免疫疾病的治療靶點，受到海內外科科技界及產業界極大的關注。實驗室研究團隊TNFR2信號的免疫調節作用機制和藥物靶標的確定，作出了一系列關鍵性原創貢獻，並發現中藥活性成分粉防己鹼可激活mTNF-TNFR2通路，而野黃芩苷、雙木犀酰胺及Rubiginosin B則可抑制TNFR2信號，從而發揮免疫調節作用。

新技術和新方法的應用大大提升了實驗室的科技創新能力，例如實驗室研究團隊基於人工智能的篩選方案，通過機器學習從3,700多種中藥小分子中篩選出山奈酚和丹葉大黃素，並在線蟲和小鼠阿茲海默症模型中證實這些小分子化合物在安全劑量下可有效減輕病理表型。

開發創新中藥產品

基於對中藥作用機制與質量的深入研究，實驗室也在開發符合國際標準並具品牌潛力的產品。2020年10月，實驗室獲澳門特區政府批准設立澳門中藥研發中心，整合資源以促進產品研發與成果轉化，並與內地高校、知名中藥企業及京港澳中藥機構合作研發。

澳大中華醫藥研究院副院長兼澳門中藥研發中心主任李鵬教授表示，實驗室與多所內地中醫藥大學及優勢企業共建產學研聯合實驗室，展開20餘項合作，涵蓋創新藥物研究、經典名方研發、名優品種升級及大健康產品開發。「通過研發中心與內地企業的合作，我們已將部分中藥經典名方投入中試生產，並啟動澳門註冊。」此外，實驗室學者在中藥研發方面已

獲多項專利，並孵育多家中醫藥科技企業。

助力藥物檢測及監管

另一方面，澳大澳門中藥檢測中心於2024年11月正式啟用，定位為權威的中藥質量檢驗機構。中藥質量研究國家重點實驗室副主任、澳門中藥檢測中心主任李紹平特聘教授表示：「我們的中心為中藥註冊、生產、物流及出口等過程提供檢測服務，並承擔政府委託的中藥註冊、監督、仲裁及應急檢驗，同時為企業提供技術支持。」

加強中藥關鍵領域的監管科學研究，有助於推動中藥監管理念、制度與機制創新，強化成果轉化應用，加速新產品研發上市。為提升澳門及大灣區在醫療產品監管方面的能力，以及加強跨行業、跨區域及國際合作，實驗室於2023年成立澳大藥品監管科學研究中心。該中心的職責包括協助澳門藥物监督管理局開展中成藥及醫療器械技術審評、監管科學及政策法律法規研究，以及為藥物評價及監管決策開發新的藥品醫療器械監管工具、標準和方法。

促進學術合作

實驗室亦積極與各地大學合作，例如在2023年10月聯同新加坡、香港、馬來西亞及韓國的頂尖大學成立「傳統藥物創新聯盟」，並於2024年3月與香港中文大學、廣州中醫藥大學成立「粵港澳高校針灸聯盟」，近年還與牛津大學、清華大學、湖北中醫藥大學、高麗大學、東京大學及悉尼大學合辦研討會與研究生論壇。實驗室學者也參與編輯多份學術期刊，包括主編的國際中醫藥期刊《Chinese Medicine》。該刊由Springer Nature出版，享譽學界。

提供醫藥科學教育

為培養具備先進技術的醫藥人才，實驗室自2002年起推出中藥學與醫藥管理碩士課程，進而於2004年開辦生物醫藥博士課程。2022年，與澳大健康科學學院合作開設理學士（藥物科學與科技）課程，並於2023年啟動理學碩士（醫藥管理）課程。實驗室近年亦與內地大學簽訂雙學位合作協議，促進學生交流。

回饋社會

實驗室亦為澳門社會提供多元服務。自2021年《中藥藥事活動及中成藥註冊法》生效以來，實驗室多名學者獲委任為中成藥審評專家顧問委員會委員，為中成藥的註冊與質量提供建議，並支持澳門藥物监督管理局決策。此外，實驗室開辦新藥研發、循證醫學等方面的持續專業發展課程、與衛生局合作推出乳腺癌風險評估專案，以及為

在過去多年為四萬多名中小學生提供科學普及活動。

促進中醫藥行業發展

澳門的大健康產業正以中醫藥研發製造為切入點持續發展。陳新教授表示，實驗室將繼續推進中醫藥傳承創新，研發傳統中藥如經典名方現代化製劑，推進中醫藥

The University of Macau (UM) has long been committed to advancing research into the mechanisms and quality of Chinese medicine. By bringing together scientists from around the world, UM fosters innovation, nurtures talent, and strengthens Macao's growing Chinese medicine industry.

UM's Advancements in Pharmacology and Toxicology

In the 2024–2025 U.S. News & World Report global rankings, UM achieved 33rd place in pharmacology and toxicology. Research in these fields at UM is primarily driven by the State Key Laboratory of Quality Research in Chinese Medicine (SKL-QRCM) and the Institute of Chinese Medical Sciences (ICMS), alongside contributions from the university's various other academic units.

Distinguished Professor Chen Xin, director of SKL-QRCM and ICMS, says that SKL-QRCM has established robust systems for research and education. Recent initiatives include the establishment

領域的科技創新，鼓勵傳統醫藥與現代前沿科技結合，推進與生物材料、人工智能和合成生物學等學科的交叉研究。「通過深入研究中藥的作用機制，我們致力於為中藥質量及安全控制帶來原創成果，服務國家及澳門中藥產業。」

of the Macao Centre for Research and Development in Chinese Medicine (MCR&DCM), the Macao Centre for Testing of Chinese Medicine (MCTCM), and the Centre for Pharmaceutical Regulatory Sciences (CPRS). Each of these centres plays a crucial role in supporting the development of the Department of Pharmaceutical Sciences in the Faculty of Health Sciences. SKL-QRCM has set international quality standards for over ten types of Chinese medicine in the United States Pharmacopeia, Chinese Pharmacopoeia, and European Pharmacopoeia. Laboratory members have received several prestigious awards, including the State Scientific and Technological Progress Award (Second Prize) in 2016 and the First Prize International Contribution Award from the World Federation of Chinese Medicine Societies in 2021. Moreover, SKL-QRCM was honoured with the Medal of Merit—Professions by the Macao SAR Government in 2022.

Mechanism-Based Quality Research in Chinese Medicine

Prof Chen explains that integrating the latest scientific

advances, including those in modern biomedical science, into Chinese medicine research provides a viable pathway for modernising and internationalising traditional Chinese medicine while enhancing the quality development of the Chinese medicine industry. This approach involves uncovering the biological mechanisms and material basis that underpin the clinical effectiveness of Chinese medicinal products, as well as establishing a quality research framework based on these mechanisms. With this vision in mind, SKL-QRCM focuses on improving clinical efficacy and ensuring the high-quality application of Chinese medicine. Through in-depth research into effective substances in Chinese medicine and their biological mechanisms, SKL-QRCM has achieved pioneering outcomes—including biomarkers, techniques, and methods—that support quality and safety control in Chinese medicine. By clarifying the scientific rationale behind the efficacy of Chinese medicine, SKL-QRCM has advanced the modernisation, commercialisation, and internationalisation of Chinese medicine, contributing to its growth both in Macao and nationwide.

Prof Chen also emphasises the importance of conducting research on Chinese medicine quality standards based on biological functions and mechanisms. SKL-QRCM focuses its research on the relationships between active ingredients and their effects on the body, ensuring that quality standards accurately reflect a medicine's clinical effectiveness. SKL-QRCM primarily focuses on the following critical research areas: quality research in Chinese medicine based on medicinal mechanisms, safety evaluations using toxicology, quality assessments through new technologies and new methodologies, commercialisation of research outcomes in Chinese medicine, and regulatory sciences. In terms of disease research, the laboratory focuses on tumours, autoimmune diseases, cardiovascular and neurodegenerative conditions, as well as liver and metabolic disorders. Additionally, in interdisciplinary research, the laboratory is exploring advanced bioactive materials, synthetic biology, and AI applications in Chinese medicine research.

In 2020, the China Association for Science and Technology identified ten key scientific questions shaping the future of research. One of the questions was: 'What are the mechanisms by which Chinese medicine regulates immune function in the human



陳新教授
Prof. Chen Xin

body?' In response, SKL-QRCM has initiated systematic research to explore the various cellular and molecular mechanisms through which Chinese medicine influences immune regulation. They have identified the TNFR2 signalling pathway as a potential therapeutic target for cancer and autoimmune diseases, drawing considerable attention from researchers and the industry worldwide. The laboratory's research team has also made significant original contributions by discovering how TNFR2 signalling regulates immunity and establishing it as a potential drug target. They have discovered that tetrandrine activates the mTNF-TNFR2 pathway, while other substances, including scutellarin, isoquercitrin, and rubiginosin B, inhibit TNFR2 signalling, thus producing immunomodulatory effects.

The adoption of new technologies and methodologies has greatly enhanced the laboratory's capacity for scientific innovation. For example, a research team has developed an AI-driven screening method using machine learning to identify kaempferol and rhapontigenin from over 3,700 small molecules in Chinese medicine. These two substances, when administered in safe dosages, have proven effective in alleviating the pathological phenotypes of Alzheimer's disease in Caenorhabditis elegans and mouse models.

Developing Innovative Chinese Medicine Products

Building on extensive research into the mechanisms and quality of Chinese medicine, SKL-QRCM is



澳大於2024年8月成為「一帶一路中醫藥發展聯盟」的創始單位
UM became a founding member of the Belt and Road Chinese Medicine Development Alliance in August 2024

also dedicated to developing products that meet international standards and possess branding potential. In October 2020, the Macao SAR Government approved the establishment of MCR&DCM, bringing together resources to drive product development and commercialisation. The centre collaborates with universities in mainland China, leading companies specialising in Chinese medicine, and institutions in Beijing, Hong Kong, and Macao.

Prof Li Peng, deputy director of ICMS and director of MCR&DCM, explains that SKL-QRCM has established joint laboratories with leading universities and companies from mainland China, leading to more than 20 collaborative projects that cover innovative drug research, the development of classical prescriptions, the enhancement of premier ingredients, and the development of health and wellness products. 'By partnering with enterprises in mainland China, we have advanced several classical Chinese medicine prescriptions into pilot production and initiated the registration process here in Macao,' says Prof Li. In addition, SKL-QRCM researchers have secured numerous patents in Chinese medicine, and incubated many Chinese medicine technology enterprises.

Supporting Pharmaceutical Testing and Regulation

MCTCM was officially inaugurated in November 2024. The centre is positioned as an authority on Chinese medicine quality control. Distinguished Professor Li Shaoping, deputy director of SKL-QRCM

and director of MCTCM, explains, 'MCTCM offers comprehensive testing services—from registration and production to logistics and export. We also take on government-assigned tasks such as registration, supervision, arbitration, and emergency testing, and we provide technical support for businesses.'

Strengthening regulatory sciences in key areas of Chinese medicine can enhance the innovative development of the regulatory concepts, systems, and mechanisms in Chinese medicine. It will also facilitate the commercialisation of research findings and accelerate the development and market entry of new products. To strengthen regulatory capabilities for healthcare products in Macao and across the Guangdong-Hong Kong-Macao Greater Bay Area, and promote cross-sectoral, cross-regional, and international collaboration, UM established CPRS in 2023. The centre's key functions include assisting the Pharmaceutical Supervision and Administration Bureau of Macao with technical evaluations of proprietary Chinese medicines and medical devices; conducting research on regulatory science, policy, and legal frameworks; developing new regulatory tools, standards, and methods for drug evaluation and regulatory decision-making.

Promoting Academic Collaboration

In addition to its research efforts, SKL-QRCM actively collaborates with universities worldwide. In October 2023, the laboratory launched the Traditional Medicine Innovation Alliance with leading universities from Singapore, Hong Kong, Malaysia,



首屆「澳門藥品監管科學國際論壇—中藥高質量發展：理論與實踐」於2024年10月在澳大舉行

The 1st 'Macau International Forum on Pharmaceutical Regulatory Science—High-Quality Development of Chinese Medicine: Theory and Practice' took place in UM in October 2024

and South Korea. In March 2024, it co-founded the Guangdong-Hong Kong-Macao University Alliance for Acupuncture with the Chinese University of Hong Kong and Guangzhou University of Chinese Medicine. In recent years, the laboratory has also co-hosted seminars and postgraduate forums with institutions including the University of Oxford, Tsinghua University, Hubei University of Chinese Medicine, Korea University, the University of Tokyo, and the University of Sydney. Furthermore, scholars from SKL-QRCM serve as editors for several academic journals, including *Chinese Medicine*. Published by Springer Nature, this international journal enjoys a strong academic reputation.

Providing Pharmaceutical Education

To develop professionals in medicine and pharmaceuticals, SKL-QRCM has offered master's programmes in Chinese medicine and pharmaceutical administration since 2002, as well as a PhD programme in biomedical sciences since 2004. In 2022, it introduced a Bachelor of Science in Pharmaceutical Sciences in collaboration with UM's Faculty of Health Sciences, followed by a new Master's in Pharmaceutical Administration in 2023. In recent years, SKL-QRCM has also signed dual-degree agreements with universities in mainland China, providing student exchange opportunities.

Giving Back to the Community

SKL-QRCM also provides a wide range of services to the Macao community. Since the Law on Pharmaceutical Activity in the Field of Traditional Chinese Medicine and the Registration of Traditional

Chinese Medicines was enacted in 2021, several SKL-QRCM experts have been appointed to the Commission of Experts and Advisors for the Evaluation of Traditional Chinese Medicines, offering essential guidance on the registration and quality of Chinese medicine products and supporting decision-making of the Pharmaceutical Administration Bureau of Macao. SKL-QRCM also offers Continuing Professional Development courses on topics such as new drug development and evidence-based medicine, collaborates with the Health Bureau on a breast cancer risk assessment project, and hosts science activities for over 40,000 primary and secondary students.

Advancing the Chinese Medicine Industry

With Macao's 'big health' industry growing steadily, centred on Chinese medicine R&D and manufacturing, Prof Chen Xin emphasises that SKL-QRCM will continue to innovate Chinese medicine while preserving its traditions. The laboratory will develop modern pharmaceutical preparations of traditional Chinese medicine, including classical prescriptions, promote scientific and technological innovation in the field, encourage the integration of traditional medicine with cutting-edge technologies, and enhance interdisciplinary research between biomaterials, artificial intelligence and synthetic biology. 'Through in-depth research into the mechanisms of Chinese medicine, we are aiming for original breakthroughs in quality and safety control. This work supports the Chinese medicine industry both in Macao and across the country,' he says.



2024年8月，為落實「澳大與深圳市藥品檢驗研究院戰略合作框架協議」，深圳市藥品檢驗研究院向澳大中醫藥檢測中心捐贈100份中藥標本。

To implement the strategic cooperation framework agreement signed with UM, the Shenzhen Institute for Drug Control donated 100 Chinese medicine specimens to the Macao Centre for Testing of Chinese Medicine in August 2024.



中醫藥研究的成果轉化

Translating Chinese Medicine Research Into Real-World Applications

文 / 葉浩男 · 圖 / 何杰平 · 編輯部

Chinese & English Text / Davis Ip · Photo / Jack Ho, Editorial Board

澳門大學中醫藥質量研究國家重點實驗室暨中華醫藥研究院歷年來在中藥創新研究方面積累了系列科技成果。為將這些成果轉化為實際產品、服務澳門中醫藥產業發展，澳大近年設立澳門中醫藥研發中心、澳門中醫藥檢測中心及藥品監管科學研究中心，形成完善的中藥科技創新與研發轉化體系。

研發創新中藥產品

實驗室把握粵港澳大灣區發展契機，於2020年設立澳門首個中醫藥創新研發與轉化平台——澳門中醫藥研發中心。聯合廣藥集團、華潤三九、片仔癀、華潤江中、中國中醫科學院中醫研究所、香港中醫藥創新研發中心等頂尖產學研機構，該中心聚焦經典名方研發、名優品種升級和健康精品開發，旨在整合中藥產業全鏈條優勢資源，推動澳門中醫藥產業升級發展。

中華醫藥研究院副院長、澳門中醫藥研發中心主任李鵬教授指出，中心以服務澳門經濟多元發展為宗旨，已攜手多家知名藥企聯合開展保元湯、半夏瀉心湯、黃芪桂枝五物湯等經典名方，滋腎育胎丸、小兒七星茶等名優品種，靈芝孢子油、雙孢菇多糖等健康產品等研發合作20餘項，推動廣藥國際靈芝孢子油等品種於澳門上市。

他補充道，隨著橫琴粵澳深度合作區加快建設具自主知識產權和中國特色的醫藥創新轉化平台，澳門中醫藥研發中心正積極與橫琴的企業及研發機構合作，充分發揮「一國兩制」優勢，結合內地的資源，共同推動中醫藥產業快速發展。

提供中藥檢測服務

中醫藥產品上市前須經嚴格審核與檢驗。為滿足澳門

不斷增長的中藥檢測需求，在特區政府支持下，澳大自2021年7月起籌建，並於2022年1月12日正式成立澳大澳門中醫藥檢測中心。該中心於2024年11月正式啟用。

中藥質量研究國家重點實驗室副主任、澳大澳門中醫藥檢測中心主任李紹平特聘教授表示：「特區政府和大學高度重視澳門中醫藥檢測中心的建設。過去兩年來，中心專注於建立質量管理體系、提升檢測能力、加強交流推介及拓展服務範圍，並參與多項能力驗證。」2023年5月，中心的首批檢測項目「中藥材中鉛、銅、砷、汞、銅含量測定法」獲得中國合格評定國家認可委員會（CNAS）認可。

李紹平教授表示：「截至2024年9月，中心已有118項中醫藥檢測獲得中國合格評定國家認可委員會的認可，涵蓋《中國藥典》中的中藥理化及微生物檢測項目。理化檢測參數包括重金屬及有害元素、二氧化硫殘留量、黃麴黴毒素、33種禁用農藥的檢測、鑒別、含量測定等；微生物參數則包括生物限度檢查及控制菌檢查。」

李紹平教授進一步指出：「促進澳門醫藥領域的產學研成果轉化是中心的另一重要目標。因此，中心致力提升專業影響力，推動澳門成為中藥質量標準制定的領導者，建立以質量為核心、標準為龍頭、檢測為手段、認證為目標的澳門特色中藥檢測認證產業，為發展『澳門製

造』、『澳門監造』和『澳門監製』提供質量保障。」

發展藥品監管科學

2023年，西太區草藥監管協調論壇（FHH）永久秘書處落戶澳大，協助搭建中醫藥產業經貿合作服務平台，推進開展區域乃至國際草藥標準、產品註冊技術要求的研究制定工作，促進標準協調一致，發揮澳門在中藥國際發展中的協調作用。

同年，澳大藥品監管科學研究中心成立，致力建構可持續發展的平台，促進澳門及大灣區在醫藥產品監管方面的能力提升。研究中心主任胡元佳教授說，該中心的職責包括：協助澳門藥物監督管理局開展中成藥及醫療器械技術審評；監管科學及政策法律法規研究；為藥物評價及監管決策開發新的藥品醫療器械監管工具、標準和方法；承擔政府及業界的研究項目；加強藥械監管人才的培養與交流；開辦業界培訓。

此外，中心積極與各界交流和合作，例如最近承辦首屆「澳門藥品監管科學國際論壇——中藥高質量發展：理論與實踐」，聯動澳門與中國內地、東南亞地區、葡語系國家和其它國家的藥品監管專家學者及政策制定者，持續打造醫藥產品產、學、研、政的交流合作平台，助力藥品醫療器械監管創新發展。胡教授表示：「中心將繼續深化職能，促進澳門的藥事服務與產業發展。」



澳大澳門中醫藥研發中心與內地和香港的知名企業和研究機構合作研發產品

The Macao Centre for Research and Development in Chinese Medicine at UM collaborates with leading enterprises and research institutions in mainland China and Hong Kong on product development

制訂中藥質量標準

國際認可的質量標準有助中醫藥走向全球市場。因此，實驗室積極推動中藥質量創新方法的建立與國際質量標準的制定，分別與美國藥典委員會、歐洲藥典委員會及中國食品藥品檢定研究院建立聯合實驗室，已立項和制定20餘項《美國藥典》、《歐洲藥典》及《中國藥典》標準，涵蓋的中藥品種包括三七、麥冬、枸杞、蛹蟲草、人工蟲草菌粉、高良薑、鐵皮石斛、廣藿香、餘甘子等。

參與制定中藥質量標準的過程中，實驗室專注於中藥質量的核心要素，開展創新方法的開發與應用。2016年，研究院與國家重點實驗室及北京協和醫學院——清華大學醫學部等機構合作完成的「中草藥DNA條形碼物種鑒定體系」研究榮獲國家科學技術進步獎二等獎。

奮發進取貢獻社會

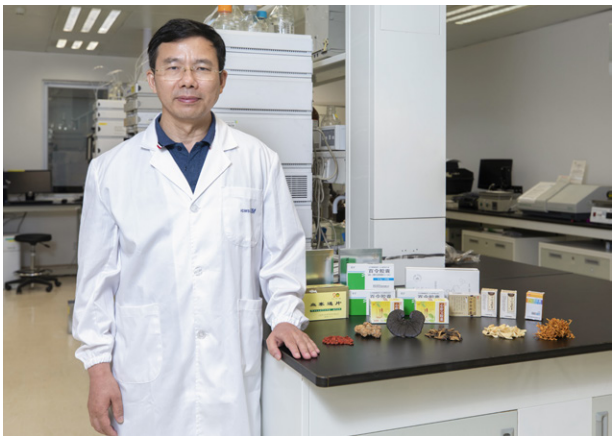
從藥物研發到產品與服務的轉化，再到推動中醫藥產業的發展，是一個漫長且充滿挑戰的過程，需要政



李鵬教授
Prof Li Peng

府、研究機構與企業之間的緊密合作。在這條產學研合作的道路上，澳大將不斷進取，致力將更多中醫藥研究成果轉化為實際應用，為推動中醫藥產業的持續發展作出貢獻。

Since their inception, the University of Macau's (UM) State Key Laboratory of Quality Research in Chinese Medicine (SKL-QRCM) and the Institute of Chinese Medical Sciences (ICMS) have achieved numerous scientific advancements in Chinese medicine innovation. To transform these research outcomes into practical products and support the development of Macao's Chinese medicine industry, UM has, in recent years, set up the Macao Centre for Research and Development in Chinese Medicine, the Macao



李紹平教授
Prof Li Shaoping

Centre for Testing of Chinese Medicine, and the Centre for Pharmaceutical Regulatory Sciences, forming a comprehensive system for innovation and translational research in the science and technology of Chinese medicine.'

Developing Innovative Chinese Medicine Products

In 2020, leveraging the growth of the Guangdong-Hong Kong-Macao Greater Bay Area, SKL-QRCM established the Macao Centre for Research and Development in Chinese Medicine (MCR&DCM), Macao's first dedicated platform for the innovation, research, development, and translation of Chinese medicine. MCR&DCM collaborates with leading pharmaceutical companies and research institutions, including Guangzhou Pharmaceutical Corporation, China Resources Sanjiu Medical & Pharmaceutical Co Ltd, Pien Tze Huang Pharmaceutical Co Ltd, China Resources Jiangzhong Pharmaceutical Group Co Ltd, the Institute of Chinese Materia Medica at the China Academy of Chinese Medical Sciences, and the Centre for Chinese Herbal Medicine Drug Development in Hong Kong. By focusing on modernising classical prescriptions, enhancing established product lines, and developing premium health products, MCR&DCM aims to consolidate



澳大澳門中藥檢測中心
The Macao Centre for Testing of Chinese Medicine at UM

resources in the Chinese medicine industry's supply chain to drive the development of the Chinese medicine sector in Macao.

Prof Li Peng, deputy director of ICMS and director of MCR&DCM, explains that MCR&DCM is dedicated to supporting the diversification of Macao's economy. To this end, the centre has collaborated with leading pharmaceutical companies on over 20 projects. These projects include developing traditional formulas such as Baoyuan Decoction (to improve vitality), Banxia Xiexin Decoction (to improve digestion), and Astragalus and Cinnamon Twig Decoction (to improve circulation); popular remedies such as Zishen Yutai Pills and Xiaoer Qixing Cha; and health products such as Ganoderma spore oil and Agaricus bisporus polysaccharides. The centre has also facilitated the introduction of products such as Ganoderma lucidum spore oil soft capsules, developed by GPHL International, into the Macao market.

Prof Li Peng adds that with the rapid development of a medical innovation platform characterised by independent intellectual property rights and Chinese features in the Guangdong-Macao In-depth Cooperation Zone in Hengqin, MCR&DCM is actively partnering with enterprises and research institutions

in Hengqin. The centre strives to leverage the advantages of the 'one country, two systems' policy and incorporate resources from the mainland to advance the Chinese medicine industry.

Providing Chinese Medicine Testing Services

Chinese medicine products must undergo rigorous examination and testing before they are launched in the market. To meet Macao's growing demand for these services, and with the support of the Macao SAR Government, UM commenced creation of the Macao Centre for Testing of Chinese Medicine (MCTCM) in July 2021. MCTCM was established on 12 January 2022, and officially came into operation in November 2024.

Distinguished Professor Li Shaoping, deputy director of SKL-QRCM and director of MCTCM, says, 'The Macao SAR Government and the university place a strong emphasis on Chinese medicine testing. Over the past two years, MCTCM has been committed to building a quality management system, enhancing testing capabilities, fostering partnerships, and expanding service offerings. The centre has also taken part in several testing capability assessments.' In May 2023, MCTCM's first testing service—measuring levels of lead, cadmium, arsenic, mercury, and copper



澳大藥品監管科學研究中心承辦首屆「澳門藥品監管科學國際論壇—中藥高質量發展：理論與實踐」
The UM Centre for Pharmaceutical Regulatory Sciences hosted the 1st Macau International Forum on Pharmaceutical Regulatory Science—High-Quality Development of Chinese Medicines: Theory and Practice

in Chinese medicinal ingredients—was accredited by the China National Accreditation Service for Conformity Assessment (CNAS).

By September 2024, 118 Chinese medicine testing services provided by MCTCM had passed CNAS's expanded and supervisory assessments. Prof Li says, 'Our accredited testing services now basically cover the standards in the Chinese Pharmacopoeia, and include a range of chemical and microbiological tests. In terms of chemical analyses, we test for heavy metals, hazardous elements, sulphur dioxide residues, aflatoxins, and 33 banned pesticides. We are also equipped to identify and quantify content levels. For microbiological testing, our parameters include microbial limits and control strains.'

Prof Li adds that another goal of the centre is to facilitate the application of pharmaceutical research outcomes in Macao. 'The centre is dedicated to enhancing its professional influence and positioning Macao as a leader in establishing quality standards for Chinese medicine. By developing a testing and certification industry for Chinese medicine with Macao characteristics—where quality is the core focus, standards provide guidance, testing serves as a key tool, and certification is the ultimate goal—our centre aims to ensure rigorous quality assurance for products that are developed, approved, and certified in Macao.'

Advancing Pharmaceutical Regulatory Sciences

In 2023, the permanent secretariat of the Western Pacific Regional Forum for the Harmonization of

Herbal Medicines was established at UM. The secretariat is committed to building a service platform for economic and trade cooperation in the Chinese medicine industry, as well as promoting research and related work for establishing regional and international standards for herbal products and developing technical requirements for product registration, in order to promote Macao's role as a key coordinator in the global development of Chinese medicine.

Also in 2023, UM established the Centre for Pharmaceutical Regulatory Sciences (CPRS). The centre is dedicated to building a sustainable platform to strengthen regulatory capabilities for healthcare products in Macao and across the Guangdong-Hong Kong-Macao Greater Bay Area. Prof Hu Yuanjia, director of CPRS, says that the centre's key functions include assisting the Pharmaceutical Administration Bureau of Macao with technical evaluations of proprietary Chinese medicines and medical devices; conducting research on regulatory science, policy, and legal frameworks; developing new regulatory tools, standards, and methods for drug evaluation and regulatory decision-making; and undertaking government and industry research projects. The centre is also dedicated to cultivating talent in regulatory science and organising relevant training and exchange programmes.

Moreover, CPRS actively promotes collaboration. The centre recently hosted the 1st Macau International Forum on Pharmaceutical Regulatory Science—High-Quality Development of Chinese Medicines: Theory and Practice. The forum brought together

pharmaceutical regulatory experts, scholars, and policymakers from Macao, mainland China, Southeast Asia, Portuguese-speaking countries, and beyond, aiming to establish a collaborative and exchange platform among industry, academia, research institutions, and government departments in medical product regulation and innovation. Prof Hu says, 'CPRS will keep expanding its role to further support the development of pharmaceutical services and the industry in Macao.'

Establishing Quality Standards for Chinese Medicine

Internationally recognised quality standards are essential to bringing Chinese medicine to the global market. Therefore, SKL-QRCM is actively developing innovative quality analysis methods and international standards. The unit has established joint laboratories with the United States Pharmacopeia Convention, the European Pharmacopoeia Commission, and China's National Institutes for Food and Drug Control, respectively. These joint laboratories have completed or are working on including more than 20 Chinese medicine quality standards in the *United States Pharmacopeia*, *European Pharmacopoeia*, and *Chinese Pharmacopoeia*. These standards cover key medicinal ingredients, including Panax notoginseng, ophiopogon root, goji berries, cordyceps militaris, artificial cordyceps powder, galangal, dendrobium, patchouli, and amla.

When it comes to the establishment of Chinese medicine quality standards, SKL-QRCM focuses on core quality elements and developing innovative



胡元佳教授
Prof Hu Yuanjia

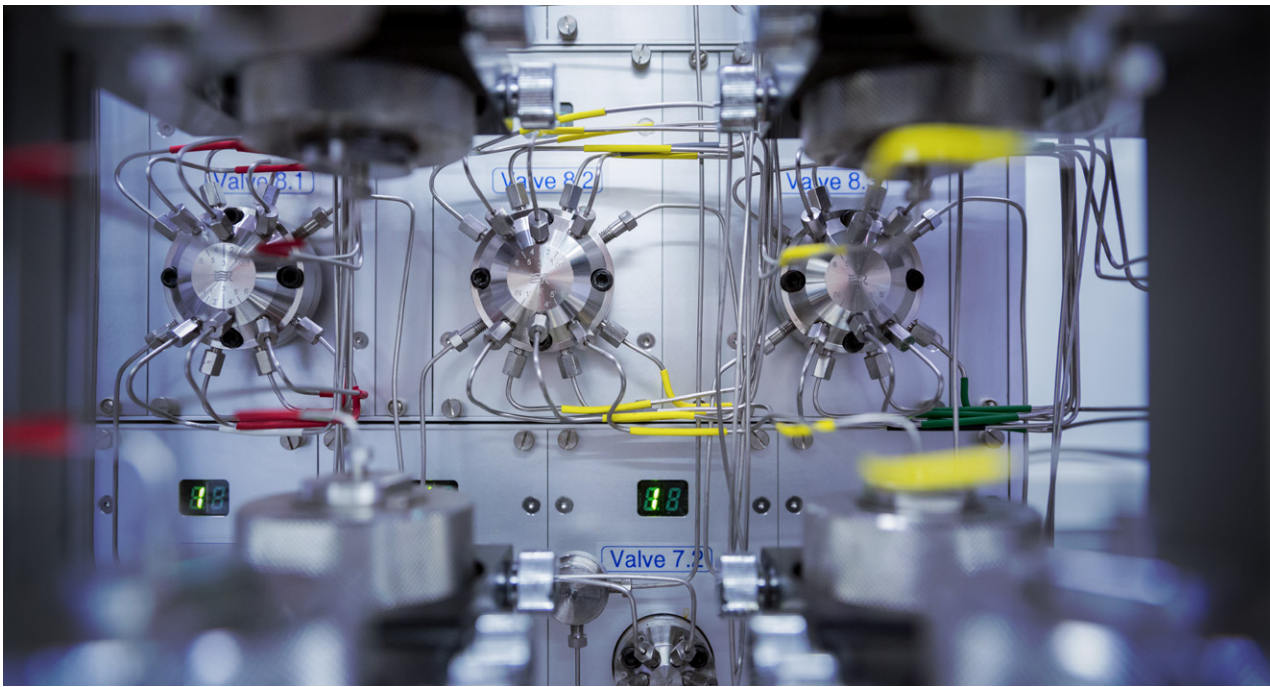
methods and applications. In 2016, SKL-QRCM, ICMS, and Peking Union Medical College conducted a research project focused on using DNA barcoding for species identification of medicinal plants, which was awarded a second prize of the State Scientific and Technological Progress Award.

Committed to Making a Social Impact

From drug development to product and service launch, and ultimately to promoting the development of the Chinese medicine industry, this journey is long and full of challenges. The process requires close collaboration between government departments, research institutions, and industry. Throughout this process, UM is committed to translating more Chinese medicine research results into practical applications, thus making contributions to the sustainable development of the Chinese medicine industry.



澳大已立項和制定20餘項《美國藥典》、《歐洲藥典》及《中國藥典》標準
UM scholars have completed or are working on including over 20 quality standards in the *United States Pharmacopeia*, *European Pharmacopoeia*, and *Chinese Pharmacopoeia*.



中醫藥與多學科交叉融合

Chinese Medicine and Interdisciplinary Integration

文 / 郭麗雅、葉浩男 · 圖 / 何杰平，部分由受訪者提供

Chinese & English Text / Gloria Kuok, Davis Ip · Photo / Jack Ho, with some provided by the interviewees

澳門大學中藥質量研究國家重點實驗室暨中華醫藥研究院與校內多個學院和研究院合作，開展交叉學科研究，聚焦先進生物活性材料、合成生物學及人工智能等在中醫藥研究上的應用。

天然多糖藥物促皮膚組織修復

許多中藥有效成分在人體內難以吸收。因此，澳大專家正在開發中藥來源的新型材料，尤其是能促進細胞活性和組織再生的生物活性材料。中藥質量研究國家重點實驗室、中華醫藥研究院教授王春明的團隊在這方面取得了重要成果。他們從中藥杜仲中提取出一種名為EUP3的多糖敷料，能促進傷口癒合，對糖尿病小鼠的慢性傷口具有顯著的修復效果。他們在2019年完成基礎研究，2022年實現技術轉化，2023年啟動臨床前測試。

目前，王教授的團隊將這些活性多糖開發成製劑，並

在中國內地的三甲醫院開展患者臨床試驗。他們還在研發其它基於中藥多糖的產品，其中一款不含酒精成份、抑菌的白及葡甘聚糖免洗護膚凝膠已經上市。

王教授的團隊近期也開發出一種獨特的小分子寡糖，並與國藥集團合作進一步開發為醫療器械。該小分子寡糖可引導調節性T細胞（一種特殊的免疫細胞，英文簡稱Tregs）在毛囊周圍聚集，加速小鼠毛髮生長。王教授說：「這項研究解決了傳統多糖材料活性多樣但缺乏特異性的問題，有助開發更安全、有效的工具用於修復皮膚及其附屬器官。」

發現植物化學防禦系統

澳大研究人員也在探索利用中藥材的活性成分來抑制病原菌侵襲，希望用於生產更穩定、更有效的植物源性農藥，減少依賴化學農藥。中藥質量研究國家重點實驗室、中華醫藥研究院教授萬建波的研究團隊近

年聯合北京中醫藥大學和西南林業大學的專家取得突破。他們發現，三七（一種人參屬藥用植物，雲南白藥的主要成分）有一種由特定酶介導的雙元素防禦系統，有助抵禦病原菌侵襲。

萬教授說，植物面對環境中的各種脅迫，會產生一系列次生代謝產物來應對，對植物的化學防禦機制至關重要。經過反覆驗證，他的研究團隊發現，這個防禦系統由一種特定的酶（β-葡萄糖苷水解酶）和一類原人參二醇型皂苷組成。當植物受病原真菌感染時，這些真菌釋放的胞外酶會破壞葉綠體（植物細胞中負責光合作用的小型結構）的完整性，從而啟動該防禦系統。隨後，β-葡萄糖苷水解酶對皂苷分子中的糖基進行選擇性水解，生成一種強效活性物質來抵抗病菌。

萬教授表示：「我們在人參、西洋參等人參屬藥用植物中也發現類似的雙元素防禦系統。這為我們開發植物源性的農藥提供重要參考，有助減少種植人參類中藥材時大量使用化學農藥，促進中藥材產業可持續發展。」

人工智能加速藥物篩選

人工智能幫助科學家高效分析海量數據，包括中藥方劑的組合、藥理機制、製劑開發和臨床試驗結果，加速發現潛在藥物。其中，中華醫藥研究院副院長、中藥質量研究國家重點實驗室副教授路嘉宏的團隊與挪威奧斯陸大學、溫州醫科大學和德睿智藥等機構合作，將人工智能與細胞、線蟲和小鼠的阿爾茨海默病的模型結合，開發了一款藥物篩選算法，以此從中藥材中篩選有潛力治療阿爾茨海默症的小分子化合物。

路教授說，他們的團隊對來自兩個數據庫共1,900萬個小分子的數據進行預訓練，開發出一個綜合考慮分子多維資訊的表徵模型。他們隨後從3,724個天然小分子篩選出18個作進一步驗證。

最終，路教授的團隊找到來自山奈等植物的天然黃酮類化合物山奈酚，以及來自閉苞買麻藤的芪類化合物丹葉大黃素：「我們發現，這兩種化合物能顯著改善患有阿爾茨海默症小鼠的神經退行性變化，有助減少牠們的病理特徵（例如澱粉樣蛋白和微管相關蛋白的聚集），並且增強牠們的學習和記憶能力。這項發現為我們將來利用線粒體自噬激活策略治療

阿爾茨海默症的工作提供基礎。」

算法平台助力藥物設計

此外，中藥質量研究國家重點實驗室、中華醫藥研究院副教授歐陽德方帶領的團隊開發了一個名為DeepCSP的機器學習框架，用於解決傳統晶體結構預測中的難題。「藥物的晶體結構直接影響其安全性、療效和生產效率，不同的晶體結構會影響藥物的吸收、穩定性和效果。由於中藥成分複雜多變，找到穩定的結晶形式往往充滿挑戰。」他又指出，這個機器學習框架結合了生成對抗網絡和分子圖卷積網絡技術，能從數據中生成潛在的晶體結構，並預測其穩定性，將晶體結構的生成和預測縮短至幾分鐘內完成。

歐陽教授續說，製劑設計是藥物開發的關鍵一環，涉及測試藥物的物理與化學性質和釋放方式。傳統的製劑設計依賴大量實驗和經驗，耗時又昂貴。因此，他的團隊推出Formulation AI平台。該平台結合豐富的藥物製劑數據和先進的人工智能算法，旨在優化藥物設計流程，提高效率和準確性，減少對實驗的依賴。

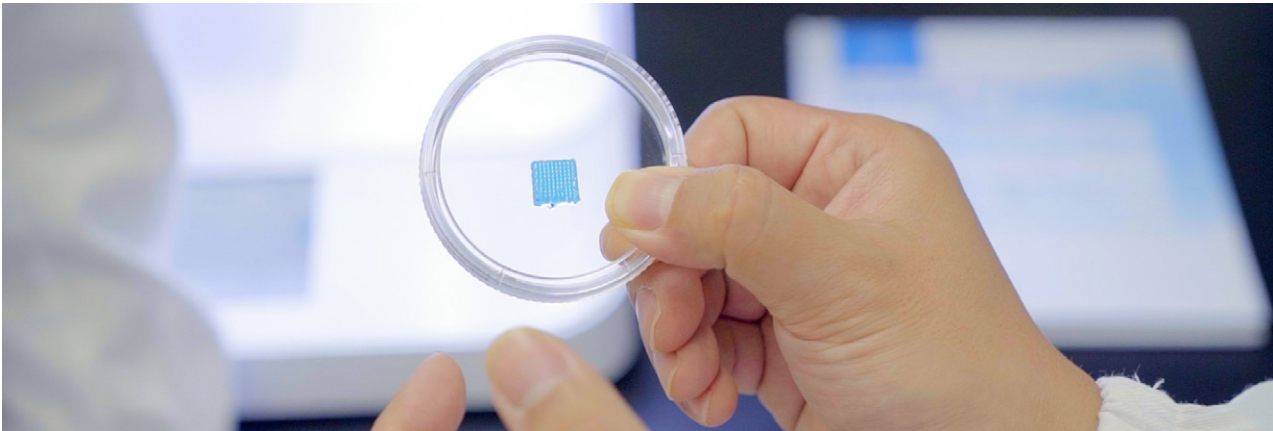
歐陽教授表示，Formulation AI能預測和評估難溶性藥物的增溶配方的17種重要特性，涵蓋藥物-環糊精、固體分散體、磷脂複合物、納米粒晶體、自乳化、脂質體遞送共六大體系。「Formulation AI能快速預測，毋須複雜的理論計算或實驗室測試，將製劑開發流程由經驗驅動轉為數據驅動，目前有逾300家知名製藥公司和研究機構使用。」

推動中藥合成生物學研究

許多中藥材來源稀缺，而且易受種植環境和氣候等影響，質量和有效成分含量波動較大。因此，澳大研究人員正在研究模擬中藥活性成分的生物合成過程，通過人工構建的生物系統和合成技術來穩定提取中藥的有效成分。中華醫藥研究院更與中國科學院天津工業生物技術研究所共建「中醫藥合成生物學聯合實驗室」，並在2023年起聯合培養博士生。

交叉學科研究助力中藥創新

澳大中藥質量研究國家重點實驗室與大學內外眾多研究機構通力合作，促進中醫藥交叉學科研究，為中醫藥產業的可持續發展開闢新方向，拓展中醫藥的全球影響力，並為大健康產業的發展作出更大貢獻。



糖尿病足傷口敷料
A dressing for diabetic foot ulcers

At the University of Macau (UM), the State Key Laboratory of Quality Research in Chinese Medicine (SKL-QRCM) and the Institute of Chinese Medical Sciences (ICMS) are working closely with the Faculty of Health Sciences, Faculty of Science and Technology, Zhuhai UM Science & Technology Research Institute, and State Key Laboratory of Internet of Things for Smart City to conduct interdisciplinary studies. They focus on the application of advanced bioactive materials, synthetic biology, and artificial intelligence in Chinese medicine research.

Promoting Skin Tissue Repair With Natural Polysaccharide Drugs

Many active ingredients of Chinese medicine are difficult for the human body to absorb. To address this, experts at UM are developing innovative materials derived from Chinese medicine to enhance

the efficacy of these active ingredients in the body, with a focus on bioactive materials that can induce cellular activity or tissue regeneration. A team led by Wang Chunming, professor in SKL-QRCM and ICMS, has made significant progress. They extracted a polysaccharide dressing called EUP3 from Eucommia, a traditional Chinese medicinal herb known for promoting wound healing, which has shown notable effects on chronic wounds on the feet of diabetic mice. The team completed basic research in 2019, achieved technological translation in 2022, and initiated preclinical testing in 2023.

Prof Wang's team is developing these active polysaccharide dressings into formulations and conducting clinical trials in Class A tertiary hospitals in mainland China. They are also developing other polysaccharide-based products derived from Chinese medicine. Notably, an alcohol-free, antibacterial hand sanitising gel containing glucomannans from Bletilla striata is already on the market.

On another front, Prof Wang's team has recently discovered a distinctive oligosaccharide fraction and is collaborating with Sinopharm Group to develop it into a medical device. This substance can guide regulatory T cells (or Tregs, a type of immune cells) to gather around hair follicles, thereby accelerating hair growth in mice. 'This research demonstrates the precise immune-modulating function of glycan materials,' Prof Wang says. 'It addresses the issue of traditional polysaccharide materials exhibiting varied activity with inconsistent therapeutic effects. This discovery unlocks the potential for safer, more



王春明教授
Prof Wang Chunming

targeted treatments based on Chinese medicine polysaccharides, with promising applications in the repair of skin and its appendages.'

Discovering Chemical Defence Systems of Plants

UM researchers are also investigating how active ingredients in Chinese medicinal plants inhibit pathogen invasion, with the aim of developing more stable and effective plant-based pesticides to reduce reliance on chemical pesticides. In recent years, a team led by Wan Jianbo, professor in SKL-QRCM and ICMS, in collaboration with experts from Beijing University of Chinese Medicine and Southwest Forestry University, made a breakthrough. They have discovered that Panax notoginseng (a type of ginseng and a key ingredient in Yunnan Baiyao) has a two-component chemical defence system mediated by specific enzymes, which helps protect the plant from pathogens.

Prof Wan explains that plants produce a series of secondary metabolites when exposed to various environmental stresses, and this chemical defence mechanism is essential for their survival. His research team found that the defence system in Panax notoginseng consists of a specific enzyme (β -glucosidase) and a class of protopanaxadiol-type saponins. When the plant is infected by pathogenic fungi, enzymes released by these fungi disrupt the integrity of chloroplasts (organelles in plant cells responsible for photosynthesis), thereby activating the plant's defence system. The β -glucosidase enzyme then selectively hydrolyses the glycosides



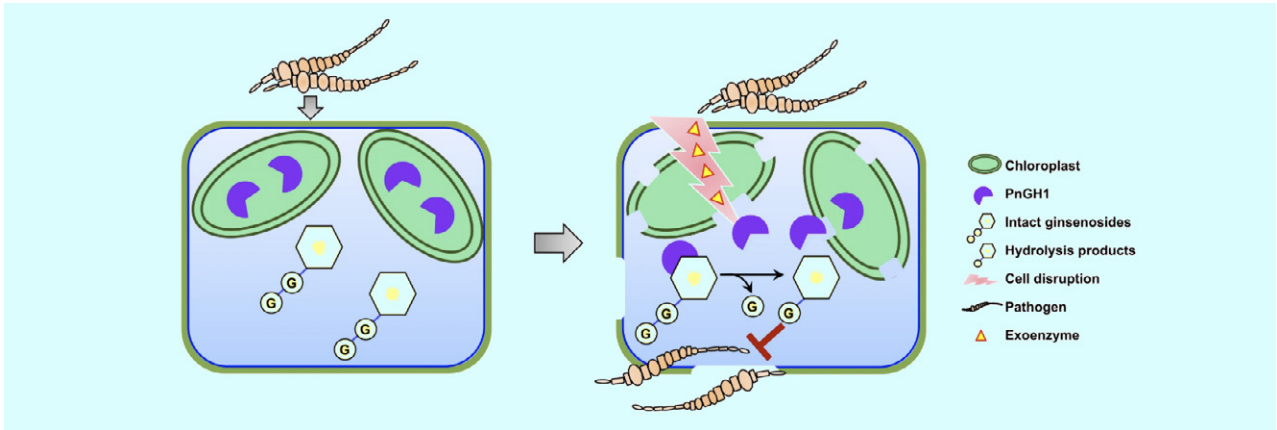
萬建波教授
Prof Wan Jianbo

in the saponin molecules, producing a potent active substance to combat the pathogens.

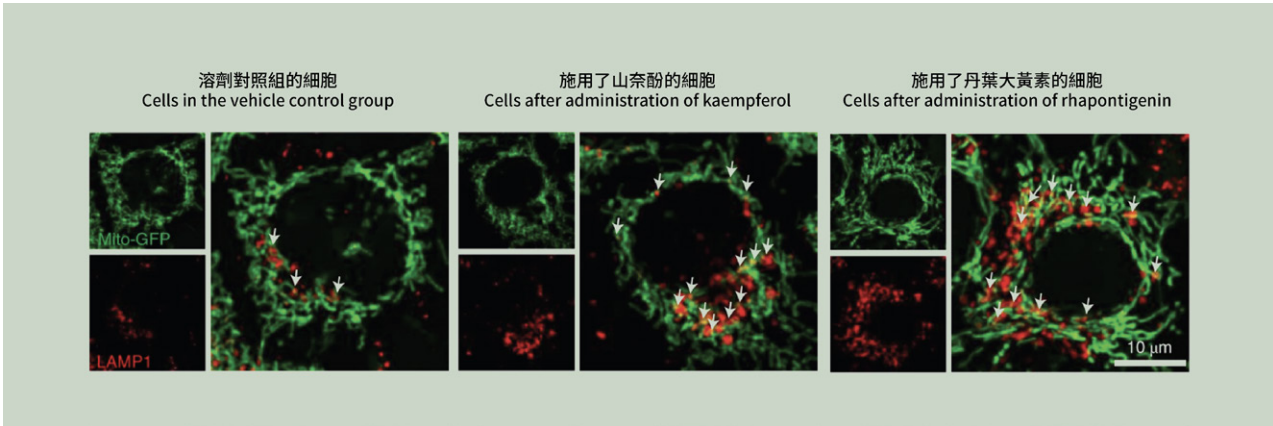
'We have also identified similar two-component defence systems in other medicinal Panax species, such as Asian ginseng and American ginseng,' adds Prof Wan. 'This discovery provides insights for developing plant-based pesticides, which can help reduce the excessive use of chemical pesticides in the cultivation of medicinal ginseng and support sustainable practices in Chinese herbal medicine production.'

Speeding Up Drug Screening With Artificial Intelligence

Artificial intelligence enables scientists to analyse vast amounts of data, including combinations of traditional Chinese medicine formulas, pharmacological



人參屬植物中雙元素防禦反應示意圖
A schematic diagram of the two-component chemical defence system in *Panax* species



研究員對GFP-mito-mCherry-Parkin HeLa細胞施用山奈酚和丹葉大黃素，驗證這兩款線粒體自噬激活劑的功效。
The researchers administered kaempferol and rhapontigenin to GFP-mito-mCherry-Parkin HeLa cells to validate their ability to induce mitophagy

mechanisms, formulation development, and clinical trial results, accelerating the discovery of potential drugs. A team led by Lu Jiahong, deputy director of ICMS and associate professor in SKL-QRCM, has collaborated with partners such as the University of Oslo in Norway, Wenzhou Medical University, and MindRank (a drug discovery company). They have developed an advanced machine-learning algorithm for drug screening by combining the AI-assisted drug screening platform with cells, *C. elegans*, and mouse models of Alzheimer's disease, and identified several small-molecule compounds from Chinese medicinal plants with potential for treating Alzheimer's disease.

According to Prof Lu, his team pre-trained a representation model incorporating multi-dimensional molecular information from data on 19 million small molecules sourced from two databases. Following this, the team screened 3,724 natural small molecules and eventually identified 18 for further validation.

Their efforts led to the discovery of two promising compounds: the natural flavonoid kaempferol from sand ginger and the stilbenoid rhapontigenin from *Gnetum cleistostachyum*. 'We found that these two compounds significantly improved neurodegenerative symptoms in mouse models of Alzheimer's disease, reducing pathological markers such as the aggregation of amyloid plaques and tau protein, while also improving their learning and memory abilities,' Prof Lu says. 'This discovery lays a foundation for our future research into using mitochondrial activation strategies to treat Alzheimer's disease.'

Supporting Drug Design Through Algorithm Platform

Meanwhile, a team led by Ouyang Defang, associate professor in SKL-QRCM and ICMS, has developed a machine learning framework called DeepCSP to address the challenges of traditional crystal structure prediction. 'The crystal structure of a drug directly affects its safety, efficacy, and production efficiency,' says Prof Ouyang. 'Different crystal structures also affect the absorption, stability, and efficacy of drugs in the human body. Given the complex and variable nature of Chinese medicine components, finding stable crystalline forms is often a challenge.' According to Prof Ouyang, DeepCSP, which integrates generative adversarial networks with molecular graph convolutional networks, can rapidly generate potential crystal structures and predict their stability, and the whole process takes only a few minutes.



路嘉宏教授
Prof Lu Jiahong



歐陽德方教授
Prof Ouyang Defang

Prof Ouyang adds that formulation design is a crucial stage in drug development, which involves the testing of a drug's physical and chemical properties as well as its release mechanisms. However, traditional formulation design is time-consuming and costly as it relies heavily on extensive experimentation and experience. To streamline this process, Prof Ouyang's team has launched the Formulation AI platform. This platform integrates drug formulation databases with advanced AI algorithms to optimise drug design process, improving efficiency and accuracy while reducing reliance on experiments.

According to Prof Ouyang, Formulation AI can predict and evaluate 17 key characteristics of solubility-enhancing formulations for poorly soluble drugs in six delivery systems: cyclodextrin complexes, solid dispersions, phospholipid complexes, nanocrystals, self-emulsifying systems,

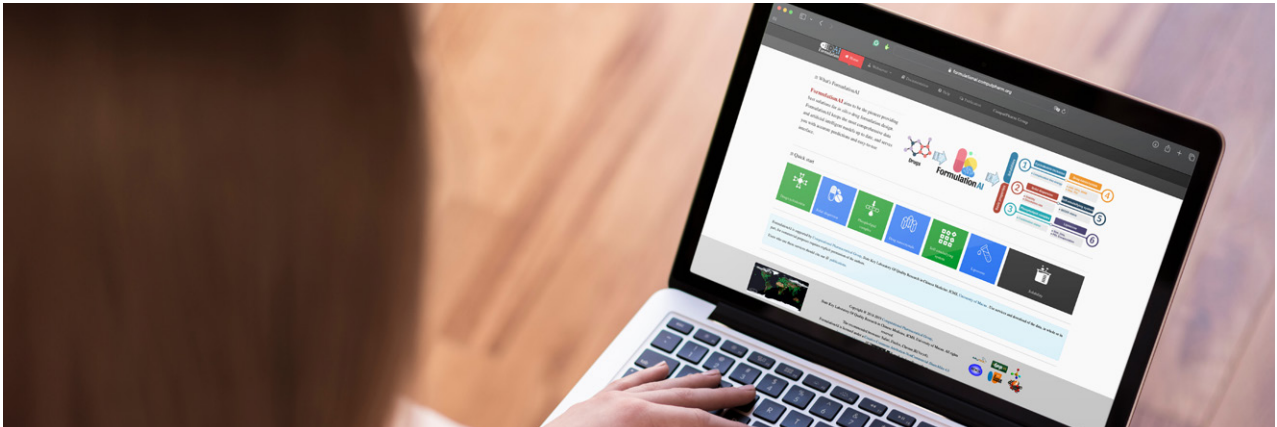
and liposomes. 'Formulation AI can provide rapid predictions without complex theoretical calculations or laboratory testing, transforming formulation development from an experience-driven process to a data-driven one,' Prof Ouyang says. 'Over 300 leading pharmaceutical companies and research institutes are using the platform.'

Advancing Research in Synthetic Biology for Chinese Medicine

Many medicinal plants are scarce and highly susceptible to factors such as cultivation environment and climate, leading to variability in both quality and active ingredient content. To address this, researchers at UM are exploring ways to simulate the biosynthesis of active ingredients in Chinese medicine. By constructing artificial biological systems and using synthetic methods, they aim to stabilise the extraction of active ingredients. Additionally, ICMS and the Tianjin Institute of Industrial Biotechnology of the Chinese Academy of Sciences have been jointly training doctoral students since 2023. The two parties are also working on the development of a joint laboratory for synthetic biology in Chinese medicine.

Driving Innovation in Chinese Medicine Through Interdisciplinary Research

UM's SKL-QRCM works closely with research institutes both within and outside the university. Their collaborative efforts promote interdisciplinary research in the field of Chinese medicine, open up new avenues for the sustainable development of the Chinese medicine industry, expand the global influence of Chinese medicine, and make greater contributions to the development of the 'big health' industry.



Formulation AI平台
The Formulation AI platform



數字時代下的教研創新——專訪五位澳大榮譽博士

Teaching and Research Innovation in the Digital Era: An Interview With Five UM Honorary Doctors

文 / 余偉業、資深校園記者王楚月 · 圖 / 何杰平、編輯部 · 英文翻譯 / 謝苑菁

Text / Kelvin U, Senior UM Reporter Wang Chuyue · Photo / Jack Ho, Editorial Board · English Translation / Bess Che

數字科技日新月異，影響各行各業，大學教育模式發生了甚麼轉變？五位澳門大學榮譽博士：「現代半導體封裝之父」汪正平教授、被評為「影響新中國60年來經濟建設的百位經濟學家」的蔡昉教授、著名語言學家王士元教授、「納米療法」研發先驅梁錦榮教授、微電子研究領軍人物Franco Maloberti教授，在訪問中探討大學在數字時代下如何推進教研創新，為高等教育發展提供新的思路與啟發。

記：「創新驅動發展」一詞近年常見於中國發展規劃的政策文件，當中的「創新」對大學有何意義？

汪：據我了解，「創新」即是Innovation，偏向應用型研究，注重開發具商業價值的研究成果。與之相

對的是「創造」，即Creativity，強調的是純學理研究（Pure research）。通常來說，如果學者有意問鼎諾貝爾獎，就會專注於「創造」，在純學理研究上尋求學問突破，因而較少「創新」；另一方面，純學理研究是許多應用研究的基礎，因此也有不少團隊是基於他人的純學理研究進行「創新」，開發商業產品。值得注意的是，中央政府近年越來越重視大學的「創新」能力，因此在資源調配上更加支持大學與產業連結，希望通過創新成果引領生產力發展。

蔡：在中國，隨著人口紅利消失，「科技創新」成為了新的增長源泉，這亦決定了中國直至2035年的增長速度，當中「創新驅動」是最關鍵的要素。中國的經濟發

展，包括粵港澳大灣區建設、澳門經濟轉型，離不開「創新驅動」。至於甚麼是「創新驅動」，就是通過開發知識產權，創造潛在的財富和就業機會。這意味著大學需要培育大量創新型人才，讓學生具有創新科技的應用能力，學習將科研成果轉化為產業商品。

記：人工智能（AI）技術是科技創新的一大原動力，它對學科發展帶來甚麼影響？

王：AI學習語言的能力實在強大，很快就能像人類般創作文章，這對語言學家而言相當有趣。從「心智理論」（Theory of mind）角度來看，人類的語言溝通是基於個體有能力理解自己與他人的心理狀態，包括情緒、期望、思想和信念等，並透過這些信息去預測和解釋他人的行為；而AI則被「餵食」整個互聯網的信息才得以產出語言。但這是否代表AI具備心智呢？我相信，我們可以透過了解AI實現創作的過程，進一步拓展語言學的研究範疇，帶來更多開創性成果。

梁：生物醫學領域也明顯受AI技術影響。AI技術為學者提供更高的生產力，能分析肉眼難以看清的數據。例如，我們進行單細胞RNA序列分析時經常要處理大量數據，這時只需一個機器學習演算法就能分析處理。

蔡：對社會科學研究來說，傳統的經濟預測大多不太準確，原因有兩個：第一，研究員永遠是基於過去的數據來預測未來；第二，抽樣採集的數據不是整體，研究員難以得到整體的數據。但是，今後當我們能應用雲計算、實時的大數據分析，研究結果就會越來越貼近當下和反映整體實況，大幅提高研究的代表性。這將是研究的發展趨勢。因此，我們要培訓學生利用AI，不被AI打敗。

記：隨著新興交叉學科蓬勃發展，傳統的學科壁壘逐漸消失，這是好事嗎？

王：我認為每個學科都有固有思維模式和局限。如果不能跳出既定框架，就難以產生新的創新點。舉例來說，一個人的語言能力逐漸喪失，可能是由於神經系統受損或衰老。為了探究成因，我經常到醫院與腦神經科學專家交流，研究大腦各個區域的神經元功能對語言能力的影響。發現問題、找出答案才是關鍵，不要把自己歸類為某個領域的學者。學科界線有如在海灘劃下的線，當下一波新知識的浪潮湧現，這些線就都被抹掉了。

梁：我在大學時期接受化學工程訓練，後來攻讀博

士時對藥物傳遞領域產生興趣，開展化學與生物和醫學全面交叉的學科研究。開發治療人類疾病的技術時，與其它學科的科學家合作是至關重要的。我認為自己是「萬事通」，熱衷於應用不同領域的知識來促進醫學發展。在數字科技當道的時代，學生應該有更強的跨學科技能，也要懂得與不同學科的團隊合作。

記：大學的科研創新應該瞄準市場需求，還是以團隊研究興趣先行？

Maloberti：大學的科研團隊應該與企業保持接觸，這樣可走少一些歪路，至少在微電子領域如此。企業只需要明天就能用上的研發，而非不久將來有潛力的項目。我曾潛心推進一個自己認為出色的項目，後來才發現合作企業不需要這樣的產品。這段經歷給我一個寶貴教訓，就是研發時應多與企業協商。

汪：科研團隊未能判斷研發項目的潛在市場價值時，可以先按自身的研究思路完成項目，因為科研人員大多擅長帶來創新的想法，有時卻未能洞察成果的真正價值。因此，大學的產學研管理平台部門給予的支援對科研團隊與企業合作至關重要，有助團隊找到伯樂企業。現時國際知名學府一般鼓勵教授申請專利，然後交由校內負責知識產權的部門尋找商業配對，引薦到各類企業。

記：大學該如何革新教研，培育下一代創新人才？

梁：我認為本科教育應該更注重數字技術的教學，並適當將這些技術引入不同學科的課程設計。在培育學生方面，我一直擔任澳大中華醫藥研究院的傑出訪問學者，多次到澳大講學並指導研究，更協助多名澳大研究員到我在美國的實驗室開展學術交流，這對他們的成長非常有利。

Maloberti：我們可以做好教育者的角色，幫助年青人實踐理想。這些年來，我看到很多充滿抱負的中國學生在研究時追求創新，立志開創美好的未來。我自1997年起與澳大的芯片研發團隊合作。後來澳大成立微電子領域的國家重點實驗室，我和澳大師生的接觸和溝通變得更加頻繁，共同推進芯片技術創新。培育學生時，我的角色是幫助他們在科研路上走少一些歪路。如果把指導學生比喻為做蛋糕的話，要炮製出鬆軟美味的蛋糕，除了要有上好的食材和焗爐，你還需要一些「泡打粉」，那就是我。

Digital technology is constantly evolving, affecting every economic sector and industry. What changes has digital technology brought to the educational model of universities? In this interview, five honorary doctors of the University of Macau (UM) share their perspectives on this question. These five honorary doctors are: Prof Ching-Ping Wong, known as the Father of Modern Semiconductor Packaging; Prof Cai Fang, listed among the ‘100 economists who influenced the economic development of China in the past 60 years’; Prof William Shiyuan Wang, a world-renowned linguist; Prof Leong Kam Weng, a pioneer in nano-therapeutics research; and Prof Franco Maloberti, a leading scholar in microelectronics research. They discuss how universities can promote teaching and research innovation in the digital era, and share their insights and visions for the future development of higher education.

Question: ‘Innovation-driven development’ has frequently appeared in the development policy documents of the Chinese government. What does ‘innovation’ mean to universities?

Prof Wong: ‘Innovation’ emphasises practical, commercially valuable research, while ‘creativity’ is more concerned with pure research. Typically, scholars who aim for a Nobel Prize prioritise ‘creativity’ and pursue intellectual breakthroughs in pure research, so they put less focus on ‘innovation’. On the other hand, since pure research underpins much applied research, many research teams engage in ‘innovation’ and develop commercial products based on the findings of pure research. I have noticed that in recent years, the Chinese central government has increasingly acknowledged the importance of innovation in universities. As a result, it has allocated more resources to enhance academia-industry collaboration to boost productivity through innovations.



汪正平教授
Prof Ching-Ping Wong

Prof Cai: In China, as the demographic dividend diminishes, technological innovation has emerged as a new growth driver, which is poised to shape China’s economic development until 2035, where ‘innovation-driven development’ plays a crucial role. China’s economic development, including the development of the Guangdong-Hong Kong-Macao Greater Bay Area and Macao’s economic restructuring, is inseparable from ‘innovation-driven development’. So, what does ‘innovation-driven development’ mean? It means generating potential wealth and employment opportunities through the development of intellectual property rights. Therefore, it is important for universities to cultivate a significant pool of innovative talent. By doing so, they can ensure that students are equipped with the skills to harness innovative technologies and transform research results into commercial products.



王士元教授
Prof William Shiyuan Wang

Question: Artificial intelligence (AI) is a driving force behind scientific and technological innovation. How does it impact the development of academic disciplines?

Prof Wang: AI picks up language very quickly and begins to produce articles as though they were produced by a human, a development that fascinates linguists. According to the theory of mind, humans have the capacity to understand others by ascribing mental states, such as emotions, expectations, thoughts, and beliefs, and use these states to predict and explain others’ actions. This is a fundamental aspect of effective communication. In contrast, AI is fed the entirety of the Internet to reproduce language. Does it mean that AI operates on a theory of mind? I believe that by understanding the process behind AI creation, we can significantly broaden the research scope of linguistics and achieve a

new horizon of information and knowledge.

Prof Leong: Biomedical sciences have been greatly influenced by AI. In particular, AI has enhanced our productivity and the ability to analyse data that are imperceptible to the human eye. For example, in biomedical sciences, you need to deal with massive amounts of data when conducting single-cell analyses such as single-cell RNA sequencing. In this case, machine learning algorithms can help you analyse such data.



蔡昉教授
Prof Cai Fang

Prof Cai: Most traditional economic forecasts in social sciences research lack accuracy, primarily for two reasons. First, researchers often base predictions on historical data. Second, data collected through sampling methods do not represent the whole picture, and it is also difficult for researchers to obtain comprehensive datasets. However, the future application of cloud computing and real-time big data analysis will enhance the relevance of research outcomes by reflecting more comprehensive data sets, thereby improving the representativeness of the research. This will be a trend in future research methodologies. Consequently, it is essential to train students to proficiently use AI technologies rather than be outpaced by them.’

Question: As emerging interdisciplinary fields thrive, traditional disciplinary boundaries are blurring. Do you view this development as positive?

Prof Wang: Each discipline has its own inherent thinking patterns and limitations. Without thinking outside the box, it is difficult to innovate. For example, a person’s gradual loss of language ability could result from neurological disorders or simply ageing. To understand the cause, I need



梁錦榮教授
Prof Leong Kam Weng

a deeper understanding of the brain, so I consult neuroscience experts at the hospital and study the anatomy of neurons to understand how various brain regions affect language ability. The key lies in identifying problems and finding solutions, rather than confining yourself to a specific field. In today’s world, boundaries between disciplines are like lines in the sand. When the next wave of new knowledge arrives, these lines will be erased.

Prof Leong: I initially trained in chemical engineering at university. During my doctoral studies, my interest shifted to drug delivery, so I started to engage in interdisciplinary research spanning chemistry, biology, and medicine. When it comes to developing technologies to treat human diseases, collaboration with scientists from various disciplines is essential. I consider myself a multidisciplinary— I am passionate about leveraging knowledge from different fields to advance medical development. Therefore, in the era of digital technology, it is crucial for students to receive interdisciplinary training and learn to collaborate with teams from different disciplines.

Question: In research innovation, should universities prioritise market demand or the interests of their research teams?

Prof Maloberti: University research teams should maintain close connections with industry partners to avoid unnecessary pitfalls. This is especially important in the microelectronics field, where companies often need something that is immediately useful, rather than just viable in the near future. I once dedicated a great deal of effort to a project I believed was excellent, only to discover that the partner company did not need such a product. This experience taught me a valuable lesson: regular communication



澳大於2023年榮譽學位及高等學位頒授典禮向五位傑出人士頒授榮譽博士學位
UM conferred honorary doctorates on five distinguished individuals at the Ceremony for the Conferment of Honorary and Higher Degrees 2023

with industry partners is essential throughout research and development.

Prof Wong: If a research team has not yet identified the potential market value of their work, they can continue to develop their project based on their original ideas. This is because most researchers are good at developing innovative ideas but often fail to recognise the commercial value of their research results. In such cases, the role of the university’s academia-industry collaboration or intellectual property (IP) department becomes crucial. They can offer support to research teams on how to form partnerships with businesses. Leading international universities encourage professors to apply for patents. They direct professors to the IP department, which helps them find business partners and introduces their projects to businesses.

Question: How should universities innovate teaching and research to cultivate the next generation of talent?

Prof Leong: I would suggest that universities put more emphasis on digital technology and incorporate digital skills into their undergraduate curricula. UM’s visiting fellowships are a very good initiative for student development. As a Distinguished Visiting Scholar at the Institute of Chinese Medical Sciences at UM, I have delivered lectures and provided research guidance for students, and facilitated academic exchanges for many UM researchers in my lab in the US. All these efforts are very beneficial to student development.

Prof Maloberti: By effectively fulfilling our roles as educators, we can empower young people to realise their dreams. Over the years, I have met many ambitious Chinese students eager to build a brilliant future through innovative research. Since 1997, I have collaborated with UM’s chip R&D team. A state key laboratory in microelectronics was later established at the university, which has facilitated my interactions and communications with UM faculty and students, further driving advancements in chip technology. In nurturing students, my role is to help them avoid pitfalls in their research journey. This process is like making a good cake: To succeed, you need good ingredients and a good oven; but maybe you also need some baking powder, and that’s me.



訪問短片
The interview video



Franco Maloberti教授
Prof Franco Maloberti

汪正平教授
Prof Ching-Ping Wong

美國國家工程院院士、科學和工程領域的先驅，其於集成電路塑料封裝中的科技創新從根本上改變了半導體封裝技術。此一突破讓美國電訊商AT&T得以更替傳統的陶瓷封裝技術，從而節省數千萬美元，也使當今企業能以更低成本生產性能更佳、與日常生活息息相關的電子設備。

Prof Ching-Ping Wong is a member of the US National Academy of Engineering and a pioneer in science and engineering. His groundbreaking plastic packaging technology in integrated circuit packaging has fundamentally transformed the semiconductor packaging landscape. This innovation enabled the American telecommunications company AT&T to replace traditional ceramic packaging, saving tens of millions of US dollars. Prof Wong’s technology has also empowered companies to manufacture electronic devices people use in daily life with improved performance and reduced costs.

蔡昉教授
Prof Cai Fang

人口及勞動經濟研究專家，現為中國社會科學院國家高端智庫首席專家及學部委員，是首位判斷中國迎來「劉易斯轉折點」並敲響「人口紅利」消失這一警鐘的學者，也是首位在論文中倡導中國經濟發展應堅持就業優先的學者，長期致力於研究應對中國扶貧工作的挑戰。

Prof Cai Fang specialises in population and labour economics research. He is currently a chief expert of the China Top Think Tank and a member of the Academic Committee at the Chinese Academy of Social Sciences. Prof Cai is recognised as the first scholar to identify China’s Lewisian Turning Point and to alert people to the disappearance of the ‘demographic dividend’. He was also the first scholar to advocate prioritising employment in China’s economic development strategies. Prof Cai has long been dedicated his career to studying and addressing the challenges of poverty alleviation in China.

王士元教授
Prof William Shiyuan Wang

引領語言理論、語言工程、演化語言學、計算語言學、實驗語音學、認知和神經語言學等領域的發展，首創「詞彙擴散理論」，成為歷史語言學領域一個具世界影響力的經典理論。其於1973年在柏克萊加州大學創辦的《中國語言學報》為中國語言學界最具影響力的期刊，該刊目前由澳大與北京語言大學合辦。

Prof William Shiyuan Wang is regarded as a leading figure in the development of language theory, language engineering, evolutionary linguistics, computational linguistics, experimental phonetics, and cognition and neurolinguistics. His ‘lexical diffusion theory’ has become a classic theoretical model with a worldwide impact on historical linguistics. In addition, Prof Wang founded *Journal of Chinese Linguistics* at the University of California, Berkeley in 1973, the most influential academic journal in the field of Chinese linguistics. This journal is now co-edited by UM and Beijing Language and Culture University.

梁錦榮教授
Prof Leong Kam Weng

美國國家工程院院士，生物材料領域頂尖學者，其開發的Gliadel創新控釋療法極大延長了癌症患者術後的預期壽命。他在過去30多年積極與中國學術界合作，推動醫學科技創新，更擔任澳大中華醫藥研究院的傑出訪問學者，多次到澳大講學並指導研究。

Prof Leong Kam Weng is a member of the US National Academy of Engineering and a leading scholar in biomaterials. He developed the innovative controlled-release therapy ‘Gliadel’, which significantly extends the life expectancy of cancer patients after surgery. Over the past 30 years, Prof Leong has actively collaborated with academic communities in China to promote innovation in medical science and technology. In addition, he served as a Distinguished Visiting Scholar at the Institute of Chinese Medical Sciences of UM, during which he made multiple visits to the university to deliver lectures and mentor research.

Franco Maloberti教授
Prof Franco Maloberti

全球數據轉換和信號處理領域的領軍人物之一，曾為歐洲的政府機構和世界各地的公司開展重大的研究項目，其著作《數據轉換器》作為教科書已被譯為波蘭語和中文，被學生和從業員廣泛使用，學術影響力遍及全球，並且助力澳大和澳門進入世界頂尖電子技術的版圖。

Prof Franco Maloberti is a leading scholar in data conversion and signal processing. He has led numerous major research projects for various government departments in Europe and for companies around the world. His textbook, *Data Converters*, which has been translated into Polish and Chinese, is widely used by both students and practitioners, exerting significant academic influence worldwide. In addition, Prof Maloberti has played a crucial role in establishing UM and Macao as leaders in the global electronics technology landscape.



澳大的憲法與基本法教育

Constitutional and Basic Law Education at UM

文 / 葉浩男、校園記者李穎曦 · 圖 / 何杰平，部分由憲法與基本法研究中心提供

Chinese & English Text / Davis Ip, UM Reporter Tracy Li · Photo / Jack Ho, with some provided by the Centre for Constitutional Law and Basic Law Studies

為了讓學生和教職員更深入了解國家和澳門特區的基本制度，澳門大學多年來不懈推動有關《中華人民共和國憲法》與《澳門特別行政區基本法》（下稱「兩法」）的教育，培養他們成為盡責的公民，為社會進步竭盡所能。

設立憲法與基本法研究中心

澳門實踐「一國兩制」已有25載。為推進兩法的教學和研究，澳大法學院於2018年初設立憲法與基本法研究中心。該中心主任、憲法與行政法專家蔣朝陽教授說：「研究中心的長期目標是發展為一個具影響力的理論研究、學術交流、人才培養、決策諮詢及弘揚『愛國愛澳』精神的基地。我們在教學和研究時均以此為目標。」

蔣教授指出，《憲法》與《基本法》共同構成澳門特區

的憲制基礎，無論在推廣或教育方面都不能偏重《基本法》而忽視《憲法》：「《憲法》是國家的根本大法，也是《基本法》的立法依據和效力來源。內地和澳門社會制度有異，但《憲法》作為一個整體對澳門特區是有效的，在澳門生活、學習和工作的人必須清晰這點。」

通識課面向本科生

蔣教授說：「中心成立初時，我們的首要任務是為澳大所有學生提供兩法教育。」澳大的本科必修通識科目「法律與社會」有部分內容涉及講授兩法。他指出，將兩法教學內容納入通識課，是為了提升學生對國家和澳門法律制度的理解，並且增進他們對國家和澳門的歸屬感。

2019年起參與兩法教學的法學院研究助理教授賴冠儒說：「我們希望學生不僅遵行兩法，避免損害國家利

益，還會主動維護國家利益，做有益於國家的事。」談及教學方法，賴教授表示：「我不逐條講解條文，亦不強求學生背誦，而是根據澳大兩法系統化教學方案，闡釋條文的制訂背景和條文之間的聯繫。我還會結合二戰後的歷史脈絡和其它故事，敘述中國建立現時的社會主義制度的緣由，激發學生興趣。」

隨著社會發展，該通識課自2022年起改進了有關兩法的內容，為學生闡述國家安全的概念、中國國家安全觀的發展歷程，以及現時的總體國家安全觀的核心內容。

賴教授說，該通識課設中文班和英文班，讓來自本地、內地和其它地方的學生都能全面了解兩法在澳門特區的重要地位。為幫助國際學生理解中國的政治制度，他還會比較中國與外國的政體。「無論中文班還是英文班，學生在課後的國情知識和對國家的歸屬感都有顯著提升。有些學生甚至在課堂後找我討論內地和澳門時事。」

鼓勵學生推廣兩法

除了開設兩法通識課，澳大與澳門基本法推廣協會自2021年起合辦「澳門大學憲法與基本法推廣優苗教員培訓課程」，選拔在兩法課表現卓越的學生參加培訓，並在所屬書院推廣兩法與國家安全知識，至今舉辦到第四屆。大學亦設有「澳門大學憲法與基本法教職員培訓課程住宿書院班」，提升教職員對憲法、基本法與國家安全的認識，使他們能更有效地指導學生推廣兩法。

賴教授表示，法學院的兩法通識課老師會根據學生的學習成效和課堂表現，找出具有教學潛力與熱誠的學生，繼而向每間書院推薦三到五位學生參與為期三週的培訓，學習推廣兩法。培訓結束後，學生須在書院內公開講解兩法內容，經篩選後成為書院兩法推廣大使和家國情懷小組成員。另外，每間書院最優秀的兩法推廣大使和一些法學院的優秀學生亦會獲推薦參加澳門基本法推廣協會的「澳門基本法青年推廣大使」課程。

法學院、滿珍紀念書院二年級生陳滢璐是兩法推廣大使之一。她在2024年6月經澳大推薦參加澳門基本法推廣協會舉辦的培訓：「身為法學院學生，我深知兩法對澳門的重要地位，希望提升公眾對兩法的關注。」

我的導師不僅講解兩法，還分享有助推廣兩法的活動策劃和公關技巧。」

身為澳門基本法青年推廣大使，陳滢璐曾到澳門的中小學推廣兩法。她認為，對中小學生來說，輕鬆而互動的教學方法能有效傳遞訊息。「國旗、國徽、國歌都是很好的題材。講述這些國家象徵設計過程的故事不僅能讓課堂生動有趣，還能提升學生對國家的歸屬感。」

培養法學人才

澳大的四個法學士學位課程及部分碩士學位課程設有探討《憲法》與《基本法》的專業科目，這兩個科目共設120小時的理論及實踐課，確保學生對這些主題有完整理解。法學院、霍英東珍禧書院二年級學生李瑋妮說：「我曾在中學的品德與公民課學習兩法，但當時只有概略認識。大學的教學則更細緻，令我對兩法有更全面和深入的理解。」

由於在兩法科目表現優良，李瑋妮也獲法學院推薦參加澳門基本法推廣協會的「澳門基本法青年推廣大使」課程，期間結識許多同樣修讀法律的同學，以及擔任律師的澳大校友，有機會向對方請教職業經驗。

蔣朝陽教授指出，澳門有眾多法官、檢察官、律師及其它法律專業人士出自澳大法學院，法學院畢業生須對兩法有深刻理解。「基本法是全國人民代表大會依據所憲法制定，而澳門特區是直轄於中央人民政府、享有高度自治權的地方行政區域。如果對這些基本概



蔣朝陽教授
Prof Jiang Chaoyang

念不夠熟悉，學生畢業後在法律實踐中或會遇到困難，容易引發法律適用上的混亂。」

加強兩法研究與社區推廣

為了培養兩法教學和研究人才，澳大憲法與基本法研究中心與內地一流大學合辦學術研討會、開展聯合研究及碩士生和博士生交流項目。2019年，研究中心更成為國家教育部人文社科重點研究基地——北京大學憲法與行政法研究中心的夥伴基地。

在澳大以外，研究中心也與其它高等院校、政府機構、社會團體合辦面向社會人士的培訓，獲澳門基本法推廣協會大力支持。研究中心更為中小學編撰補充教材，以及協助澳門教育及青年發展局提供教師專業培訓。研究中心也於2018年推出澳大兩法系統化教學方案，2019年全校推行。澳門特區政府在2020年將該方案推薦至國家教育部。在中央和特區政府的支持下，該方案已逐步延伸至在本地中小學的品德與公民課程使用。

The University of Macau (UM) places great importance on educating students and staff about the Constitution of the People's Republic of China and the Basic Law of the Macao Special Administrative Region (SAR). The aim is to deepen their understanding of these key legal frameworks and cultivate responsible citizens committed to societal progress.

Establishing the Centre for Constitutional Law and Basic Law Studies

The 'one country, two systems' principle has been implemented in Macao for 25 years. In early 2018, UM's Faculty of Law (FLL) established the Centre for Constitutional Law and Basic Law Studies to strengthen teaching and research in this area. Prof Jiang Chaoyang, director of the centre and an expert in constitutional and administrative law, explains, 'Our long-term goal is to establish the centre as a hub for high-impact research, academic exchange, talent development, and advisory services. At the same time, we aim to foster a strong sense of patriotism and pride in Macao. This vision drives both our teaching and research.'

Prof Jiang stresses that both the Constitution and the Basic Law form the constitutional foundation of the Macao SAR, and that the Constitution should also be taken into account when promoting the Basic Law.

此外，研究中心多位教師合撰的《中國憲法簡明讀本》在2022年由澳門基金會出版，幫助香港和澳門居民理解國家的基本概念、制憲目的與使命、憲法的地位與作用、中國特色社會主義制度的本質特徵、各項基本制度及國家機構等內容。

確保「一國兩制」薪火相傳

蔣教授表示，澳大的兩法教育自2018年以來有長足進展，尤其是兩法通識課的教學與評鑑日益系統化。過去五年的研究數據顯示，澳大本科生的國情教育成效達到「非常高」，學生的國情知識和對教學的滿意度均從五年前的「中等偏高」顯著提升至「非常高」。

蔣教授指出：「我們會進一步擴展兩法教學與研究項目，增強澳大學生、教職員及社會大眾對國家和澳門的認識與歸屬感，確保『一國兩制』事業在澳門薪火相傳、生生不息。」

He explains, 'The Constitution is the fundamental law of the state and is the source of authority for the Basic Law, which is enacted under the Constitution. Although mainland China and Macao have different social systems, the Chinese Constitution as a whole remains valid in the Macao SAR. It is important for everyone who lives, studies, or works in Macao to recognise this fact.'

General Education Course for Undergraduates

'When we first set up the centre, our main priority was to ensure that every UM student received a proper education on the Constitution and the Basic Law,' Prof Jiang adds. These topics are now included in 'Law and Society', a compulsory general education course designed to enhance undergraduate students' understanding of both the national and Macao legal systems, and foster a stronger sense of belonging.

Lai Kuan Ju, research assistant professor in FLL, has been an instructor for this course since 2019. He says, 'We expect our students not only to uphold the Constitution and the Basic Law and avoid actions that might harm the country's interests, but also to actively protect those interests and contribute to the country.' Speaking about his teaching approach, Prof Lai explains that he does not analyse every article in



澳大法學院憲法與基本法研究中心於2019年成為國家教育部人文社科重點研究基地——北京大學憲法與行政法研究中心的夥伴基地

In 2019, the UM Faculty of Law's Centre for Constitutional and Basic Law Studies became a partner of the Center for Constitutional and Administrative Law at Peking University, a key research base for the humanities and social sciences recognised by China's Ministry of Education.

the laws during class or require students to memorise them. 'Instead, I follow the UM Structured Teaching Plan for the Constitution and Basic Law Education, where I explain the background of how the two laws were created, and how the articles relate to each other. To keep students engaged, I incorporate storytelling and the historical context of the post-World War II era while discussing how China established its current socialist system.'

The general education course was updated in 2022 to include national security topics, which cover the evolution of the Chinese government's approach to national security and the key concepts of the holistic approach to national security.

According to Prof Lai, the university allows students to take the course in either Chinese or English, ensuring that students from Macao, mainland China and elsewhere gain a comprehensive understanding of the significance of the Constitution and the Basic Law in the Macao SAR. To help international students understand China's political system, Prof Lai compares it with those of other countries. 'By the end of the course, whether they took it in Chinese or English, most students gain a much clearer perspective on China and a greater sense of belonging to the country. Some were so motivated

that they came up to me after class to talk about current affairs in mainland China and Macao, continuing the discussions we started in class.'

Encouraging Students to Promote the Constitution and the Basic Law

Since 2021, UM and the Macao Basic Law Promotion Association have been running the annual 'UM Constitution and Basic Law Student Ambassadors Training Programme'. Three editions have been held so far, with participants selected from undergraduates who have excelled in the course on the Constitution and the Basic Law. After completing the training programme, these students are prepared to promote knowledge of the Constitution, the Basic Law, and national security in their residential colleges. In parallel, the university has introduced a training programme for faculty and staff in residential colleges to deepen their understanding of the Constitution, the Basic Law, and national security, and to enable them to support and guide students in promoting these laws more effectively.

According to Prof Lai, FLL instructors assessed students in the general education course based on their potential and enthusiasm for teaching the subject. Following these evaluations, three to five



賴冠儒教授
Prof Lai Kuan Ju

students from each of the ten residential colleges are recommended for a three-week training programme. They are then asked to give a presentation on the Constitution and the Basic Law to their peers within the college. Ultimately, one student from each college is selected to become the college’s ambassador for the promotion of the Constitution and the Basic Law and a member of the Student Workgroup for the Enhancement of Affection for Home Country. These ambassadors, together with a few outstanding FLL students, are then nominated to participate in the ‘Macao Basic Law Youth Ambassadors Training Programme’ organised by the Macao Basic Law Promotion Association.

Chen Yinglu, a second-year FLL student and member of Moon Chun Memorial College, was one of the ambassadors nominated to attend the association’s training programme in June 2024. She says, ‘As a law student, I know how important the Constitution and the Basic Law are to Macao, and I want to help raise public awareness about them. The programme has not just given me a deeper understanding of these laws. It has also equipped me with valuable skills in event planning and public relations, which have been helpful in my efforts to promote the two laws.’

As a Macao Basic Law Youth Ambassador, Chen has visited primary and secondary schools across Macao to promote knowledge about the Constitution and the Basic Law. She believes that a relaxed, interactive teaching style is the best way to engage younger students. ‘I have found that national flag, emblem, and anthem are excellent topics to start with. By sharing the stories behind these symbols, we not only make the lessons more engaging, but

also foster a stronger sense of belonging to the country among students.’

Nurturing Legal Professionals

To ensure a comprehensive legal education, UM offers two dedicated courses—one on the Constitution and another on the Basic Law—as part of its four undergraduate law programmes, as well as certain master’s programmes. These two courses consist of theoretical and practical lessons, adding up to 120 hours of learning. Winnie Li, a second-year FLL student and member of Henry Fok Pearl Jubilee College, says, ‘In secondary school, we only got a brief introduction to the Constitution and the Basic Law in our moral and civic education lessons. But at UM, I have the opportunity to gain a deeper, more thorough understanding of the two laws.’

As a high-achieving student in the courses on the two laws, Li was nominated to take part in the ‘Macao Basic Law Youth Ambassadors Training Programme’ of the Macao Basic Law Promotion Association. There, she met many law students, as well as UM alumni who are now practising lawyers, giving her valuable opportunities to seek advice on planning her own legal career.

Prof Jiang mentions that many of Macao’s judges, prosecutors, lawyers, and other legal professionals are FLL graduates, adding that it is crucial for such graduates to have a thorough understanding of both the Constitution and the Basic Law. ‘The Basic Law was enacted by the National People’s Congress under the Constitution, and Macao is a local administrative region directly under the Central People’s Government and enjoys a high degree of autonomy. If students do not have a clear understanding of these key concepts, they may encounter challenges in their legal careers, which could lead to confusion when it comes to applying the laws,’ he explains.

Enhancing Research and Community Engagement on the Constitution and the Basic Law

In addition to its teaching efforts, UM’s Centre for Constitutional Law and Basic Law Studies has partnered with leading universities across mainland China to develop talent in conducting research on the Constitution and the Basic Law. These collaborations have led to academic seminars, joint research projects, and exchange programmes for master’s and

PhD students. In 2019, the centre became a partner of the Center for Constitutional and Administrative Law at Peking University, a key research base for the humanities and social sciences recognised by the Ministry of Education of China.

The centre extends its efforts beyond UM by working with other universities, government bodies, and social organisations to provide public training programmes, with strong support from the Macao Basic Law Promotion Association. The centre also develops supplementary teaching materials for local primary and secondary schools, and supports Macao’s Education and Youth Development Bureau by providing professional training for teachers. In 2018, the centre designed the UM Structured Teaching Plan for the Constitution and Basic Law Education, which was implemented in 2019. In 2020, the Macao SAR Government recommended the teaching plan to the Ministry of Education for further study. With the support of the central and the Macao SAR governments, the teaching plan has been incorporated into the moral and civic education lessons in local primary and secondary schools.

The centre’s commitment to education is also reflected in its publications. In 2022, several members of the centre co-authored *A Concise Guide to the Constitution of China*, published by the Macao Foundation. The book aims to help Macao

and Hong Kong residents better understand the key concepts of national governance, the purpose and mission of the Constitution, its significance and role, the defining features of socialism with Chinese characteristics, and the country’s fundamental systems and state institutions.

Ensuring the Success of ‘One Country, Two Systems’

Since 2018, UM has made considerable progress in improving education on the Constitution and the Basic Law, particularly through more structured teaching and assessment in the general education course, says Prof Jiang. He adds that an analysis of the past five years shows that the effectiveness of national education among undergraduates has now reached a ‘very high’ level. Furthermore, students’ knowledge of national issues and their satisfaction with the course have significantly improved, rising from ‘above average’ five years ago to ‘very high’ today.

Looking ahead, Prof Jiang says that the centre will continue to broaden its teaching and research on the Constitution and the Basic Law. ‘We are committed to helping UM students, staff, and the wider community deepen their understanding and sense of belonging to both the country and Macao. It is all about ensuring that the ‘one country, two systems’ principle continues to thrive in Macao for generations to come.’



第四屆「澳門大學憲法與基本法推廣優苗教員培訓課程」開課儀式
Opening ceremony of the 4th edition of the UM Constitution and Basic Law Student Ambassadors Training Programme



推動中葡高校發展——專訪莫桑比克大學校長、澳大校友 Manuel Guilherme Júnior

Promoting the Development of Higher Education Institutions in China and Portuguese-Speaking Countries: An Interview With Manuel Guilherme Júnior, University Rector and UM Alumnus in Mozambique

文 / 余偉業、資深校園記者張嘉禾 · 圖 / 何杰平、編輯部 · 英文翻譯 / 謝苑菁

Text / Kelvin U, Senior UM Reporter Zhang Jiahe · Photo / Jack Ho, Editorial Board · English Translation / Bess Che

18年前，來自莫桑比克的Manuel Guilherme Júnior在中葡友好的歷史機緣下到澳門大學深造，畢業後回國一展所學，推動當地高等教育發展。經過歲月磨練，這位校友如今已是莫桑比克歷史最悠久、規模最大的高等學府——蒙德拉內大學的校長。為了推動中國與葡語國家高校合作，Manuel Guilherme Júnior重回母校，深化兩校教研合作，並與論文導師重聚，重溫在澳大求學的回憶片段。

模最大的高等學府——蒙德拉內大學的校長。為了推動中國與葡語國家高校合作，Manuel Guilherme Júnior重回母校，深化兩校教研合作，並與論文導師重聚，重溫在澳大求學的回憶片段。

乘中葡友好之風赴澳深造

當年取得法律本科學位後，Manuel Guilherme Júnior萌生出國深造、擴闊國際視野的念頭。他把目光鎖定澳門，因為自澳門回歸以來致力推動中國與葡語國家的友好關係再上台階，擔當重要的樞紐角色。他相信葡語國家學生能在中葡友好的機緣中受惠，既能推進個人專業發展，也可為中葡經貿往來貢獻力量。

適逢其時，澳大於2006/2007學年開設首屆國際商法碩士課程，Manuel Guilherme Júnior對此深感興趣，於是赴澳大深造。「國際經貿往來離不開法律層面的支撐。修讀澳大這門法學課程使我能從法律和商業的視野，思考澳門與莫桑比克等葡語國家的關係。」他憶述開學不久就遇上第二屆「中國一葡語國家經貿合作論壇」在澳門舉行，該論壇讓他結識到來自其它葡語國家的朋友，也進一步了解澳門在中葡經貿方面的緊密聯繫。身為該課程的首屆畢業生，他認為課程有助他深入探討歐盟、國際層面、中國內地和港澳地區的國際法律法規標準，為日後開展相關法律研究奠定基礎。

重回澳大

對Guilherme Júnior校長來說，這次重訪母校讓他感受到澳大的變遷。他還記得當年在氹仔山上的校舍上課，常要上落「長命斜」，如今踏足琴島之上的校園，看到豁然開朗、綠樹成蔭的景緻，令他為之振奮。最令他驚喜的是，他在澳大圖書館博碩士論文庫找到自己的紙本畢業論文，感觸良多。「沒想到我當年的研究生論文不僅能在網上參閱，紙本也保存完善，如此井然有序的館藏管理值得我們借鏡。」

這份論文紙本喚起了Guilherme Júnior校長在澳大求學的青蔥歲月。他還特意到法學院與當年的論文導師——法學院副院長（研究）魏丹教授相聚，笑言導師的嚴謹教誨言猶在耳：「魏教授處事認真，從不馬虎，而且對守時特別在意，因此同學們總是特別準時。此外，每當我的研究遇上瓶頸，她總能提供清晰的指引。」

當時，他對布雷頓森林體系深感興趣，但要深入剖析其塑造的國際貨幣金融秩序、以及這個秩序如何影響發展中國家並不容易。在魏教授指導下，他引用不同國家的案例比對分析，觀察在經濟全球化下出現的貿易爭端如何訴諸國際法律，相關研究成為具參

考價值的文獻。「我從魏教授身上學到如何開展法學研究，以及身為學者應秉持的精神。在澳大的學習時光對我往後的學術和專業發展大有裨益。」

投身莫桑比克高教事業

Guilherme Júnior在2008年於澳大畢業後回國，重返蒙德拉內大學擔任教授和研究員。該大學為莫桑比克歷史最悠久、規模最大的高等學府。自此，他致力以學術研究探討國際法律問題，撰寫多篇論文，如〈莫桑比克電信聯盟的法律保護〉〈多邊環境協定和國際貿易便利化〉，有的刊登於澳大法學院出版的《澳門法學》期刊，還出版了三本書籍。

經過多年努力，他在蒙德拉內大學深受重用，不僅在法學院肩負教務工作，還擔任該校區域一體化法研究中心主任、歐洲聯盟合作辦公室主任。他也擔任Zambeze University社會科學和人文學院院長、莫桑比克天主教大學經濟和管理學院法律課程協調員，助力提升莫桑比克高校的教學水平。雖然身居要職，但他未嘗自滿，多年來不斷進修，於2019年取得蒙德拉內大學法學博士學位。對他而言，發揮所學為國效力、創造最大益處，是履行公民責任的體現。

2022年，他獲莫桑比克總統Filipe Jacinto Nyusi委任為蒙德拉內大學校長。身為大學領導者，他積極推動大學的內部改革、教學創新和課程國際化，並且拓展與海外高校合作，為學生提供與國際接軌的學習平台。當中，訪問澳門、深化中國與葡語國家高校的合作關係，是他實踐國際化策略的重要一步。

借鏡母校辦學經驗

闊別母校將近廿載，Guilherme Júnior校長在此次澳大之行率領蒙德拉內大學多名學術及行政主管，到訪法學院、工商管理學院、滿珍紀念書院、資訊及通訊科技部等部門，了解澳大國際化的辦學模式和管理經驗。他說：「澳大遷校後發展迅速，教學設施完善，因此我們到澳大取經，了解大學數字化、現代化的管理模式，亦希望得到澳大在技術上的支持。」

訪問期間，Guilherme Júnior校長與澳大校長宋永華教授、副校長馬許願教授會面，就學術合作、高校管理和發展等交換意見，並且簽署合作備忘錄，加強在學

術研究、人才培養、人員互訪等領域的合作和交流。他對此深感鼓舞，認為深化合作能提升兩校的國際化教學水平：「身為澳大校友，我期望有更多學生和教學人員赴澳大深造；身為蒙德拉內大學校長，我相信此舉是大學拓展海外合作夥伴這項策略的重要一步，有助莫桑比克提升高等教育質量。」

放眼全球的育人理念

Guilherme Júnior校長指出，澳大跨文化學術氛圍濃厚，自己也在課堂體會到「地球村」這個概念：當時來自非洲國家、葡萄牙、中國內地和澳門的學生聚首一堂，與法學院來自世界各地的教授交流，彼此觀點碰撞，他至今仍歷歷在目。「教室彷彿成為了整個世界的縮影。與不同地域、不同文化背景的教授和同學上課，拓展了我的世界觀和思維方式。」

這段求學經歷使Guilherme Júnior校長了解到培養學生具備全球視野和跨文化能力的重要性。他認為高等教育的目標之一是應對全人類面對的問題。在如今全球暖化持續、人工智能和數字技術當道的時代，

學生尤其需要加強擔當精神，勇於為非洲乃至全球的發展議題出力。因此，他不僅要求學生心繫社區、放眼全球，更要培養坦誠和正直的品格。他指出，學術水平和科研能力固然重要，但勇於承擔、恪守法紀、為人正直、為人設想等觀念，更是大學育人時注重的核心價值。「這也是我在澳大求學時的一些感悟：博學為善，且有抱負，為世界創造更多福祉。」

擔當中葡友好橋樑

十年樹木，百年樹人，育人就如見證一場「蝴蝶效應」。昔日，Manuel Guilherme Júnior乘中葡友好之風來到澳門、將非洲音樂響遍澳大東亞樓；如今，他已成為中國與葡語國家友好合作的橋樑，為雙方高等教育的共同發展牽線。此次重回母校，Júnior校長不僅加強了蒙德拉內大學與澳大的合作共識，更形成了持續、全面的國際夥伴關係：「這有利雙方院校長遠發展，拓展教學優勢，兩校師生亦可享受學術交流和研究合作機會，互利共贏。我希望學生珍惜學習時光，充實自己，為中國與葡語國家的共同發展貢獻力量。」

Choosing Macao as a Study Destination Amid the Burgeoning Ties Between China and Portuguese-Speaking Countries

After obtaining his bachelor's degree in law, Guilherme Júnior considered studying abroad to expand his international horizons. He set his sights on Macao because he knew that since the 1999 handover to China, the city had been committed to enhancing the relationship between China and Portuguese-speaking countries and had played an important role in fostering cooperation between these two sides. Guilherme Júnior believed that students from Portuguese-speaking countries could capitalise on the opportunities arising from this burgeoning relationship. He saw studying in Macao not only as an avenue for personal and professional growth, but also as a means to contribute to trade and commerce between China and the Lusophone world.

In the 2006/2007 academic year, UM launched a master's degree programme in International Business Law. This prompted Guilherme Júnior to further his studies at UM, as he was particularly drawn to this field. He explains, 'International trade



澳大與蒙德拉內大學簽署教學及科研合作備忘錄

UM and UEM sign a memorandum of understanding on teaching and research collaboration

and commerce hinge heavily on legal considerations. Pursuing this law programme at UM would allow me to examine the relationship between Macao and Portuguese-speaking countries such as Mozambique through both a legal and a commercial lens.' Guilherme Júnior highlighted that the 2nd Forum for Economic and Trade Cooperation between China and Portuguese-speaking Countries was held in Macao shortly after he started his studies in the city. This event not only provided him with an opportunity to make friends with people from other Portuguese-speaking countries, but also deepened his understanding of the economic and trade connections between Macao, China and the Lusophone world. As one of the inaugural graduates of the programme, he believes that it equipped him with the knowledge and skills to delve into the standards of existing international laws and regulations within the European Union, the broader global context, mainland China, Hong Kong, and Macao. The programme also provided him with a solid foundation for his future legal studies.

Returning to UM

Guilherme Júnior's recent return to UM has given him a strong sense of the transformations and advancements that have taken place at his alma mater. While he vividly recalls the inevitable hill he had to climb to reach the old UM campus in Taipa, he is impressed by the expansive and verdant campus now situated on Hengqin Island. One of Guilherme

Júnior's most surprising discoveries was his thesis paper in the UM Dissertations and Theses collection database in the UM Library. This discovery left him deeply moved, as he remarks, 'I am amazed that not only can I access my thesis online, but the physical copy is also so well-preserved. The UM Library's meticulous collection management truly sets an example for us to follow.'

The sight of his thesis paper evoked fond memories of Guilherme Júnior's youthful days as a UM student, prompting him to make a special visit to the Faculty of Law (FLL) to meet his thesis supervisor, FLL Associate Dean (Research) Prof Wei Dan. Guilherme Júnior humorously recalls Prof Wei's strict teaching style, saying, 'Prof Wei was very serious. She never compromised on standards and was particular about punctuality, so students were always on time for her classes. Whenever I faced challenges in my research, she was always there to provide clear guidance and direction.'

During his time at UM, Guilherme Júnior developed a keen interest in the Bretton Woods system. However, it was not easy to conduct an in-depth analysis of the impact of the international monetary and financial order created by the system on developing countries. Fortunately, under Prof Wei's guidance, Guilherme Júnior successfully conducted comparative case studies across different countries to understand how

trade disputes arising from economic globalisation were adjudicated through international laws. This research has also become a valuable reference source. Reflecting on this experience, he shares, ‘Prof Wei has taught me how to conduct research in legal studies and the importance of the spirit of scholarship as an academic. My studies at UM have proven very beneficial to my subsequent academic and professional development.’

Pursuing a Career in Higher Education in Mozambique

After graduating from UM in 2008, Guilherme Júnior returned to his home country and joined UEM again—this time as a professor and researcher. He has since focused his academic research on international legal issues and has authored several articles, including *Legal Protection of Mozambique Telecommunication Union* and *Multilateral Environmental Agreements and International Trade Facilitation*. Some of his works have also been featured in *Macao Law Review*, a journal published by UM FLL. Moreover, he has published three books.

Guilherme Júnior’s years of dedicated service at UEM were highly commended. In addition to his teaching position in the Faculty of Law at UEM, he also served as director of the University Centre for Regional Integration Law and director of the European Union Cooperation Office, making significant contributions to the university’s development. Furthermore, he held positions such as dean of the Faculty of Social Sciences and Humanities at Zambeze University and coordinator of law courses of the Faculty of Economics and Management at the Catholic University of Mozambique. Through these roles, Guilherme Júnior has made notable contributions to enhancing the teaching standards in Mozambican universities. Despite these prestigious positions, he remained committed to his personal and professional growth. He pursued doctoral studies and successfully obtained a PhD in law from UEM in 2019. He believes that it is his civic responsibility to serve his country by utilising his knowledge and expertise.

In 2022, Guilherme Júnior was appointed rector of UEM by the president of Mozambique, Filipe Jacinto Nyusi. As the university’s leader, he has actively implemented reforms, promoted innovation

in teaching and curriculum internationalisation, and expanded partnerships with overseas universities, all with the aim to provide students with a learning platform that aligns with global standards. The recent visit to Macao was a crucial step in his internationalisation strategy to further strengthen cooperation between universities in China and Portuguese-speaking countries.

Learning From UM’s Education Model and Management Practices

Nearly two decades after graduating from UM, Guilherme Júnior returned to UM as UEM rector, leading a delegation of academic and administrative leaders. The delegation visited various units, including the Faculty of Law, Faculty of Business Administration, Moon Chun Memorial College, and Information and Communications Technology Office, to gain insights into UM’s international education model and management practices. Guilherme Júnior shares, ‘Since its relocation to Hengqin Island, UM has made remarkable progress. The current campus is equipped with state-of-the-art teaching facilities. Therefore, we came to UM to learn from its experiences, particularly its digital and modern management model. We also hope that UM can provide us with technical support.’

During his visit, Guilherme Júnior met with UM Rector Yonghua Song and Vice Rector Rui Martins. They discussed academic collaboration, as well as university management and development. In addition, a memorandum of understanding was signed to further strengthen collaboration and exchanges in academic research, talent cultivation and mutual visits between the two universities. He describes the visit as very encouraging, believing that deepening collaboration can enhance the international teaching standards of both universities. He says, ‘As a UM alumnus, I hope to see more students and academic staff choosing UM as a destination for further education. As rector of UEM, I believe that this visit is an important step in our strategy to expand our overseas network, which will ultimately contribute to the quality of higher education in Mozambique.’

Cultivating a Global Perspective in Students

According to Guilherme Júnior, UM features a vibrant cross-cultural academic environment. He still has a vivid picture of the lively discussions among students

from Africa, Portugal, mainland China, Macao, and FLL professors who are from different parts of the world. These experiences brought the concept of a ‘global village’ to life. He adds, ‘The classroom was like a microcosm of the entire world. Learning alongside students and professors from different places and cultures broadened my worldview and the way I think.’

Guilherme Júnior’s educational journey at UM has instilled in him a strong belief in the importance for students to develop a global perspective and cross-cultural competence. He believes that one of the objectives of higher education is to address challenges faced by humanity as a whole. In today’s world, marked by global warming, artificial intelligence, and digital technology, it has become even more crucial for students to cultivate a strong sense of commitment and make contributions to the development of Africa and the wider world. Therefore, his education philosophy not only emphasises students’ concern for their society and the world, but also stresses the development of integrity and honesty. While academic and research skills are essential, he believes that a strong sense of responsibility, a law-abiding spirit, integrity, and empathy are equally important core values of university education. He reflects, ‘These are some of the lessons I learned at UM: to acquire knowledge, to be compassionate, and to aspire to make the world a better place.’

Serving as a Bridge Between China and Portuguese-Speaking Countries

‘The roots of education are bitter, but the fruit is sweet.’ This adage resonates with Guilherme Júnior’s journey, illustrating how the sweet fruits of education can ripple outward like a butterfly effect. Eighteen years ago, carried by the winds of the friendship between China and Portuguese-speaking countries, Guilherme Júnior arrived in Macao. During his time at the old UM campus, he served as an ambassador of African culture and shared African music with his peers in the East Asia Building. Today, he stands as a bridge between China and Portuguese-speaking countries, making contributions to the common development of higher education on both sides. His visit to UM has not only reinforced the consensus on collaboration between UEM and UM, but has also forged a sustainable and comprehensive international partnership between them. ‘This close relationship will not only benefit the long-term development of both UEM and UM, but will also enhance their respective teaching strengths. It will also provide faculty and students from both universities with more opportunities for academic exchanges and research collaboration, leading to a win-win situation for both sides. I hope that students will cherish their learning experiences and equip themselves to contribute to the common development of China and Portuguese-speaking countries in the future.’



葡文版
Article in Portuguese
Artigo em português



蒙德拉內大學代表團到訪澳大
The UEM delegation visits UM



林少陽： 在東亞歷史中重審「文」的意義

Lin Shaoyang: Revisiting the Significance of ‘Wen’ in East Asian History

文 / 葉浩男・圖 / 何杰平

Chinese & English Text / Davis Ip・Photo / Jack Ho

澳門大學歷史系特聘教授林少陽自幼嗜讀中國典籍，15歲時卻決意修習日文，開始探索東亞的文化與歷史，尤其是從「文」的概念著手，考究其在現代衰亡的因由和在全球化世界的意義。

從中國古典文學到漢字文化圈

林教授祖籍廣東紫金。在四壁書架環繞、藏有上千冊中、日、英文書籍的辦公室內，林教授談到自己的學術發展，首先感謝父母引導：「我的父母都是中學老師，

善於觀察學生潛能，引導我從小學習文科。」

1977年，內地恢復高考，15歲的林少陽於第三年參加。高考前夕，他偶然看到一本中日字典。「我發現日文也使用漢字，非常好奇為何一種外語會使用漢字。這份好奇心成為我研究日本的契機。中日同屬漢字文化圈，文化既相似、又不同，我開始思考，在歷史上除了戰爭外，中日之間還有甚麼關係？」這些疑問驅使他踏上學習日文的旅程，也使他對日本的好奇與對中國的思

考相互交織。「我視東亞為一個整體。我的中國研究和日本研究從一開始就是在一個超越民族國家框架的東亞框架出發。當然，這個東亞也是置於全球史的脈絡之中。」

廈門到東京的學術路

林少陽入讀廈門大學外文系後，受到來自日本筑波大學、研究中國先秦思想的森秀雄老師啟蒙。森教授對教學非常投入，並且邀請林少陽等三、四位優秀學生每週到他家中研討，讓他們在大四剛開始時便幾乎提前接受碩士層次的訓練。「我在大學時就對學科的設置存疑。在強烈的求學好奇心引導下，我得以在一、兩年內學會日文，又在森老師指導下在三、四年級研習東亞歷史和文化，可以說未有太受封閉的學科制度所限。我能在學業上有較快的提升，大抵要歸功森老師啟蒙，至今我仍感激不盡。」

這時，林少陽已決意成為學者，於是赴吉林大學攻讀碩士。他的室友來自哲學系，自己則屬於文學專業，但他對「文學」這一制度有許多疑問。他對文史哲都高度關心，研究題目則偏向思想史。

探索日本思想史

林少陽往後再到東京大學綜合文化研究科深造，後來在該校任教多年。他表示：「戰後日本社會深受美國文化影響，但知識分子崇尚法國和德國思想，同時將美國視為日本國家權力的一部分。我的導師小森陽一是日本反體制知識分子的領袖人物之一。他有一種無所不包的『文學』概念，以『文學』為材料研究日本近現代史。」林教授在日本深造和任教時常與幾位日本著名知識分子深度交流，這對思想史研究者來說有點像人類學的田野調查，是一筆寶貴的資產。「這也激發我深入探討東亞『文』的傳統與知識分子的關係。」林教授視「文」為一種漢字圈知識分子的無神「宗教」，而他的日本思想研究則主要涉及17世紀末至18世紀初的江戶日本，以及20世紀戰後的日本。

「文」無定界

林教授認為自己是典型的近現代思想史研究者，但他的「近現代」是始於16世紀末，有別於一般認知。他早年便對東亞傳統中「文」的概念深感興趣，最初是因為對其在現代的消失感到困惑。這也是他的博士論文的焦點之一。「『文』這概念源於先秦時代，《論語》即充滿對『文』的討論，涵括我們今天稱

作文學、歷史、哲學、語言的內容。六世紀初的《文心雕龍》更將山川動植物皆視為『文』，不只是英文『literature』那種以小說為中心的狹義概念。我從年輕時便很反感學科劃分制度，這一態度直接影響我的學術起點和之後的發展。」他後來留意到，「文」也是中國傳統中有關政治、道德、甚至宇宙秩序的一個複雜概念，很難清晰定義。比如，體現在外交關係中的「文」多以儒教話語出現，強調德治或文治，也是一種以中國中心的形式出現的安保平衡。朝貢禮儀和立足於這一禮儀的秩序是這種體系的典型體現，而當這一秩序失敗時，便會出現戰爭（武）的問題。因此，他近年除了研究16世紀末、17世紀初的東亞的朝貢秩序，也探討這一秩序失敗後東亞的戰爭問題。

林教授認為，從某種意義上說，學者研究的是問題而非「學科」，不應「有學無問」：「我們帶著問題進入某個領域，自然也當準備隨時到其它領域尋找解決問題的手段和視角。例如，近年我研究東亞朝貢禮儀與『文』的關係時，發現傳統歷史學的相關論著無法充分釋疑，要借助社會科學的方法，比如一些人類學、宗教學的儀式研究理論和社會學的理論，才有較具說服力的答案。」

研究章太炎思想二十載

林教授在東京大學求學治學期間，開始關注「文」與當時在日本盛行研究的法德思想家（如德國的解釋學思想家、法國的薩特、福柯、德里達）的關聯，這也為他試圖重構「文」提供新的角度。林教授認為，東亞有一位與這些西方思想家有相通之處、但政治經歷更為傳奇、且與日本關係深厚的中國思想巨擘。他就是與孫文、黃興並稱清末「革命三尊」的章太炎（1869—1936）。

林教授表示，章太炎深諳「文」的力量。清末革命期間，孫文在革命團體同盟會統籌全局，章太炎則以思想和文字推動反清革命，建立民國，並倡議亞洲各國的革命者團結互助，以解放受帝國主義和專制主義雙重壓迫的亞洲民眾。這些理念對後來的第三世界理論（即「弱小民族」話語）影響深遠。

2004年，林教授完成東京大學博士階段學習，旋即獲得該校研究生院綜合文化研究科助理教授的位置，後來逐步升為教授。他也曾兩度因家庭原因到香港城市大學任教。過去20年，林教授不斷研究章太炎及以「文」為手段的「革命」，這種革命有別於狹義的暴力革命。

他的著作對相關研究領域產生深遠影響。2004年，他的《「文」與日本現代性》一書入選北京萬聖書園的年度排行榜。該書之所以引起關注，是因為作為理論概念的「文」被遺忘後首次再被提出，並以與歐美思想對話的方式重提。該書也是他的博士論文的副產品。他的一系列研究在日本也備受關注，原因同樣是「文」作為一個思想和理論概念早已被遺忘。2009年，他的日文著作《「修辭」という思想：章炳麟と漢字圏の言語論的批評理論》出版。2018年，他的中文著作《鼎革以文——清季革命與章太炎「復古」的新文化運動》問世。該書以章太炎的思想為主軸，闡述清末革命如何以「文」為手段開展，提出一個與眾不同的晚清革命和晚清思想論、一個與辛亥革命的傳統解釋迥然有異的新解。

探討全球化下的澳門和東亞史

2022年，林教授加入澳門大學歷史系擔任特聘教授，兼任人文社科高等研究院學術項目與刊物主任，主編《南國學術》（澳門大學學報）。他表示：「來到澳門，與我的研究有一定聯繫。我近年研究1592年至1599年初豐臣秀吉試圖借道朝鮮侵略明朝的戰爭。這段歷史與澳門關係密切。如果沒有16世紀日漸成熟的歐洲大航海後的全球化貿易與明朝的朝貢貿易一體化的對外政策之間產生的相互作用，便不會有高度活躍的民間國際貿易網絡。沒有這段歷史，也不會有廈門、澳門這類新興城市。澳門在16世紀以來的全球貿易網絡中扮演樞紐角色，直接連接日本長崎與西班牙殖民地的菲律賓，也間

接連接歐美兩大洲。澳門不僅對研究中國自16世紀以來的歷史非常重要，對於研究16、17世紀的日本歷史也是不可或缺。」

同時，林教授關注「文」自16世紀以來在國際關係中的體現，並探究以「文」為基礎的秩序瓦解後的戰爭問題，追溯「文」在全球化背景下的演變。「我正在撰寫一本書，探討豐臣秀吉試圖通過侵略朝鮮進攻明朝的戰爭，研究時要參考在澳門的中葡文獻。」

重塑跨越國界的東亞傳統

來到澳門後，林教授的新著《戰後思想と日本ポストモダン——その連続と断絶》在2023年8月出版，這是中日英文學界首本系統探討二戰後日本知識分子思想與後現代思潮之間關係的著作。他正著手改寫為英文版，之後計劃出版中文版。同時，由於章太炎的著作比較艱澀，林教授計劃將自己對章太炎的研究翻譯，並進一步改寫為英文專著，以便西方學界認識這位思想巨擘。

全球史研究方興未艾，林教授指自己一直以全球史視角關注東亞的「文」在現代與歐洲思想之間的關係：「我自認是一位比較東亞研究者，透過比較研究來理解中國及其周邊地區。隨著研究日深，我越來越感受到，單靠民族國家框架來詮釋中國是非常狹隘的，甚至是非學術的。正如文言文一樣，先秦文化是東亞的共同傳統，但這一傳統在16世紀後深受到早期全球化的影響。我希望繼續追尋『文』的意義，使傳統的東亞文化價值在全球化的世界立足。」

Lin Shaoyang developed a passion for classical Chinese literature early in life. Yet at 15, he chose to study Japanese at university—a decision that set him on a lasting journey into East Asian culture and history. Now a Distinguished Professor of History at the University of Macau (UM), Prof Lin focuses his research on the concept of ‘wen’ (文), a fundamental cultural notion within the East Asian Sinitic sphere. He examines the reasons behind the decline, even disappearance, of ‘wen’ in modern times and considers its significance in today’s globalised world.

From Chinese Classics to the Sinitic Sphere

With ancestral roots in Zijin County, Guangdong Province, Prof Lin’s academic journey began with the education he received at home. In his UM office

where the shelves are packed with over a thousand volumes in Chinese, Japanese, and English, Prof Lin reflects, ‘My parents were both secondary school teachers. They had an exceptional ability to recognise potential in their students and encouraged me to pursue the humanities from an early age.’

In 1977, the National College Entrance Examination (gaokao) was reinstated in mainland China. Prof Lin took the exam in 1979 at the age of 15. Shortly before the exam day, he came across a Chinese-Japanese dictionary. ‘I noticed the use of Chinese characters, which are known as “kanji”, in the Japanese language and became very curious about it. This curiosity sparked my interest in studying Japan. China and Japan are both part of the Sinitic sphere, sharing a cultural foundation yet remaining distinct. I began to wonder: beyond the conflicts we often heard about, what other connections existed between the two nations throughout history?’ This question led him to begin learning Japanese, intertwining his curiosity about Japan with reflections on China. ‘I view East Asia as a unified sphere. My research about China and Japan has always begun from an East Asian framework that transcends national borders. Of course, this East Asia is also situated within the broader context of global history,’ Prof Lin explains.

An Academic Journey From Xiamen to Tokyo

Prof Lin went on to study in the Department of Foreign Languages at Xiamen University (formerly called Amoy University), where he was taught by Hideo Mori, a University of Tsukuba graduate and scholar of pre-Qin Chinese philosophy. The late Prof Mori was dedicated to teaching. He invited Prof Lin and a few other top students to participate in discussions at his home every week, giving them an early taste of master’s-level academic training in their fourth year of undergraduate studies. ‘I had been sceptical of the rigid structure of academic disciplines during my university years. Driven by intense curiosity, I learned Japanese within a year or two. With Prof Mori’s guidance, I began exploring East Asian history and culture in my third and fourth years, without being affected by the constraints of conventional academic boundaries. My rapid academic progress owes much to Prof Mori’s mentorship, for which I remain grateful to this day.’

By this time, Prof Lin had been committed to pursuing an academic career. He went on to pursue

a master’s degree at Jilin University. While his roommate was in the Philosophy Department and Prof Lin was studying literature, he felt increasingly sceptical of the rigid boundaries within ‘literature’ as a discipline. His interests spanned literature, history, and philosophy, with his research taking on an intellectual history focus.

Exploring the Intellectual History of Japan

Prof Lin furthered his education at the Graduate School of Arts and Sciences at the University of Tokyo (UTokyo), where he later taught for many years. ‘Post-war Japanese society was profoundly affected by American culture, yet intellectuals looked to French and German thought, viewing America’s influence as embedded within Japan’s own state power structure,’ he reflects. His mentor, Prof Yoichi Komori, was one of these intellectuals. A leading figure among Japan’s anti-establishment thinkers, Prof Komori adopted a broad view of ‘literature’ as a lens through which to study Japan’s modern history. Prof Lin recalls the frequent in-depth discussions with prominent Japanese intellectuals like Komori during his years studying and teaching in Japan. For an intellectual historian, he notes, this experience was akin to anthropological fieldwork—an invaluable asset for his research. ‘The discussions also inspired me to explore the relationship between “wen” in East Asian traditions and intellectual life.’ Prof Lin regards ‘wen’ as a kind of ‘religion’ without God for intellectuals in the Sinitic sphere, and his research on Japanese thought focuses on the late 17th to early 18th-century Edo period and post-war 20th-century Japan.

Wen: An Encompassing Concept

Prof Lin describes himself as a typical scholar of modern intellectual history, although his definition of ‘modern’ starts in the late 16th century, in contrast to the conventional interpretation. His fascination with the East Asian concept of ‘wen’ dates back to his early academic years, initially sparked by his perplexity over its decline in the modern era—a focus of his doctoral dissertation. ‘The concept of “wen” traces back to the pre-Qin era. For example, *The Analects* is rich with discussions of “wen”, covering what we would now refer to as literature, history, philosophy, and language. The early 6th-century work *Wen Xin Diao Long* (The Literary Mind and the Carving of Dragons) even described the natural world—mountains, rivers, flora, and fauna—as



林少陽教授的中文和日文著作

Prof Lin Shaoyang’s books in Chinese and Japanese

expressions of “wen”, a far broader idea than the “literature” concept in English, which focuses mainly on novels,’ Prof Lin explains. ‘From a young age, I resisted rigid disciplinary boundaries, and this perspective directly influenced my early academic path and subsequent development.’ Over time, Prof Lin observed that ‘wen’ is an intricate concept in the Chinese tradition, encompassing politics, morality, and even cosmic order, which makes it challenging to define. In diplomacy, for example, ‘wen’ often manifests through Confucian language, emphasising moral governance and civil rule, presented as a China-centred model of security balance. The Chinese tributary rituals and the order they establish exemplify this system. However, when this order broke down, the problem of war, or ‘wu’ (武, meaning military force), emerged. In view of this, Prof Lin, in recent years, has expanded his research to examine the East Asian tributary system of the late 16th and early 17th centuries, exploring the conflicts that arose as the order of ‘wen’ began to disintegrate.

Prof Lin believes that scholars answer questions rather than studying a specific academic discipline.. Therefore, scholars should not confine themselves to strict disciplinary boundaries. ‘We are guided by questions as we explore a field, so we should be open to seeking answers from other disciplines when necessary. For example, while researching the relationship between East Asian tributary rituals and “wen”, I’ve found that traditional historical studies alone could not fully address my questions. I needed to draw on methods and theories from social sciences, including anthropology, religious studies on rituals, and sociology, to arrive at more convincing answers.’

Two Decades Devoted to Zhang Taiyan’s Thought

While studying and working at UTokyo, Prof Lin began exploring the relationship between ‘wen’ and the ideas of prominent European thinkers influential in Japan at that time, including German hermeneutic philosophers and French intellectuals such as Jean-Paul Sartre, Michel Foucault, and Jacques Derrida. This inquiry offered him a fresh perspective for reimagining ‘wen’. Moreover, Prof Lin believes that there was a thinker in East Asia who rivalled these Western figures intellectually, but with a more politically remarkable background

and close connections to Japan. This thinker was Zhang Taiyan (1869–1936) from China, who is often remembered alongside Sun Yat-sen and Huang Xing as one of the ‘Three Revolutionaries’ in the late Qing Dynasty.

Prof Lin notes that Zhang Taiyan had a profound understanding of the power of ‘wen’. During the revolutionary era in the late Qing Dynasty, while Sun Yat-sen led the strategic vision of the Tongmenghui alliance, Zhang advanced the anti-Qing revolution and the establishment of the Republic of China through his ideas and writings. He also called for solidarity among revolutionaries across Asia to liberate those oppressed by imperialism and authoritarianism. These ideals had a significant impact on Third World discourses, particularly on the narrative of ‘small nations’ resisting dominant powers.

In 2004, Prof Lin completed his doctoral studies at UTokyo and was soon appointed as an assistant professor in the university’s Graduate School of Arts and Sciences, later rising to the rank of Full Professor. He also taught at the City University of Hong Kong for two periods due to family reasons. Over the past two decades, Prof Lin has been dedicated to his research on Zhang Taiyan and the concept of revolution through ‘wen’—a form of revolution distinct from narrowly-defined violent movements. His work has made a significant impact in the field. In 2004, his book *The Conflict of Wen in Japanese Modernity* was included on the annual booklist at Beijing’s All Sages Bookstore. The book drew significant attention because it reintroduced ‘wen’—an idea largely forgotten over time—as a theoretical concept and engaged it in dialogue with Western thought. This work was a by-product of his doctoral dissertation. Prof Lin’s research has also garnered considerable interest in Japan, similarly because it has revived ‘wen’ as an intellectual and theoretical concept long overlooked. In 2009, he published his Japanese-language book, *Rhetoric and Thought: Zhang Taiyan and His Theory*. His 2018 Chinese-language work, *Revolution by Means of Culture: The Late Qing Revolution and Zhang Taiyan from 1900 to 1911*, focuses on Zhang Taiyan’s ideas, examining how the late Qing revolution employed ‘wen’ as a transformative tool. This interpretation offers a unique perspective on late Qing revolutionary and



林少陽教授的辦公室藏有逾千本中、日、英文歷史書和古籍

Prof Lin Shaoyang’s office is filled with over a thousand history books and classical texts in Chinese, Japanese, and English

intellectual history, presenting a fresh view distinct from traditional accounts of the 1911 Revolution (Xinhai Revolution).

Exploring Macao and East Asian History in the Context of Globalisation

In 2022, Prof Lin joined the UM’s Department of History as a Distinguished Professor and took on the role of Head of Academic Programmes and Publications at the UM Institute of Advanced Studies in Humanities and Social Sciences, where he serves as editor-in-chief of *South China Quarterly: Journal of University of Macau*. ‘Macao has a connection to my research,’ he explains. ‘In recent years, I have been studying the wars from 1592 to early 1599, when Toyotomi Hideyoshi attempted to invade China in the Ming Dynasty through Korea. This historical episode was intricately connected with Macao. Without the interactions between emerging global trade networks following Europe’s Age of Exploration and the Ming Dynasty’s policy of integrating tribute with trade, the dynamic networks of international commerce would not have developed as they did. And without this backdrop, new urban centres like Amoy (Xiamen) and Macao would not have emerged.’ Prof Lin adds, ‘Macao served as a pivotal hub in global trade networks from the 16th century onwards, directly linking Japan’s Nagasaki with the Philippines, which was then a Spanish colony. Macao also indirectly connected

Europe and the Americas. The role of Macao is not only crucial for understanding Chinese history from the 16th century onwards, but also indispensable for studying the history of Japan in the 16th and 17th centuries.’

Prof Lin also examines the manifestation of ‘wen’ in international relations since the 16th century, and explores conflicts arising from the breakdown of orders grounded in ‘wen’, thereby tracing the evolution of ‘wen’ within the context of globalisation. He adds, ‘I am writing a book on Toyotomi Hideyoshi’s attempted invasion of Korea as a route to attack the Ming Dynasty. The research process involves consulting Chinese and Portuguese-language literature preserved in Macao.’

Reimagining a Transnational East Asian Tradition

After moving to Macao, Prof Lin published his book *Postwar and Postmodern Japan: Its Continuities and Discontinuities* in August 2023. This is the first work in Chinese, Japanese, or English-language academia that systematically examines the relationship between Japanese intellectual thought after World War II and postmodernism. He is currently adapting the book into an English edition, with plans for a Chinese version to follow. Given the complex nature of Zhang Taiyan’s works, Prof Lin also aims to translate and adapt his research on Zhang into an English monograph, with the goal of introducing this influential thinker to Western scholars.

As global history research continues to flourish, Prof Lin explains that he has long explored the relationship between East Asia’s concept of ‘wen’ and European thought from a global historical perspective. ‘I see myself as a scholar of comparative East Asian studies who aims to understand China and its neighbouring regions through a comparative lens. The deeper my research goes, the more I realise that solely replying on a nation-state framework to interpret China is narrow—even unacademic. Much like the Literary Chinese language, pre-Qin culture was a shared tradition across East Asia, yet this tradition was profoundly shaped by early globalisation since the 16th century. I hope to continue examining the significance of “wen” and to situate the traditional values of East Asian culture within today’s globalised world.’



曾創業的人更易辭職嗎？

Are All Former Entrepreneurs Risky Quitters?

文、圖 / 張麗文 · 中文翻譯 / 葉浩男
Text & Photo / Zhang Liwen · Chinese Translation / Davis Ip

全球超過一半初創企業以失敗告終，高達85%創業者後來重返職場。與此同時，各類組織面臨日益嚴峻的人才短缺問題，急需招攬過去被忽視的人才，擁有創業經驗的人正是其中之一。他們兼具創造力和商業技能，在當今崇尚創新的商業環境中有潛力協助企業保持競爭優勢。

創業經驗與辭職意向

曾創業的人對各類組織而言，都有頗大的潛在價值，但招聘者經常忽視他們，認為他們大多不願意久居受薪職位。我們最近一項研究就對這種刻板印象提出質疑。我們從時間角度分析，指出不是所有曾創業的人都會輕易辭職。研究結果顯示，擁有近期創業經驗

（例如上一份工作為創業）的僱員，其實比其它僱員更不傾向於再度創業，辭職意向也較低。這種情況在男性較為明顯，在女性身上則不顯著。

為了驗證我們的假設，我們分析了《澳洲家庭、收入及勞動力動態報告》（HILDA）中的12,606份僱員工作記錄，涵蓋在2001年至2020年的情況。結果顯示，預測一個人的辭職意向和實際辭職行為，關鍵在於分析其創業經驗的時間點。

具體來說，有近期創業經驗的人比沒有創業經驗的人更傾向於再度創業或辭職。我們還發現了顯著的性別差異：近期曾創業的男性，比起沒有創業經

驗的男性較少會有再度創業的想法或辭職的意向，這個情況在女性中卻不明顯。另外，儘管我們在分析個人工作和生活經驗時經常考慮時間因素（如年份、天數、時數），但我們發現不論是創業時間的長短，抑或是結束創業後的時間長短，這些因素都不足以有效預測一個人的創業意向、辭職意向或自願離職行為。

創業經驗的時間點與性別差異

這項研究探討了創業經驗的時間點，並且提出三個有實際意義的見解。首先，我們質疑了「所有曾經創業的僱員都很容易辭職」這個刻板印象，並證明在預測僱員再度創業的意向或辭職的傾向時，創業經驗的時間點是重要的分析因素。聘用剛結束創業的人往往能為組織帶來嶄新的商業技能，僱主毋須過於擔心他們會輕言辭職。

其次，我們的研究結果顯示，創業者在結束業務後需要時間恢復財務狀況和心境，才能再度創業，這點對創業失敗的人來說尤其重要。從事受僱工作有助他們於挫折中復原，從過往的經歷中抽離，繼而

再訂目標，爭取下次創業時做得更好。

最後，我們的研究揭示了女性創業者的優勢：女性結束創業後不會大幅喪失創業意志，這點與男性不同。女性在創業初期遇上的挑戰可能反而減低了她們在創業失敗或退出業務後面對的負面影響。因此，政策制定者和投資者或許可以考慮為女性創業者提供充足的支援，例如政策和培訓，幫助她們在結束業務後的短期內再度創業。另一方面，男性結束創業後較易暫時失卻創業的意願。政策制定者和投資者能夠以此為依據，考慮為他們提供心理支援等資源、給予他們充裕時間，支持他們重拾信心、再接再厲。

打破刻板印象

總而言之，這項研究中探討了創業經驗的時間點如何和何時會影響僱員辭職的可能性，其結果質疑了「所有曾經創業的僱員都很容易辭職」的普遍觀念。這種刻板印象並不公允，固守成見的招聘者或會錯失良才。

More than half of start-ups worldwide fail, and up to 85 per cent of entrepreneurs return to wage employment. Meanwhile, organisations around the world are facing a growing talent shortfall, making it more important than ever to tap into previously neglected labour pools. Former entrepreneurs stand out as a valuable talent source, with their creativity and entrepreneurial skills potentially critical to maintaining organisations’ competitive advantages in today’s innovation-driven business environment.

Entrepreneurial Experience and Turnover Intention

Despite the potential value that former entrepreneurs bring to organisations, recruiters often overlook them, believing it is difficult to retain them in wage employment. In our recent research, we challenged the prevailing stereotype that recruiters hold against former entrepreneurs. We followed a temporal perspective and proposed that not all prior entrepreneurs are more likely to quit. Specifically, employees with recent entrepreneurial experience (i.e., their last job was running their own business) would be less likely to have entrepreneurial intentions and thus demonstrate lower turnover intentions and

a reduced likelihood of quitting their wage jobs compared with employees without entrepreneurial experience. Moreover, the serial mediation effect would be stronger for men than women.

To examine our hypotheses, we derived a sample of 12,606 wage job spells from the nationally representative Household, Income, and Labour Dynamics in Australia (HILDA) Survey dataset, spanning from 2001 to 2020. Our findings supported our hypotheses that the timing of prior entrepreneurial experience matters in predicting post-entrepreneurship employment intention to leave and actual turnover.

Specifically, individuals with recent entrepreneurial experience were no more likely to develop subsequent entrepreneurial intentions and, consequently, quit their wage jobs than those without recent entrepreneurial experience. Moreover, we found important gender differences: men, but not women, with entrepreneurial experience in their most recent job spell tend to show lower levels of subsequent entrepreneurial intention and a lower likelihood of voluntary turnover compared to men without recent entrepreneurial experience. In addition, although

natural clock time (e.g., years, days, hours) is more commonly used when considering individual work and life experiences in general, we found that neither the duration in nor the duration away from entrepreneurship was a significant predictor of subsequent entrepreneurial intention, turnover intention, and voluntary turnover.

Timing and Gender Differences in Entrepreneurial Experience

In the research, we adopted a temporal perspective to conceptualise prior entrepreneurial experience. Our findings provide three novel insights and implications for practice. First, our findings challenge the prevailing stereotype that all entrepreneurs are risky quitters in wage employment. They highlight the importance of the timing of entrepreneurial experience in predicting former entrepreneurs’ post-entrepreneurship employment attitudes (e.g., entrepreneurial intention, turnover intention) and behaviour (voluntary turnover). Hiring former entrepreneurs, especially those who have recently quit entrepreneurship, could benefit organisations by bringing in fresh entrepreneurial skills without the potentially high cost associated with turnover.

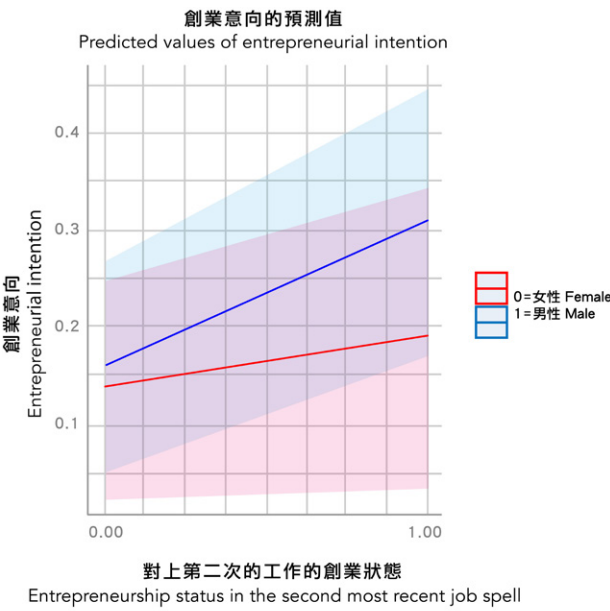
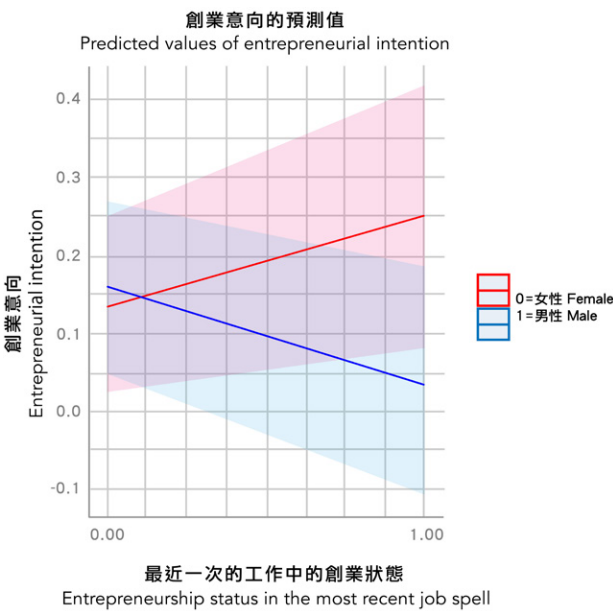
Second, our findings suggest that former entrepreneurs need time to recover financially and emotionally from their previous entrepreneurial exit before they are ready to re-enter entrepreneurship. Former entrepreneurs, especially those who failed, may benefit from giving themselves time by taking up a wage job to recover from their past entrepreneurial experience. Doing so may help

them distance themselves from previous setbacks and reset themselves for future entrepreneurial goals, leading to better outcomes in their next entrepreneurial attempt.

Third, our findings suggest a novel advantage for women: after exiting entrepreneurship, female entrepreneurs, unlike their male counterparts, do not significantly reduce their entrepreneurial intentions. The disadvantages female entrepreneurs face at the earlier stages of entrepreneurship may have paradoxically shielded them from the liability of entrepreneurial failure or exit. Policymakers and investors may consider providing female entrepreneurs sufficient opportunities (e.g., policies, training) to promote and support their entrepreneurial attempts right after they exit entrepreneurship. In contrast, male entrepreneurs tend to experience a temporary dip in entrepreneurial intention after leaving entrepreneurship. Policymakers and investors may consider providing former male entrepreneurs with resources (e.g., psychological support) and time to help them recover from their entrepreneurship exit and to encourage future entrepreneurial attempts.

Breaking the Stereotype

Overall, we examined whether, when, and which entrepreneurial experience influences voluntary turnover in subsequent wage employment. Our findings challenge the prevailing hiring stereotype that all former entrepreneurs pose a high risk of quitting. Recruiters holding this stereotype may prematurely exclude former entrepreneurs from consideration.



這些圖表顯示，近期有創業經歷的男性僱員，其創業意向顯著低於沒有創業經歷的男性。不過，如果他們曾有早期的創業經驗，卻會展現出更高的創業意向。女性僱員之間則沒有這種顯著差異。

These graphs show that compared to male employees without entrepreneurial experience, male employees with recent entrepreneurial experience demonstrated lower entrepreneurial intention, but those with entrepreneurial experience from an earlier stage in their career demonstrated higher entrepreneurial intention. However, there were no such significant differences among women.

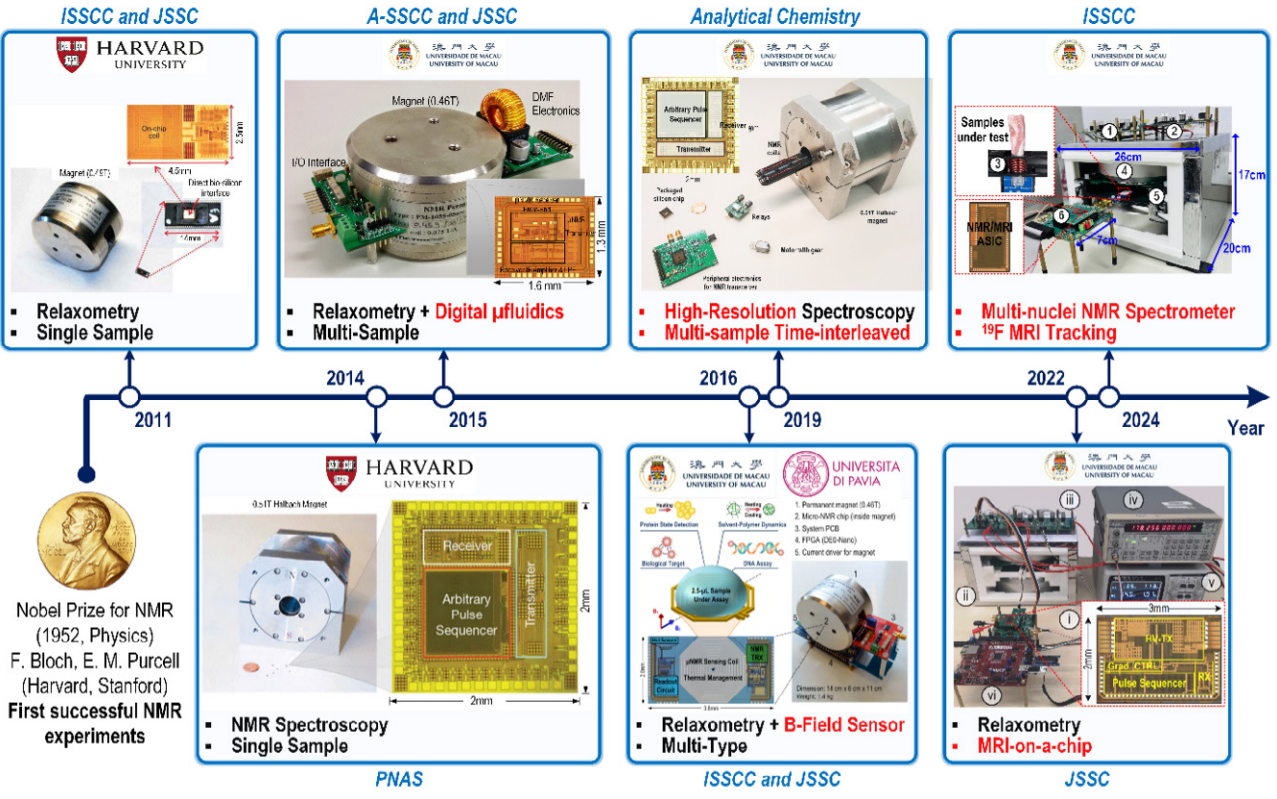
張麗文是澳門大學工商管理學院助理教授，於佛羅里達州立大學取得組織行為與人力資源管理博士學位。她的研究聚焦於企業如何吸引及甄選有潛力的合適人才，並在聘用後留住這些員工。她曾在《Journal of Applied Psychology》和《Personnel Psychology》等著名期刊發表論文，並獲美國管理學會人力資源分會頒發2014年學術成就影響力獎。

Zhang Liwen is an assistant professor in the Faculty of Business Administration at the University of Macau. She obtained her PhD in organisational behaviour and human resources from Florida State University. Her research focuses on how organisations attract and select potentially qualified job candidates and further retain them after hiring. Her papers have been published in prestigious journals, including the *Journal of Applied Psychology* and *Personnel Psychology*. She was awarded the 2014 Scholarly Achievement Impact Award by the Human Resources Division of the Academy of Management.



「學術研究」為投稿欄目，內容僅代表作者個人意見。

Academic Research is a contribution column. The views expressed are solely those of the author(s).



NMR/MRI系統過去十年的小型化歷程

The miniaturisation of NMR/MRI systems over the past decade

CMOS技術革新小型化核磁共振掃描儀

Transformative Impact of CMOS Technology on Miniaturised MRI Scanners

文、圖 / 范姝豪、李家庭 · 中文翻譯 / 葉浩男

Text & Photo / Fan Shuhao, Lei Ka Meng · Chinese Translation / Davis Ip

核磁共振（英文簡稱NMR）技術讓我們毋須侵入人體便可探究體內分子的結構和動態，廣泛用於化學、物理及生物學研究，其中一大用途就是核磁共振成像（英文簡稱MRI）。MRI作為現代醫學的利器，大大提升了醫生觀察病變的能力。我們在澳門大學微電子研究院的研究團隊近期開發出一款基於互補式金屬氧化物半導體（英文簡稱CMOS）技術的小型化核磁共振成像掃描器，期望改進個性化醫療技術。

運用多核MRI技術

隨著多核MRI技術出現，人們得以利用各種原子核進行醫學成像，例如氫-1（1H）和氟-19（19F），增強診斷和治療監測的效果。由於氫-1廣泛存在於生物組織內，它在MRI進行時能清晰顯示人體的解剖結構。不過，同樣因為氫-1廣泛存在，它在用於追蹤體內的特定物質時效果有限。相比之下，氟-19在生物組織內極為罕見，因此我們可以使用含氟-19的全氟化碳納米粒子作為標記物，更精準地通過追蹤靶向藥物等特定物質來評估病情和療效。

MRI技術的小型化革新

傳統的MRI儀器採用超導磁體和離散電子元件，體積龐大、成本高昂，用途因而受限。隨著NMR/MRI系統的小型化，這些困難正被逐漸克服。這些新的小型MRI系統大多採用由CMOS技術製成的專用集成電路（英文簡稱ASIC）和成本較低的永久磁鐵。我們的研究團隊在初期主要關注NMR光譜和弛豫測量設備的小型化，致力實現核磁共振系統的芯片化（即建立「芯片上的NMR」）。2023年，我們推出了首個三維「芯片上的NMR」平台，展示了一款小型化MRI掃描器。

創建小型化多核NMR/MRI平台

過去十多年來，澳大模擬與混合信號超大規模集成電路國家重點實驗室的研究團隊致力推動NMR/MRI系統的小型化，研發了多代系統，各有特色。最新版本是我們的首個小型化多核NMR/MRI平台，採用定製的硅芯片，專供追蹤氟-19的體外MRI使用。

這個平台的掃描器配備一個強度為0.52特斯拉的永磁體和高度集成的高壓絕緣硅專用集成電路，設計緊湊小巧，在尺寸、重量、成像區域、圖像解析度和信噪比等均有優化。

這款小型化NMR/MRI系統的核心是一個專門設計的CMOS ASIC芯片。芯片核心區域僅4.1平方毫米，使小型化的多核NMR/MRI平台更易攜、更靈敏，其組件包括：一）任意脈衝序列合成器（配備32kb內存和指導各模塊操作的狀態協調器）；二）高壓發射器（向線圈發送射頻信號，從而激發觀察樣本中的原子核）；三）低噪聲接收器（捕捉和處理原子核旋進信號）；四）高壓容忍開關（保護接收器免受發射器的高電壓信號的影響）；五）3D梯度控制器（由三組12位數字模擬轉換器所組成，用於編程所需的梯度，藉此作空間編碼）。

突破技術界限

這個小型化多核NMR/MRI平台採用了複合射頻脈衝。這種脈衝是經過精確調整的相位和強度的射頻信號組合，能夠最大程度地減少由原子核頻率不準確（即「離共振效應」）所引發的問題。這對多核NMR/MRI來說極為重要。此外，它能同時解決靜態和射頻磁場強度不均而導致成像質量下降的問題。這種複合脈衝需要小於1度的高精度相位分辨率，而多數已知的緊湊型NMR/MRI系統無法達到這個要求。因此，我們通過集成基於相位插值雙DLL架構的多相生成器，使NMR

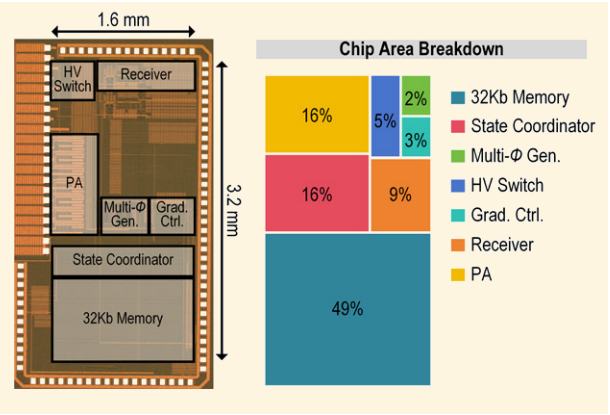
光譜的精確度提高了28%，顯著增強這個低場NMR平台的性能和成像質量。

此舉不僅革新了複合射頻脈衝的生成方式，還改進了功率傳輸機制。該系統使用配備高壓溝道金屬氧化物半導體場效應管陣列的D類功率放大器，能提供大範圍MRI掃描所需的高功率容量（100Ω負載下輸出20.5W）。此外，系統中的高壓容忍開關在激發樣品中的原子核時發揮了關鍵作用，保護接收器免受高壓影響，並減少接收過程中的噪聲，確保信號質量和系統性能。

在醫療領域，追蹤氟-19是多核MRI的重要用途。為了驗證這個新系統的效能，我們採用全氟化碳作為造影劑，將它注入已取出體外的豬肉樣本，以MRI掃描來生成顯示組織結構（包括肌肉和脂肪）的氫-1分佈圖像，同時顯示全氟化碳精確位置的氟-19分佈圖像。我們發現，結合這兩種圖像能讓我們精確追蹤和分析樣本內部的特定化學物質。這項技術在小型化多核NMR/MRI系統中得以應用，無疑是我們研發工作上的一個里程碑。

推動個性化醫療

我們相信，這款設計緊湊的小型化多核NMR/MRI系統有助推動個性化醫療技術進步。它能深入從分子層面分析身體組織，有潛力帶動早期疾病檢測、治療策略和疾病管理等方面的革新。隨著我們的團隊在CMOS集成電路技術上不斷取得進展，這些複雜的成像技術可望將來成為常規的醫療工具，賦予醫療人員前所未有的精準診斷能力。



用於小型化多核NMR/MRI平台的定製芯片

The customised integrated circuit for the miniaturised multi-nuclei NMR/MRI platform

Nuclear magnetic resonance (NMR) is a cornerstone technique in chemistry, physics, and biology, pivotal for non-invasive study of the structure and dynamics of molecules within the human body. Among its primary applications is magnetic resonance imaging (MRI), an indispensable tool in modern medicine that allows doctors to easily observe pathological changes in patients. Our research team in the Institute of Microelectronics (IME) at the University of Macau (UM) has recently developed a compact MRI scanner based on complementary metal-oxide-semiconductor (CMOS) technology, aiming to advance personalised medicine.

The Advent of Multi-Nuclei MRI Technology

With the advent of multi-nuclei MRI technology, we can now perform medical imaging using various nuclei, such as hydrogen-1 (1H) and fluorine-19 (19F), to improve the effectiveness of diagnosis and treatment monitoring. Hydrogen-1, which is abundant in biological tissues, allows for clear anatomical MRI images. However, its ubiquity limits its effectiveness in tracking specific substances within the body. In contrast, fluorine-19 is extremely rare in biological tissues, making it an excellent marker for tracking targeted drugs and other specific substances with high precision, thereby allowing a more accurate assessment of disease progression and treatment efficacy.

Innovations in the Miniaturisation of MRI Technology

Traditional MRI machines, which use superconducting magnets and discrete electronic components, are bulky, expensive, and have limited applications. However, the advent of miniaturised NMR/MRI systems is changing the landscape. These new systems are powered by CMOS application-specific integrated circuits (ASICs) and more affordable permanent magnets. In the initial stages, our research team focused on miniaturising NMR spectroscopy and relaxometry, known as NMR-on-a-chip. In 2023, we developed the first three-dimensional MRI-on-a-chip platform, and introduced the miniaturised MRI scanner.

Creating a Miniaturised Multi-Nuclei NMR/MRI Platform

Over the past decade, the research team in the State Key Laboratory of Analog and Mixed-Signal VLSI at UM has been working on the miniaturisation of NMR/MRI systems and has developed several generations of portable NMR/MRI platforms, each with unique and innovative features. Among these platforms, the

latest generation is the first miniaturised multi-nuclei NMR/MRI platform with a customised silicon chip for ex vivo 19F MRI tracking.

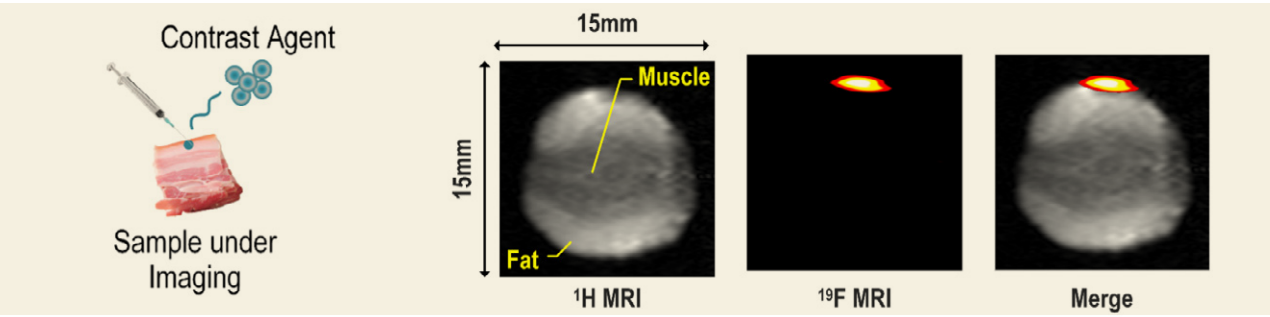
The scanner on this platform is equipped with a 0.52 Tesla permanent magnet and a highly integrated high-voltage insulated silicon ASIC. It is designed to be compact and lightweight, with optimised size, weight, imaging area, image resolution, and signal-to-noise ratio.

At the core of this miniaturised NMR/MRI system is a customised CMOS ASIC chip. The compact core area is only 4.1mm², which enhances the portability and sensitivity of the miniaturised multi-nuclei NMR/MRI platform. Its components include: 1) an arbitrary pulse sequence synthesiser (equipped with 32kb of memory and a state coordinator to instruct the operation of each module); 2) a high-voltage transmitter (TX, which sends RF signals to the coil to excite the nuclei in the sample); 3) a low-noise receiver (RX, which captures and processes signals from the nuclei); 4) a pair of high-voltage-tolerant switches (which protect RX from TX); and 5) a three-dimensional gradient controller (comprising three sets of 12-bit digital-to-analogue converters used to programme the necessary gradients for spatial encoding of the nuclei).

Pushing Technological Boundaries

The miniaturised multi-nuclei NMR/MRI platform employs composite radio-frequency (RF) pulses. These pulses are a combination of RF signals with precisely adjusted phases and amplitudes, designed to minimise off-resonance effects, which is critical for multi-nuclei NMR/MRI. In addition, these pulses can mitigate the effects of inhomogeneous static and RF magnetic field strengths, such as image quality degradation. It is worth noting that such composite pulses require a phase resolution of less than 1°, which most compact NMR/MRI systems are unable to achieve. To address this limitation, we have integrated a multi-phase generator based on a phase-interpolated dual-DLL architecture and improved the accuracy of the NMR spectrum amplitude by 28 per cent, significantly enhancing the quality and capabilities of our low-field NMR platform.

This transformative technology not only revolutionises the generation of composite RF pulses but also improves the power transmission mechanism within the system. By leveraging a class-D power amplifier equipped with a sophisticated high-voltage NMOS array, the system can deliver the high-power capacity required for large FOV MRI applications (20.5W into a 100-Ω load). The



以MRI技術在注入了全氟化碳的豬肉樣本中追蹤氫-1和氟-19，從而區分樣本中的肌肉 (T1：191.2毫秒) 和脂肪 (T1：82.9毫秒)。

MRI tracking of 1H and 19F in the porcine sample injected with PFC, which helps differentiate between muscle (T1: 191.2 ms) and fat (T1: 82.9 ms) in the sample

high-voltage-tolerant switches also play a crucial role during nuclear excitation as they protect the receiver and reduce noise during acquisition, thereby ensuring optimal signal quality and system performance.

In the medical field, 19F tracking is a hallmark application of multi-nuclei MRI. To evaluate the performance of this new system, we used perfluorocarbon (PFC) as an MRI contrast agent and injected it into the ex vivo porcine sample to obtain 1H/19F images. The 1H image details the structure of the porcine sample (muscle and fat), while the 19F image shows the location of the PFC. We found that combining these images allows precise tracking and analysis of specific chemical substances within the sample. The application of this technology in a

miniaturised multi-nuclei NMR/MRI system marks a milestone in our research and development efforts.

Advancing Personalised Medicine

We believe that this compact, miniaturised multi-nuclei NMR/MRI system will drive advancements in personalised medicine. By enabling in-depth molecular analysis of body tissues, the system has the potential to revolutionise early disease detection, treatment strategies, and disease management. As our team continues to make strides in CMOS integrated circuit technology, we are setting the stage for a future where this sophisticated imaging technology becomes a standard tool in healthcare, offering medical professionals more powerful diagnostic capabilities than ever before.



范姝豪在2024年獲澳門大學博士學位，2016年獲東北林業大學學士學位、2017年獲香港科技大學碩士學位，曾在2024年於哈佛大學當訪問生，研究重點是便攜式NMR/MRI平台與定製集成電路，成果曾在IEEE國際固態電路會議、《IEEE固態電路期刊》、《IEEE電路與系統期刊-I》和國際微全分析系統會議等會議和期刊上發表。

Fan Shuhao obtained her PhD from the University of Macau in 2024. She earned her BSc degree from Northeast Forestry University in 2016, and her MSc degree from the Hong Kong University of Science and Technology in 2017. She was also a visiting student at Harvard University in 2024. Her research interests include portable NMR/MRI platforms with customised integrated circuits, and her work has been featured in conferences and journals such as the IEEE International Solid-State Circuits Conference, *IEEE Journal of Solid-State Circuits*, *IEEE Transactions on Circuits and Systems I: Regular Papers*, and the International Conference on Miniaturized Systems for Chemistry and Life Sciences.



李家明於2019年起在澳門大學微電子研究院擔任助理教授，分別於2012年和2016年澳門大學獲學士學位和博士學位，研究興趣包括精密模擬集成電路、傳感器與模擬前端接口，以及高解析度的便攜式NMR/MRI平台。

Lei Ka Meng has been an assistant professor in the Institute of Microelectronics at the University of Macau (UM) since 2019. He received his BSc and PhD degrees from UM in 2012 and 2016, respectively. His research interests include precision analogue integrated circuits, sensors and analogue front-end interfaces, and high-resolution portable NMR/MRI platforms.

「學術研究」為投稿欄目，內容僅代表作者個人意見。

Academic Research is a contribution column. The views expressed are solely those of the author(s).



中國與葡語國家的夥伴關係： 量身定制的合作模式

Chinese Partnerships and Portuguese-Speaking Countries: Tailor-Made Cooperation Models

文 / 利天佑、李翌超 · 中文翻譯 / 葉浩男

Text / Francisco José Leandro, Li Yichao · Chinese Translation / Davis Ip

中國正在構建全球夥伴關係網絡，推動制度化多邊合作。正如習近平主席在2023年新年賀詞中說：「今天的中國，是緊密聯繫世界的中國」。中國自1993年與巴西建立首個戰略夥伴關係以來，不斷擴展雙邊承諾，促進現有合作更趨全面。

靈活變通、共識先行

中國的外交深受其傳統文化和不結盟理念所影響，以關係性為指導原則。因此，中國建立的夥伴關係有別於傳統的結盟模式。在國際關係上，盛行一時的傳統結盟模式通常出於軍事考慮或敵對意圖，成員國須在意識形態或政治立場上達成一定程度的一致。相比之下，中國建立的雙邊夥伴關係強調平等、互相尊重（尤其是尊重政治獨立）、互利、和諧發展，具有非對抗性和不結盟的特徵，由共識所驅動。根據馬克思·韋伯所說，當我們對他人行為的預期是現實可行的時候，所謂的「共識」便已存在。夥伴關係正是通過共識，才能將這些預期化為現實。

中國建立的夥伴關係是一種因時制宜、基於共識而沒有法律約束力的政治和外交工具，旨在構建務實、靈活的

雙邊合作框架，穩步促進主權利益，在合理範圍內實現互惠互利、經濟安全與和平發展。這些夥伴關係既是一種政治合作框架，也是一種量身定制的合作模式，能將各類共識轉化為「廣泛的變革願景」，通過「理解和談判」達成「共同點」。相比傳統的結盟模式，這些夥伴關係更有彈性、適應性和靈活性，可按雙方需求不斷調整。

這些夥伴關係涉及的項目可增可減，合作的範圍、性質和條款均可修訂，實施進度也可按需要加速、減速，甚至暫停，以各方的國家利益和國內政策的優先關注為大前提。憑藉這種靈活變通的特質，中國的夥伴關係能容納和促進各類合作，為雙方持續的實質合作提供多元化的基礎。這也意味著中國與各國建立的夥伴關係各有獨特之處，無一雷同。

這些夥伴關係為中國提供了穩定而平衡的平台，用於擴展和協調與他國的利益，有助塑造「有利於中國崛起成為全球大國的國際環境」、推動中國成為重要的國際關係行為者，以及實現構建人類命運共同體的全球願景。

夥伴關係日益緊密

中國與他國的夥伴關係中，未被歸類為「戰略性」的不足一成。描述中國與其它國家的合作和雙邊關係時，「全面」、「合作」、「全天候」、「全方位」和「友好」等用詞能反映它們的範圍。中國與葡語國家一直通過夥伴關係穩步促進聯繫。表一詳列有關中國與九個葡語國家建立和推進夥伴關係，以及融入相應區域經濟組織的情況。

目前，中國已與全數九個葡語國家建立了戰略層面的夥伴關係，其重要性不言而喻。過去兩年（2023年和2024年），中國與大多數葡語國家的夥伴關係顯著加強，尤其是與東帝汶和非洲葡語國家的關係更趨緊密。這一進展推動了雙邊合作和區域一體化，特別體現在新市場和生產中心的准入方面。

China is building a global network of partnerships as instruments to advance institutional and multilateral cooperation. As President Xi Jinping emphasised during his 2023 New Year address, ‘today’s China is a country closely linked with the world’. Since the establishment of its first strategic partnership with Brazil in 1993, China has not only engaged in more bilateral commitments, but has also strengthened existing ones into more comprehensive forms of cooperation.

Flexible and Consensus-Driven Partnerships

Chinese partnerships are in significant ways distinct from classical, conventional alliances, as China’s approach to foreign relations is heavily influenced by traditional Chinese culture and the landmark notion of non-alignment, with relationality as a guiding principle. Whereas classical alliances that once prevailed in international relations tend to be driven by military and/or hostile intents and necessitate some level of ideological and/or political alignment among the multiple states involved, China builds bilateral partnerships that are premised on equality, mutual respect (especially on the importance of political independence), mutual benefits and harmonious development; non-antagonistic and characterised by non-alignment; and consensus-driven. Max Weber defined consensus as ‘something that exists when our expectations regarding the behaviour of others are realistic’, and it is through consensus that partnerships turn such expectations into reality.

推動經濟一體化

無論是獨立開展還是結合「一帶一路」倡議，中國的夥伴關係均為量身定制的合作模式，有助推動各個葡語國家本身的發展計劃。此外，這些夥伴關係也是一種經濟一體化的機制，有助強化這些國家在區域上的角色。國際關係向來都不是靜止不動，任何雙邊關係（包括夥伴關係）都會不斷演變。由此可見，夥伴關係是中國與葡語國家之間重要的外交工具。在葡萄牙、巴西、東帝汶與中國的雙邊關係不斷發展之際，2024年舉行的中非合作論壇北京峰會標誌著引領全球南方現代化的新開始。事實上，2024年中非合作論壇北京峰會加強了中國的夥伴關係作為政治和外交工具的價值。這些夥伴關係旨在達致互利共贏和基於共識的務實合作框架。中國的戰略方向是最終與每個國家和地區建立命運共同體，這點尤其值得注意。

Chinese partnerships serve as ad hoc, dynamic, consensual and non-legally binding political-diplomatic instruments designed to set a flexible, bilateral and pragmatic cooperation framework. Their aim is to advance stable sovereign interests and generate a reasonable level of mutual benefits, economic security and peaceful development. Indeed, they are political cooperative frameworks and models of tailor-made cooperation that can translate different forms of consensus into ‘a wide vision for change’ and achieve ‘common points [...] through understanding and negotiations’. They can be as elastic, adaptable and dynamic as the two sides wish them to be, especially in comparison with traditional, conventional alliances.

For example, the number of projects within a partnership can increase or decrease; the overall scope, nature, and terms of cooperation can be modified; and the implementation process can accelerate, decelerate or even be paused to better cater to the individual parties’ national interests and/or domestic policies and priorities. Such flexibility allows Chinese partnerships to accommodate and facilitate a variety of constituent programmes, providing a versatile basis for the two parties to continue to achieve substantive cooperation. Such flexibility also means that no partnerships exactly replicate others, as each is unique to the specific implementors.

For China, these partnerships provide a stable, balanced platform for expanding and coordinating

表 1 Table 1 葡語國家、 「一帶一路」 倡議與區域經濟一體化 Portuguese-Speaking Countries (PSCs), the Belt and Road Initiative (BRI), and Regional Economic Integration					
葡語國家 PSCs	與中國的夥伴關係 Partnerships with China		已簽署的 「一帶一路」備忘錄 BRI MOU (Signed)	非洲大陸 自由貿易區 African Continental Free Trade Area	區域經濟一體化 Regional Economic Integration
	年份 Year	類型 Types			
葡萄牙 Portugal	2005	全面戰略夥伴關係 Comprehensive strategic partnership	2018	不適用 Not applicable	歐盟 European Union (EU)
	2018	進一步加強 Further strengthened			
巴西 Brazil	1993	戰略夥伴關係 Strategic Partnership	2024年7月， 巴西表示制定 加入「一帶一路」 的提案 In July 2024, Brazil revealed a plan to join the BRI.	不適用 Not applicable	南方共同市場 Southern Common Market (Mercosur)
	2009	進一步加強 Further strengthened			
	2012	全面戰略夥伴關係 Comprehensive strategic partnership			
	2014	進一步加強 Further strengthened			
	2019	加強和深化 Strengthened and deepened			
	2023	深化 Deepened			
東帝汶 Timor-Leste	2014	全面合作夥伴關係 Comprehensive cooperative partnership	2017	不適用 Not applicable	東南亞國家聯盟觀察員國 Observer to Association of Southeast Asian Nations (ASEAN)
	2023	全面戰略夥伴關係 Comprehensive strategic partnership			
	2024	深化 Deepened			
安哥拉 Angola	2010	戰略夥伴關係 Strategic partnership	2018	批准 Ratified 04/11/2020	南部非洲發展共同體；安哥拉也是中部 非洲國家經濟共同體的成員 South African Development Community (SADC)； Angola is also a member of the Economic Community Central African States (ECCAS)
	2024	全面戰略合作夥伴關係 Comprehensive strategic cooperative partnership			
莫桑比克 Mozambique	2016	全面戰略合作夥伴關係 Comprehensive strategic cooperative partnership	2018	批准 Ratified 05/07/2023	
佛得角 Cabo Verde	2024	戰略夥伴關係 Strategic partnership	2018	批准 Ratified 05/02/2022	西非國家經濟共同體；幾內亞比紹也是 薩赫勒-撒哈拉國家共同體的成員 Economic Community of West African States (ECOWAS)； Guinea-Bissau is also a member of the Community of Sahel-Saharan States (CEN-SAD)
幾內亞比紹 Guinea-Bissau	2024	戰略夥伴關係 Strategic partnership	2021	批准 Ratified 27/09/2022	
赤道幾內亞 Equatorial Guinea	2015	全面合作夥伴關係 Comprehensive cooperative partnership	2019	批准 Ratified 02/07/2019	中部非洲國家經濟共同體 Economic Community Central African States (ECCAS)
	2024	全面戰略合作夥伴關係 Comprehensive strategic cooperative partnership			
聖多美和普林西比 São Tomé and Príncipe	2024	戰略夥伴關係 Strategic partnership	2021	批准 Ratified 27/06/2019	
*葡萄牙和中國於2017年建立了藍色夥伴關係。 Portugal and China established a blue partnership in 2017.					
來源：作者整理。2024年9月4日最後更新。 Source: Compilation by the authors. Last updated on 4 September 2024. https://www.fmprc.gov.cn/web/ https://www.yidaiyilu.gov.cn/country https://www.tralac.org/resources/infographic/13795-status-of-afcfta-ratification.html					

its interests with other countries, shaping ‘an international environment that is propitious to its rise as a global power’, as well as becoming a significant international actor and advancing its global vision—to build communities with a shared future for humankind.

China’s Strengthening Ties with Portuguese-Speaking Countries
Among all Chinese partnerships, less than 10 per cent are not designated as ‘strategic’. Meanwhile, the presence of other descriptors such as ‘comprehensive’, ‘cooperative’, ‘all-weather’, ‘all-round’ and ‘friendly’ indicates the scope of cooperation and/or bilateral relations. China and Portuguese-speaking countries have been consistently reinforcing their mutual relations through partnerships. Table 1 depicts the dynamics associated with the establishment and advancement of partnerships between China and the nine Portuguese-speaking countries and their incorporation in regional economic spaces.

Up to 2024, all Portuguese-speaking countries have established partnerships with China, and all have reached the ‘strategic’ level, underscoring the importance of these partnerships. Over the past two years (2023 and 2024), China’s partnerships with most Portuguese-speaking countries have significantly improved, especially with Timor-Leste and African Portuguese-speaking countries, facilitating bilateral flows of cooperation and regional integration, namely through access to new markets and production centres.

Economic Integration Through Partnerships
Chinese partnerships, which are tailor-made cooperation models operating individually or in conjunction with the Belt and Road Initiative, not only contribute to the national development plans of each of the Portuguese-speaking countries, but they also function as mechanisms of economic integration, strengthening their regional role. International relations have never been static, and any bilateral relationships (including partnerships) will evolve. Therefore, these partnerships remain essential diplomatic instruments between China and Portuguese-speaking countries. Side-by-side to the continuing development of bilateral relations between Portugal, Brazil, Timor-Leste and China, the 2024 Beijing Summit of the Forum on China-Africa Cooperation (FOCAC) represents the inception of a new era of modernisation in the context of South-South cooperation. Indeed, the 2024 Beijing Summit of FOCAC has reinforced the value of Chinese partnerships as a political-diplomatic instrument as they represent a consensual, pragmatic and cooperative framework for developing a win-win, mutually beneficial relationship. Notably, China’s strategic direction is to eventually establish a community of shared future with every country and region.



葡文版
Article in Portuguese
Artigo em português



利天佑是澳門大學社會科學學院國際關係副教授，持有特許任教資格，兼任該院全球與公共事務研究所副主任，2010年獲葡萄牙天主教大學政治學與國際關係博士學位。

Francisco José Leandro is an associate professor with Habilitation in International Relations in the Faculty of Social Sciences at the University of Macau, and deputy director of the Institute for Global and Public Affairs in the faculty. He received a PhD in Political Science and International Relations from the Catholic University of Portugal in 2010.



李翌超是浙江師範大學非洲研究院助理研究員，2021年獲澳門城市大學葡語國家研究院博士學位，2018年獲澳門大學法學碩士學位（中文—比較民事法），2021至2022年在葡萄牙里斯本大學學院國際關係研究中心任博士後研究員。

Li Yichao is an assistant research fellow at the Institute of African Studies at Zhejiang Normal University. She received her PhD from the Institute for Research on Portuguese-speaking Countries at the City University of Macau in 2021. She also received a Master of Law in Chinese Language - Comparative Civil Law from the University of Macau in 2018. From 2021 to 2022, she was a postdoctoral researcher at the Centre for International Studies, ISCTE-IUL, Lisbon, Portugal.

「學術研究」為投稿欄目，內容僅代表作者個人意見。
Academic Research is a contribution column. The views expressed are solely those of the author(s).



2024年馬萬祺羅柏心書院院長第一講
The 1st Lecture of MLC to freshmen in 2024

馬萬祺羅柏心書院： 詩意棲居的大美之境

Ma Man Kei and Lo Pak Sam College: A Poetic Dwelling With Grand Beauty

文 / 楊柳 · 圖 / 張廷豐、何杰平 · 英文翻譯 / 葉浩男
Text / Yang Liu · Photo / Brian Cheong, Jack Ho · English Translation / Davis Ip

「詩意的棲居」，是18至19世紀德國詩人荷爾德林提出的一個充滿哲思的概念，表達了他對詩意生活的推崇。荷爾德林認為，人生猶如苦旅，但是，我們不能像苦行僧一樣地活著；應不斷尋找生活中的美，不斷充實自己的精神世界，讓平庸的生活充滿詩情畫意、充滿美和情趣。而澳門大學馬萬祺羅柏心書院正是這樣一個胸懷大美、充滿情趣的詩意棲居之所。

詩意的全人教育

馬萬祺羅柏心書院擁有詩意棲居的全人教育理念。根據國家教育發展規劃、澳大的全人教育理念和書院培養目標，馬萬祺羅柏心書院推行專業教育、通識教

育、研習教育及社群教育之「四位一體」的「全人教育」模式。學生初入大學，即在書院安居一年。書院通過活動學習、共膳教育、書院課程、學術支持和關顧服務等五項措施，培養學生成為具有家國情懷的卓越人才，力求在公民責任心、全球競爭力、知識整合能力、團隊協作、服務與領導、文化參與和健康生活等七項勝任力方面全面提升學生的發展，使之成為有趣的全人！

詩意之大美淵源

馬萬祺羅柏心書院詩意棲居之大美淵源，與澳門大學和馬萬祺先生家族的一樁美學息息相關。2016年金秋

時節，澳大感念於著名愛國愛澳人士、全國政協前副主席、慈善家馬萬祺先生與夫人羅柏心女士的大力支持，以及羅柏心紀念有限公司的愛心捐贈，將澳大第九所書院命名為「馬萬祺羅柏心書院」。從此，慈善為懷、兼濟天下、美美與共的大愛大美精神就一直與師生攜手同行，代代相傳。

優美的自然環境

馬萬祺羅柏心書院擁有詩意優美的自然環境。依托澳大，書院院生享有天空之鏡：水天一色，猶如夢境。白天到處可見繁花異草，可聞鳥語花香；夜晚比白天更炫目，散步校園間，常常可見各色雲彩撲面而來，那紫色的雲朵猶如雕塑般神奇！書院的建築融合了嶺南和南歐建築風格，散發出迷人的氣息。書院中庭的蕾絲金鳳園、龍珠茉莉園、椰蘭私語地和千年紅寶石廣場令人流連忘返。

高雅的人文語境

馬萬祺羅柏心書院擁有高雅的人文語境。在「美育學堂」，你可以與來自世界各國的美學家、哲學家 and 科學家盡情對話。在獨樹一幟的「愛國愛澳展館」裏，你可以深度領略中國的大國之魂、書院的大愛傳統和院生的奇妙物語。在書院的「百科全書圖書館」中，你可以與跨學科的智慧先賢和中國56個民族對坐而談，在高雅別致的語境中培養優雅品性和崇高精神。書院擁有多元的國際化全人教育資源和創新街區。16

A ‘poetic dwelling’ is a philosophical concept envisioned by Friedrich Hölderlin, an 18th- and 19th-century German poet, that encapsulated his reverence for a life immersed in poetry. He likened life to a harsh journey but insisted that we should not plod through it like austere monks. Instead, according to Hölderlin, we should seek the inherent beauty of our existence to continually nurture our spiritual selves and transform the mundane into something infused with poetic elegance, beauty, and charm. Ma Man Kei and Lo Pak Sam College (MLC) at the University of Macau (UM) embodies this ideal, a place where grand beauty is not only acknowledged but also celebrated. Here, life is transformed into a captivating poetic dwelling.

A Poetic Whole Person Education

First and foremost, MLC embodies a poetic dwelling through its holistic educational philosophy. Informed

個學術群體的中外導師為你提供多維而深刻的學術指引，18個興趣小組和學生團體為你搭建才華施展平台，與同輩朋友共創豐富浪漫的大學生活，「國際創客中心」將引領你走向世界科創與文創的巔峰！

秉持詩意的人生追求

馬萬祺羅柏心書院人人秉持詩意美好的人生觀、道德觀和價值觀。美的人生觀玉成院生及時做好人生的規劃與設計：既仰望星空，又腳踏實地。美的道德觀鑄就特立獨行的精神世界：既有青春之浪漫，又敢於立世擔當。美的價值觀賦予師生「修身、齊家、治國、平天下」的宏大追求：既獨善其身，又熱愛家庭，為追求均衡、公平、和諧美好的社會而堅持不懈……書院融合多種詩意與格調與一體，生機勃勃，燦爛多姿！

構築生命的存在之詩

正如詩人荷爾德林所說，「人充滿勞績，但還詩意地棲居於這片大地上。」唯有構築生命的「存在之詩」，方能抵禦執念的苦痛、物慾的誘惑、工作的內卷……從而回歸人類的心靈家園。總之，馬萬祺羅柏心書院就是這樣一所心靈的家園！即使你可能不知如何吟詩，但依然可以放下一切，在此美景安居，吟唱一首專屬於你的生命之詩：或是一首恢宏莊嚴的史詩，也可以是一首直抒胸臆的詠懷詩，還可以是一首清新自然的山水詩，或詼諧幽默的自由詩……

by national educational development strategies, UM’s commitment to whole-person education, and the college’s nurturing objectives, MLC implements an integrated ‘whole-person education’ system. This includes discipline-specific, general, research & internship, and community & peer education. Through a one-year RC residence experience, students embark on a poetic journey of growth through active learning activities, communal dining experiences, college coursework, academic support and mental care. The aim is to develop seven competencies among students: responsible citizenship, global competitiveness, knowledge integration, teamwork and collaboration, service and leadership, cultural engagement, and a healthy lifestyle. This approach moulds well-rounded individuals who are not only academically proficient but also engaging in every aspect of their lives.



澳大校長宋永華教授、副校長莫啓明教授、學生事務長彭執中看望馬萬祺羅柏心書院師生，與新生和家長交流。
UM Rector Yonghua Song, Vice Rector Mok Kai Meng and Dean of Students Paul Pang visited MLC, greeting new students and their parents.

The Poetic Root of Grand Beauty

The profound beauty of Ma Man Kei and Lo Pak Sam College's poetic dwelling is closely linked to a remarkable act of generosity by Mr Ma Man Kei's family towards UM. Founded in the autumn of 2016, the college stands as a tribute to Mr Ma Man Kei, a renowned patriot and philanthropist dedicated to both the nation and Macao, who served as a vice chairman of the National Committee of the CPPCC. The college also honours his wife, Madame Lo Pak Sam. In gratitude for the generous support and substantial donation from the Lo Pak Sam Memorial Limited, UM named its ninth college 'Ma Man Kei and Lo Pak Sam College'. Since then, the spirit of charity, compassion, diversity and grand beauty has been embraced by our staff and students, and passed down through the generations.

A Picturesque Natural Setting

MLC is set in a beautifully poetic natural environment. Nestled within the UM campus, the college offers students a serene landscape often likened to a 'mirror of the sky', where water and sky blend seamlessly, creating a dreamlike setting. During the day, the surroundings are filled with vibrant blossoms and exotic plants, accompanied

by the gentle melodies of birdsong. At night, the campus transforms, inviting strolls under skies illuminated by clouds of various hues, including extraordinary purple formations that resemble magical sculptures. The college's architecture, blending Lingnan and Southern European styles, exudes a rich cultural ambience and a welcoming warmth. Those who wander through the college can slow their pace to become one with nature, embracing a simplicity akin to the natural elegance of a blooming golden phoenix, dragonball jasmine, coconut orchid, and millennium ruby flowers.

An Elegant Cultural Milieu

MLC offers an elegantly poetic cultural environment. In the MLC Academy of Aesthetic Education, students can immerse themselves in aesthetic enlightenment, conversing with aestheticians, philosophers and scientists from around the world. In the distinctive Love Country Love Macao Exhibition Hall, students can gain a profound understanding of China's national spirit, the college's tradition of generosity, and the captivating stories of its students. They can engage in discussions with wise people and representatives of China's 56 ethnic groups at the MLC Encyclopaedia Library. Amidst such an elegant and unique environment, students are encouraged to cultivate graceful manners and

noble spirits. MLC also embraces multidisciplinary and international education resources and innovation space. Non-residential fellows and affiliates from 16 academic clusters offer a wealth of learning resources, providing students with multidimensional academic guidance. The student leaders from 18 clubs and associations build various platforms for cultivation of talents and romantic college life. The Global Maker Centre will lead students to the peak of scientific and cultural innovation.

Embracing the Pursuit of a Poetic Life

At MLC, everyone is engaged in the poetic pursuit of life. This perspective helps students strategically design their life paths, filled with imagination and poetry, yet balanced with a resolute drive to achieve even the most ambitious goals. Their unique moral compass shapes an independent spirit, resonant with both the vibrant innocence of youth and the responsibility of adulthood. Their values nurture ambitions such as personal growth, family harmony, good governance, and global peace. Both teachers and students work towards the betterment of their country and the world, exuding an aura of youthful energy. In conclusion, the college blends abstract and realistic styles, and its lively, colourful approach to life fosters an environment rich in vigour and diversity.

Crafting the Poetry of Existence

As Hölderlin observed, 'Full of merit, yet poetically, man dwells on this earth.' Crafting life's 'poetry of existence' helps us withstand the pain of obsession, material temptation, and the internal friction of work, guiding us back to our spiritual home. MLC serves as this poetic home. Even if students may not know how to read a poem, they can lay down their burdens here and create their own song of existence. This might be an insightful epic spanning history, a passionate lyric, a fresh poem with natural style, or a witty free verse.....



馬萬祺羅柏心書院學生走進愛國愛澳展館學習
MLC student leaders learn in the Love Country Love Macao Exhibition Hall

楊柳教授，博士生導師，曾留學英國劍橋大學和美國奧本大學，南京大學博士。現為澳門大學馬萬祺羅柏心書院院長、人文學院教授，國家社會科學基金評委，教育部學科評估診斷專家，中國譯協對外話語體系研究委員會副主任委員。研究方向為英語語言文學、美學翻譯學、書院教育與跨文化研究。

Prof Yang Liu is a doctoral supervisor who studied at the University of Cambridge in the UK and Auburn University in the US, with a PhD from Nanjing University. She is currently the College Master of MLC and a professor in the Faculty of Arts and Humanities at the University of Macau. She holds positions including a National Social Science Fund evaluator, an expert in academic assessment and diagnosis for China's Ministry of Education, and Vice Director of the Research Committee of China Studies under the Translators Association of China. Her research interests include English language and literature, aesthetic translation studies, collegiate education and cross-culture research.



「書院發展」為投稿欄目，內容僅代表作者個人意見。

RC Development is a contribution column. The views expressed are solely those of the author(s).

澳大於2010年引入住宿式書院系統。書院作為多元文化與多元學科融會貫通的知識整合學習平台，致力培養學生具有公民責任心、全球競爭力、知識整合能力、團隊協作、服務與領導、文化參與和健康生活的七項勝任力。

UM launched its residential college (RC) system in 2010 to create a multicultural and multidisciplinary learning platform for knowledge integration. RC education aims to cultivate seven competencies of students, namely responsible citizenship, global competitiveness, knowledge integration, teamwork and collaboration, service and leadership, cultural engagement, and healthy lifestyle.



住宿式書院系統網站
Website of the Residential College System



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ISSN 2077-2491



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