Autumn/Winter 2021 | Issue 24

澳大新語 UMagazine

人工智能
創新應用
Innovative AI Applications

本期附《澳門大學年度簡報2020/2021》
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《**澳大新語**》創於2009年，為澳門大學官方刊物，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, ***UMagazine*** aims to report great ideas and research breakthroughs from the University of Macau. It also showcases the latest developments and achievements of the university in teaching, research, and service.

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編者的話

EDITOR'S WORDS

過去40年，一代代澳大人不懈研發創新科技，並致力將它們轉化為改善人們生活的產品和服務。澳大目前在中醫藥質量、芯片設計、智慧城市物聯網、精準醫學、先進材料、大數據、人工智能等方面已有可喜成績。

當前澳門經濟急需轉型，科技發展更見重要，澳大作為澳門唯一的綜合性公立大學，近年積極落實習近平主席有關「創造更多科研成果」的指示，緊扣國家發展戰略、配合澳門特區政府施政部署，全力推動科技成果轉化，促進澳門產業多元化發展。

約30年前，澳大已開展人工智能方面的教學和研究，近年更與海內外院校和企業加強合作，攜手研發真正惠及所有人的技術、產品和服務。今期《澳大新語》聚焦大學多個人工智能科研項目及其應用，包括自動巴士、無人船、工業機器人、智慧旅遊和偽造圖像偵測，全部切合澳門發展所需，也展現了澳大為推進粵港澳大灣區建設國際科技創新中心的不懈努力。

我們也介紹了澳大另外兩個重要科研方向，分別是制訂在國際性藥典的中藥質量標準和區域海洋研究。此外，我們也專訪了社會科學學院院長胡偉星教授、哲學與宗教學教授王慶節。在「學術研究」專欄，澳大學者介紹新冠疫情與犯罪，以及近年推動哥德文學研究的進展。

張惠琴 Katrina Cheong

Over the past four decades, generations of researchers at the University of Macau (UM) have developed many innovative technologies and transformed them into products and services that can improve people's lives, most notably in such fields as Chinese medical sciences, internet of things for smart cities, chip design, precision medicine, advanced materials, big data, and artificial intelligence.

Indeed, not only has technological innovation become ever more important to Macao in view of the pressing need to upgrade the city's industrial structure, but it has also been elevated to the status of national strategy, as is reflected in President Xi Jinping's explicit instructions for higher education institutions in Macao to 'attain more achievements in scientific research'. As the only public comprehensive university in the city, UM actively carries out President Xi's instructions and closely aligns itself with national development strategies and the Macao SAR government's policies, in order to promote technology transfer and the diversification of Macao's economy.

This issue of *UMagazine* focuses on the AI projects conducted by professors at UM, which began its AI education and research three decades ago. In recent years, we have strengthened our partnerships with universities and companies at home and abroad to develop new AI technologies, products, and services that will truly benefit everyone. We spotlight some of our most exciting projects, including a self-driving bus, unmanned marine vessels, industrial robots, and software for smart tourism and image forgery detection. These projects, which will find broad applications in Macao, prove our effort to support the Guangdong-Hong Kong-Macao Greater Bay Area's transformation into a global technology and innovation hub.

In this issue, we also bring you stories about two important research areas: establishing quality standards for Chinese medicinal herbs for major pharmacopoeias and regional oceanology. Other stories not to be missed include interviews with Faculty of Social Sciences Dean Prof Richard Hu and Prof Wang Qingjie in the Department of Philosophy and Religious Studies, as well as two articles in the 'Academic Research' column, which discuss the impact of the COVID-19 on crime and its control, and the latest developments in Gothic scholarship at UM.

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澳門第一台自動駕駛巴士於2020年底啟用

Macao's first self-driving bus was launched at UM in late 2020

人工智能新技術研發自動駕駛

Unleashing the Power of AI on Self-driving

文/葉浩男．圖/何杰平、部分由受訪者提供

Chinese & English / Davis Ip · Photo / Jack Ho, with some provided by the interviewee

科幻電影中自動車穿梭大都會街頭的畫面，再也不是海市蜃樓。為了研究自動駕駛技術，澳門大學正與本地和內地多個機構開展一個大型科研項目，並在澳大校園啟用澳門第一台自動駕駛巴士，作為測試新技術的平台。

以自動駕駛巴士測試新技術

這架自動駕駛巴士在2020年10月啟用，有八個座位和六個站位，時速最高40公里，是科研項目「協同智能驅動的無人駕駛關鍵技術與平台研究」的重要一環。該項目2019年起獲澳門科學技術發展基金資助，由智慧城市物聯網國家重點實驗室（澳門大學）、中國科學院深圳先進技術研究院、國防科技大學、百度和深圳海梁科技共同承擔，並獲澳門電訊提供流動網絡技術支援。

研究團隊由澳大科技學院院長、電腦及資訊科技系講座教授須成忠領導。須教授研究自動駕駛已有十多年，在美國底特律任教時曾與通用汽車等大企業合作研究智能駕駛，2011年回國後繼續探索相關技術，2019年加入澳大後不久開展這個自動駕駛項目。

全球各地都在研究自動駕駛。今日的自動車已能在受控制的環境下正常行駛，但現有技術還不足以製造出能安全、恰當地應對極端天氣和其他突發情況的全自動汽車，因此須教授的團隊正在研究令自動駕駛更安全的技術，成果令人鼓舞。單在2019年，他們就有22篇論文獲國際學術期刊登載，也有在一些頂尖國際會議上發表論文。

提升自動車決策能力

卷積神經網絡是一種主流的機器學習模型，某程度模仿人腦的感知方式，是自動駕駛技術的重要一環。須教授說，我們可以用大量關於交通情況的圖像數據來訓練一個卷積神經網絡，使它能在新的圖像中辨別出物件、車輛和行人。

卷積神經網絡的決策能力很取決於它用來學習的訓練數據。目前多數用於訓練自動車的數據都是在良好天氣下收集所得，因此自動車平日能比較容易檢測出物件，但遇上颱風等惡劣天氣和其他特殊情況時卻很可能失靈。我們原則上可以引入更多數據，為每種路

況都來一個訓練卷積神經網絡(或其他機器學習模型),但實踐中卻難以有足夠的數據和時間來訓練這些網絡,也無法預見汽車所有可能遇到的情況。

應對這個問題的方法之一就是運用「遷移學習」人工智能方法,原理有點像訓練一個單車手學習駕駛電單車。單車手憑著他們的經驗,可能駕駛電單車時會比其他人更易保持平衡,毋須像其他人一樣從頭學起。同樣,如果沒有足夠的數據或時間,我們可以用已經訓練好的機器學習模型為基礎,為類似任務訓練出新的模型。

為了提升遷移學習的成效,澳大與百度的研究人員提出了一種新算法,名為Re-Initializing the Fully-connected LayEr(簡稱RIFLE),用於訓練基於遷移學習方法的卷積神經網絡時的「反向傳播」過程。他們先用這個新算法訓練一個卷積神經網絡,然後以它來分類、檢測和分割數以萬計的圖像,發現其表現遠勝一些經主流算法訓練的對手。相關論文已在頂尖的國際機器學習年會上發表。

加快訓練機器學習模型

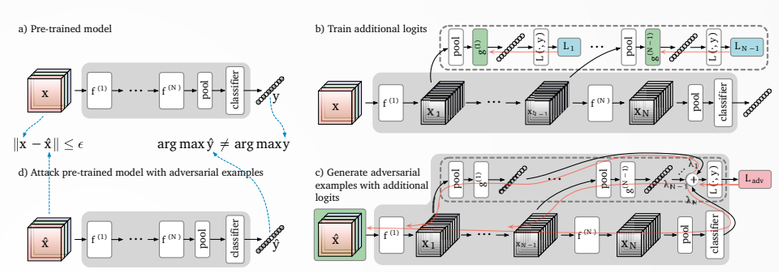
重新訓練一個卷積神經網絡前,我們可以先刪除一些與新任務無關的部分,這個過程稱為「剪枝」。「剪枝」有助降低卷積神經網絡的複雜程度、從而加快運算,但有時也會削弱其執行任務的能力。

針對這個問題,澳大、中科院深圳先進技術研究院和百度的研究人員開發了一種新的「剪枝」方法,名為Attentive Feature Distillation and Selection(簡稱AFDS)。他們用AFDS和多種主流算法修剪一個有101個卷積層的卷積神經網絡,再用這些網絡來分析六個圖片數據庫,辨識圖片上有甚麼物件。他們發現,在運算量下降30%的情況下,用AFDS修剪的網絡達到幾乎同樣準確的辨識結果;即使運算量下降90%,準確度仍能夠保持在約70%,遠高於用其他方法修剪的網絡。相關論文已在頂尖的國際學習表徵年會上發表。

自動車通常會用卷積神經網絡來分析周邊的物體,它們一旦受到網絡攻擊或遇到不太清晰的物件(例如有塗鴉的路標)時很易判斷錯誤,例如將停車標誌誤判為讓先標誌,隨時釀成慘劇。因此,研究人員開發了LAFEAT算法,令卷積神經網絡面對攻擊或噪聲時更具魯棒性(robustness,又譯穩健性)。這款新算法在實驗中的表現遠勝10多種現有的算法。

在2021年中,澳大和百度的研究人員將LAFEAT算法

澳大自動駕駛研究團隊
The UM research team behind the self-driving project



AFDS算法有助提升機器學習模型的運算速度
The AFDS algorithm accelerates the training of machine learning models

須成忠教授
Prof Xu Chengzhong

在國際計算機視覺與模式識別會議上發表,該會議的論文錄取率僅為4.59%。他們也用這項算法參加了美國伊利諾大學、清華大學和阿里安全合辦的「CVPR安全AI挑戰者賽」算法比賽,與全球1680支隊伍切磋,勇奪亞軍,成為唯一來自澳門的獲獎隊伍。

走向自動駕駛的未來

研究團隊亦在深入研究人機交互技術,重點包括自然語言處理,目標是讓自動車正確回應語音指令。須教授也說,澳門路面較窄、電單車特別多,對自動車帶來額外挑戰,所以他的團隊亦在研究應對澳門複雜路況的技術。

那麼,到底我們何時才能在日常生活用自動車出行?須教授說,要真正廣泛使用自動車,我們還要克服不少技術難題,也需要有新的道路、網絡基建和法律法規配合,有賴社會各界共同努力。「我們會不斷開發新的自動駕駛技術。通過在澳大啟用自動巴士,我們也希望提升公眾對自動車的認識,為在澳門實現自動駕駛創造有利條件。」

Once only visible in science fiction films, self-driving cars roaming streets in futuristic cities may enter your car park sooner than you think. To advance the technology behind such cars, the University of Macau (UM) and its partners from Macao and mainland China are conducting a major research project. Together, they have launched Macao's first-ever self-driving bus as a testing vehicle at the university.

Tests Underway on an Unmanned Bus

The self-driving bus hit the road in October 2020. It has eight seats, allows six standees, and can travel up to 40 km per hour. Its launch is part of the 'Key Technologies and Platforms for Collaborative Intelligence-driven Autonomous Vehicles' project, which has been supported by the Macao Science and Technology Development Fund since 2019. The researchers come from the State Key Laboratory of Internet of Things for Smart City (University of Macau), the Shenzhen Institutes of Advanced Technology (SIAT) under the Chinese Academy of Sciences, the National University of Defense Technology, Baidu, and Shenzhen Haylion Technologies. Macao's telecommunications service provider CTM provides mobile network technology to support the project.

The research team is headed by Prof Xu Chengzhong, dean of UM's Faculty of Science and Technology and chair professor of computer and information science. Prof Xu has studied self-driving technology for over a decade. He worked with American automakers such as General Motors on the development of intelligent vehicles when he was a professor in Detroit. He has continued to explore the field since returning to China in 2011, and kick-started this self-driving car project in Macao after he joined UM in 2019.

Self-driving research has proliferated across the world. Today, cars can already drive themselves smoothly in controlled environments. However, Prof Xu says that we are still far from having fully autonomous cars that can safely navigate in extreme weather conditions and other unpredictable situations in the real world. In making self-driving cars safer, Prof Xu's team has seen some encouraging results. In 2019 alone, they published 22 papers on related technologies in leading academic journals and presented some other papers at top international conferences.

Teaching Cars to Make Smart Decisions

According to Prof Xu, Convolutional Neural Network (CNN), which is a popular type of machine learning model, is essential to self-driving cars. A CNN loosely mimics the way a human thinks. Given a large image dataset for it to learn from, a CNN can be trained to detect objects such as road signs, vehicles, and pedestrians from new images.

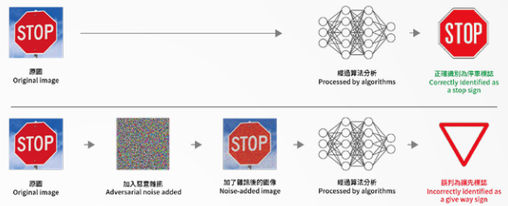
The decision-making power of a CNN largely depends on its training data. Most existing data for training self-driving cars was collected in clear weather conditions, so it is easier for self-driving cars to detect objects in good weather, but they may make serious mistakes in adverse weather conditions such as typhoons and snow. In theory, scientists can bring in more data to train a CNN (or other machine learning model) for every scenario. In practice, however, they probably won't have enough data or time, nor can they foresee all the situations a car might encounter.

One of the solutions is transfer learning, which works a bit like a cyclist learning to ride a motorcycle. By drawing on their experience, cyclists may find it easier to balance themselves on two wheels, without starting from scratch. Similarly, in the absence of enough data or time, researchers can train a machine learning model based on a 'transferred' model that has already been perfected for a similar task.

With the self-driving car project, researchers at UM and Baidu have proposed a new way to help CNNs based on transfer learning to accurately detect objects like stop signs. Their algorithm is called Re-Initialising the Fully-connected LayEr (RIFLE), which is used in the 'back propagation' process in the training of CNNs. The researchers used a CNN trained with the new algorithm to classify, detect, and segment tens of thousands of images. It turns out that this CNN outperforms its rivals trained with some mainstream algorithms. The team has presented a paper about

研究人員可在設於智慧城市物聯網國家重點實驗室(澳門大學)的實驗平台用模型車輛測試自動駕駛技術

This testbed in the State Key Laboratory of Internet of Things for Smart City (University of Macau) allows researchers to test their self-driving strategies on mini-cars in a mock urban scenario



卷積神經網絡受攻擊時或會誤判路標

Convolutional neural networks under cyberattacks may misjudge road signs

the RIFLE algorithm at the prestigious International Conference on Machine Learning.

Faster Training of Learning Models

We can remove unnecessary parts of a CNN before retraining it for a new but similar task. Known as 'pruning', the process can reduce the size of the original network and thus shorten the time required for training the new one. However, pruning sometimes sharply weakens the network's decision-making power.

To address this problem, researchers at UM, SIAT, and Baidu proposed a new pruning method called 'Attentive Feature Distillation and Selection' (AFDS). They used ADFS and some mainstream counterparts to prune a 101-layer CNN, and then used the final products to identify objects from images stored in six databases. The results show that the AFDS-pruned network remains very effective despite a 30 per cent cut on the amount of computation. Even when the amount of computation was reduced by 90 per cent, the network accuracy rate stood at 70 per cent, much higher than its competitors. The researchers have presented an academic paper about the AFDS method at the influential International Conference on Learning Representations.

Self-driving cars must be able to identify everything around them. CNNs can usually perform such tasks effectively, but they can be vulnerable when facing cyberattacks or unclear objects like road signs with graffiti. This can cause potentially fatal mistakes like misreading a stop sign as a give-way sign. Therefore, Prof Xu's team has developed the 'LAFEAT' algorithm, which can make CNNs more robust to adversarial attacks or noise. The new algorithm has outperformed a dozen existing options in computer trials.

In mid-2021, researchers at UM and SIAT presented the LAFEAT algorithm at the Conference on Computer Vision and Pattern Recognition, which has an acceptance rate of just 4.59 per cent. They also used the new algorithm to compete with 1680 teams from around the world at the CVPR Security AI Challenger, an algorithm competition jointly organised by the University of Illinois, Tsinghua University, and Alibaba Security. The team won a second prize, becoming the only winning team from Macao.

Stepping into a Driverless Future

Prof Xu's team is also studying technologies to enable better interactions between humans and self-driving cars. For instance, they are designing natural language processing solutions that will allow cars to respond appropriately to spoken commands. Moreover, they are searching for ways to help cars adapt to the complicated road conditions in Macao, a city known for its narrow roads and abundance of motorbikes.

So, when can we take our hands off the wheels? Prof Xu believes that many technological breakthroughs need to be achieved before self-driving cars can finally go mainstream. A driverless future would also need major transformations in transport and telecommunications infrastructure as well as new legal rules - all requiring the concerted effort of various sectors of the community. Prof Xu says, 'We will of course continue to advance self-driving technology, but by launching our bus on the UM campus, we also hope to raise the public's understanding of self-driving cars, so that we can be better prepared for their deployment in Macao.'

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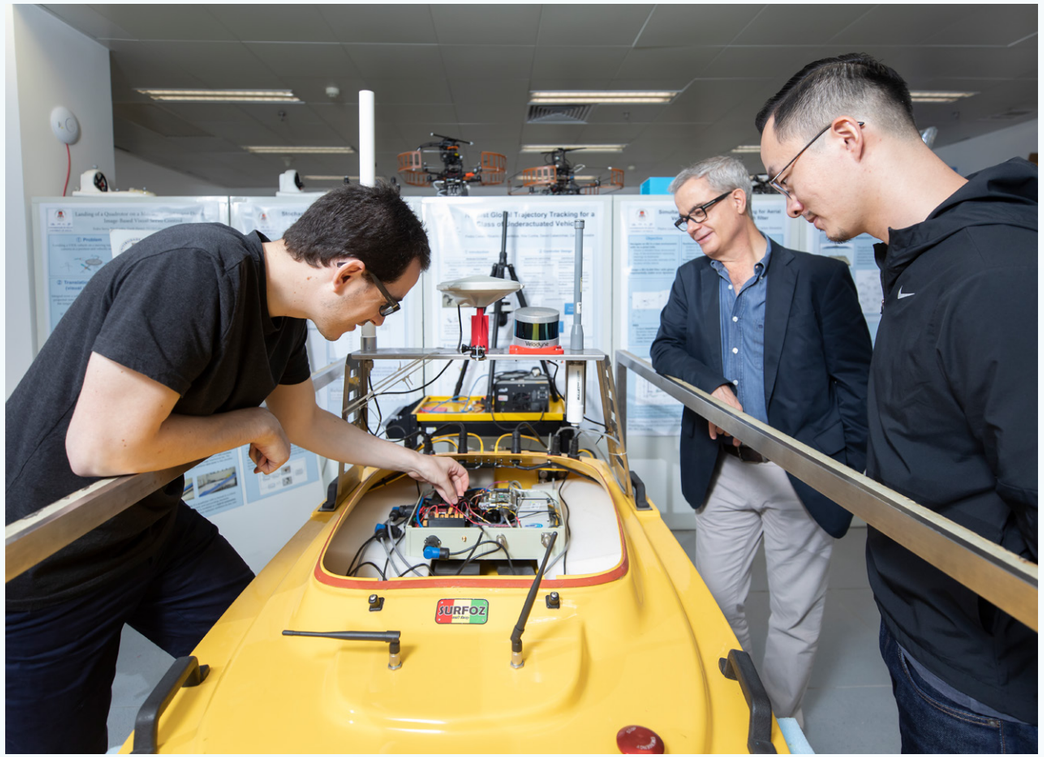
觀看訪談片段
Scan the QR code to watch the interview



Carlos Silvestre教授（中）、研究助理Joel Reis博士（左）和博士生余甘
Prof Carlos Silvestre (middle), research assistant Dr Joel Reis (left), and PhD student Yu Gan

智能海洋機器人用途廣泛

Smart Marine Robots to See Greater Use

文/葉浩男．圖/何杰平、部分由受訪者提供
Chinese & English / Davis Ip．Photo / Jack Ho, with some provided by the interviewee

澳門大學電機及電腦工程系Carlos Silvestre教授的團隊正在研發新型自主船艇。他們在2020年一項國際智能無人船賽事奪冠，目前則在研究智能水下無人艇，能用於執行海底測繪等諸多任務。

應用廣泛

Silvestre教授在2011年領導成立「基於傳感器的協作機器人研究實驗室」（SCORE實驗室），目前與研究助理Joel Reis博士、博士生余甘和其他學生一同開展動力系統理論的科學探索，並且運用研究成果開發智能海洋機器人和空中無人機。

Silvestre教授早在30多年前開始研究海洋機器人。當時他是里斯本大學高等技術學院的碩士生。他說，在不同類型的機器人中，無人水面艦艇（USV）的用途尤其廣泛，在執行巡邏、貨運、海洋研究、搜救、油氣勘探和海底電纜安裝等任務時均有明顯優勢。

設計導航及控制算法

由於風、浪、洋流等環境因素，要使USV始終在正確時間沿著正確路徑航行並非易事。USV需要一個由複雜算法組成的軌跡跟蹤控制系統，才能即時、準確和安全地運作，並在偏離預定路徑時進行快速修正。

SCORE實驗室近年來在設計非線性軌跡跟蹤智能控制系統方面取得豐碩成果，它們的有效性已在電腦仿真和澳大校園內的實地試驗得到驗證。實驗室成員開發的算法能讓USV避開障礙物、在電力耗盡時返回出發點和應對其他突發情況。

SCORE實驗室成員憑藉他們的算法，在2020年底首屆珠海萬山國際智能船艇公開賽獲得冠軍。他們在比賽期間編寫了智能製導、控制和導航程序並安裝在USV上，然後在海上執行自動導航、避開障礙物和目標識別等任務。他們的USV最終的追蹤準確度不僅遠高於十名對手，更被賽事主辦方譽為「史無前例」。

新型無人潛水器

此外，Silvestre教授的團隊正在設計一種新型自主水下航行器，將會配備專業級的聲納系統、攝像頭和慣性傳感器。這個項目名為「ORVIS-Ocean Robotic Vehicles for Intervention in Shallow Waters」，為期數年，2020年起由澳門科學技術發展基金資助。

據Silvestre教授介紹，這款新型水下機器人將會配備聲納傳感器，在低能見度的水底仍能產生高解像度的圖像。「在颱風等天災後，我們可以使用這個機器人來檢查澳門能見度很低的水域的水下設施有否損壞。海洋機器人可以巡邏水域、檢查海堤等海洋設施、繪製海床地圖和監測海洋生態系統，相信將會在澳門得到更廣泛的應用。」

SCORE實驗室在澳大校園的湖面試測無人船
The SCORE Laboratory's unmanned vessel is being tested on the UM campus

澳大團隊在首屆珠海萬山國際智能船艇公開賽的一個項目奪冠
The UM team wins a first prize at the first Zhuhai Wanshan International Intelligent Vessel Competition

無人船裝有一個軌跡跟蹤控制系統

The unmanned vessel is equipped with a trajectory tracking control system

A team led by Carlos Silvestre, a professor in the University of Macau's (UM) Department of Electrical and Computer Engineering, is developing next-generation marine vessels that can perform tasks on their own. Since winning a first prize at an international intelligent vessel competition, the team has been designing underwater robots which can, among many other things, map the ocean floor.

Diverse Applications

In 2011, Prof Silvestre founded the Sensor-based Cooperative Robotics Research Laboratory (SCORE Laboratory), where he conducts scientific investigations in dynamical systems theory with research assistant Dr Joel Reis, Yu Gan, and several other PhD students. Moreover, they apply their research results to the development of advanced intelligent marine robots and aerial drones.

Prof Silvestre began studying marine robotics more than three decades ago, when he was still a master's student in Instituto Superior Técnico at the University of Lisbon. He says that, among different types of robots, unmanned surface vessels (USVs) are particularly useful in activities such as patrolling, cargo shipping, ocean research, maritime search and rescue, oil and gas surveying, and installation of submarine cables.

Designing Navigation and Control Algorithms

Due to wind, waves, ocean currents, and other environmental factors, it is not easy for USVs to always move along the right path at the right time. It takes a trajectory tracking control system, consisting of sophisticated intelligent algorithms, to accurately and safely maneuver a USV in real time, and to make quick corrections when the vehicle deviates from the intended path.

In recent years, the SCORE Laboratory has made considerable progress in designing non-linear trajectory tracking intelligent control systems, whose effectiveness has been proved in computer simulations and actual trials with a USV on the UM campus. Laboratory members have also developed algorithms that allow USVs to avoid obstacles, return to their start locations when running out of power, and cope with unexpected situations.

With their cutting-edge algorithms, the SCORE laboratory members won a first prize at the first Zhuhai Wanshan International Intelligent Vessel Competition in late 2020. During the competition, the UM team wrote an intelligent guidance, control and navigation programme and installed it on a USV, which then performed various tasks on the sea, such as automatic navigation, obstacle avoidance, and target identification. The tracking accuracy achieved by the UM team was not only far greater than the results obtained by all ten of its rivals in the competition, but was also praised as 'unprecedented' by the event organisers.

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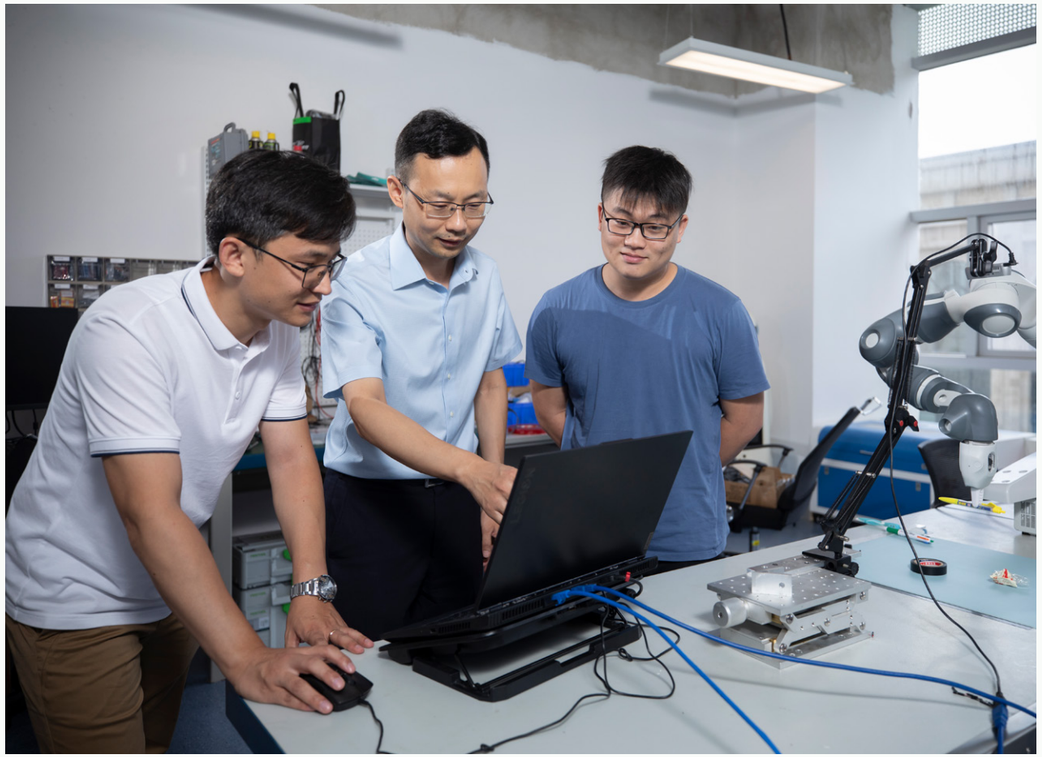
Innovative Unmanned Underwater Vessels

Moreover, Prof Silvestre's team is designing an innovative autonomous underwater vehicle, which will be equipped with high-end, professional-level sonar systems, cameras, and inertial sensors. This multi-year project, titled 'ORVIS - Ocean Robotic Vehicles for Intervention in Shallow Waters', has been funded by the Macao Science and Technology Development Fund since 2020.

According to Prof Silvestre, the new underwater robot will have sonar sensors that can produce high-resolution underwater images even in low-visibility conditions. 'After typhoons or other natural disasters, it will be possible to use the vessel to check whether underwater facilities are damaged in the waters of Macao where visibility is quite low. I believe Macao will see broader applications of marine robots, which can patrol waters, inspect marine facilities like seawalls, map the seabed, and monitor marine ecosystems.'

Carlos Silvestre 教授

Prof Carlos Silvestre



徐青松教授(中)的團隊研製各類機器人
The team of Prof Xu Qingsong (middle) has designed many types of robots

智能機器人創新惠民

Intelligent Robots Serve Society with Innovations

文/葉浩男・圖/何杰平、部分由受訪者提供
Chinese & English / Davis Ip・Photo / Jack Ho, with some provided by the interviewee

隨著人工智能的進步和行業需求的增長,智能機器人早已成為全球各地的研究熱點。澳門大學機電工程系教授徐青松一直帶領團隊研發創新的智能機器人,服務民生和社會。

消毒機器人協助防疫

2020年新冠疫情初期,徐教授的團隊獲澳門科學技術發展基金資助開發了智能機器人「消毒智多星」,期間獲澳門發展及質量研究所提供空氣指標監測支援。他說消毒機器人能減省人力、提高效率、降低醫護人員接觸病毒的風險和確保消毒劑均勻噴灑。

徐教授說:「我們一手研發了機器人的零件和程式,更包辦其外觀設計和組裝,所以能夠壓縮成本和售價,吸引更多機構使用機器人。」他表示,澳大已就相關技術申請專利,也正與企業洽談專利權轉讓,期望將智能消毒機械人批量生產,推向粵港澳大灣區等地的市場。

工業機器人推動智能製造

在澳門科學技術發展基金首屆重點研發專項資助計劃支持下,徐教授的團隊也在開發擁有三維視覺感知和柔順力控的新一代工業機器人,能夠在可變化的環境與人類緊密合作。所謂柔順力控,即是機器人能夠因應外力影響(例如是機器臂活動時被人碰到一下)靈活調整自身力度,確保完成任務。

徐教授說,新的機器人將會比同類產品更靈活、更智能,能完成更複雜的工作。這個項目的目標是提升機器人智能作業系統的性能,將以零件裝配、汽車打磨、飛機維護等任務作為示範用途,相信成果會有利推進澳門經濟適度多元化發展。

微操作機器人促進生物醫學工程

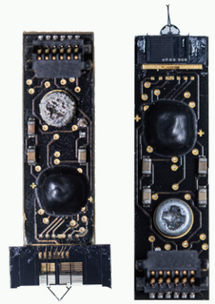
徐教授團隊早前還研發了智能微操作機器人系統。該系統能夠自動在微納米尺度上操控微注射器和微夾鉗,可以用於基因編輯等活體細胞操作,大大增加細胞在顯微注射後的存活率,使顯微注射更可靠、效果更穩定,滿足生物醫學工程對活體細胞操作不斷增長的需求。他們還發明了新型智能精確運動與力度混合控制算法,讓微操作機器人工作時更迅速和更準確。

此外,徐教授團隊的項目「機器人微夾鉗系統研發及產業應用」是澳門大學—華發集團聯合實驗室的首批科創項目之一,正在珠海澳大科技研究院的支援下,將研究成果轉化為面向市場的產品。

經過10餘年研發積累,徐教授先後擔任多份著名國際期刊的編委,並多次獲得澳門科學技術獎勵,期望團隊再接再厲:「我們也正在開發血管機器人、高空作業機器人等智能機器人,進一步以科技創新改善人們的生活。我相信智能機器人將會與人共融,更好地服務社會。」

消毒機器人
A disinfection robot

智能工業機器臂
An intelligent industrial robotic arm



機器人微夾鉗系統
Robotic microgrippers

Researchers around the world have been exploring new technologies to develop intelligent robots, a phenomenon driven by advances in artificial intelligence and its ever-growing demand from industries. At the University of Macau (UM), Xu Qingsong, a professor in the Department of Electromechanical Engineering, is leading a team to build innovative intelligent robots to improve people's lives and serve society.

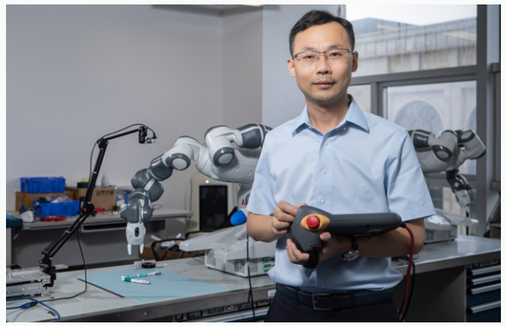
Disinfection Robots for Pandemic Response

Prof Xu began to design a disinfection robot called 'Smart Cleaner' during the early stage of the COVID-19 pandemic. The project was funded by the Macao Science and Technology Development Fund (FDCT), and the Institute of Development and Quality provided support by monitoring air quality indicators. The robot not only can reduce the need for human cleaners and the risk of virus transmission, but also can ensure that disinfectant is evenly sprayed.

'We did everything ourselves, from the development of hardware to programming, design, and assembly. That's why we can keep the cost low, which is important for promoting the robot,' Prof Xu says. According to Prof Xu, UM has applied for a patent for the robot technology. The university is also talking with companies for patent transfer, in order to put the robots on the market in the Greater Bay Area and beyond.

Industrial Robots for Smart Manufacturing

The team is also developing a next-generation industrial robot with three-dimensional visual perception and compliant force control, with the support of the FDCT's first Macao Funding Scheme for Key R&D Projects. Compliant force control refers to the ability of a robot to adjust its force flexibly in response to external forces, such as a person pushing a robotic arm, to continue its task. Prof Xu says that his new robot will be more flexible and intelligent than its counterparts in use, and will be capable of performing more complicated tasks. Moreover, his team will use the new robot to assemble some parts of devices, polish cars, and maintain aircraft. The application of research outcomes will be conducive to the diversification of the local economy, Prof Xu adds.



徐青松教授
Prof Xu Qingsong

Microrobots for Biomedical Engineering

Prof Xu's team has also developed an intelligent micromanipulation robot system that can automatically control microinjectors and microgrippers at the micro to nano scale for cell operations such as gene editing. This system can make microinjection more stable and reliable by ensuring a high cell survival rate. He says the new system can meet the ever-growing demand for the cell operations in biomedical engineering. Furthermore, the team has also designed a new algorithm for precise hybrid motion and force control. This intelligent algorithm will help the robot perform micromanipulation more accurately and quickly.

The team's project, 'Development and Industrial Application of Robotic Microgripper System', is among the first batch of scientific and technological innovation projects at the University of Macau-Huafa Group Joint Laboratory. They are also supported by the Zhuhai UM Science & Technology Research Institute to transform their research results into marketasle products.

Over the past decade, Prof Xu has served on editorial boards of several top international journals and has been awarded the Macao Science and Technology Award multiple times, and his team is still striving for further advances. Prof Xu says, 'We're also developing vascular robots, aerial robots, and many other intelligent robots, in order to improve people's lives through technological innovations. I am confident that intelligent robots will be closely integrated with people to better serve society.'

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徐青松教授團隊研發的第一代「消毒智多星」在澳門鏡湖醫院噴灑消毒液
A first-generation Smart Cleaner, developed by Prof Xu Qingsong's team, sprays disinfectant in Kiang Wu Hospital in Macao.

周建濤教授團隊借助澳大智能超算中心的超級電腦訓練用於圖像篡改偵測的深度學習模型

Prof Zhou Jiantao's team uses the Super Intelligent Computing Centre at UM to train their deep learning models for image forgery detection

智能偵測圖像篡改

The AI Image Forgery Detective

文/葉浩男・圖/何杰平、部分由受訪者提供

Chinese & English / Davis Ip・Photo / Jack Ho, with some provided by the interviewee

科技令圖像篡改變得輕而易舉、電子文件真偽難測。澳門大學電腦及資訊科學系副教授周建濤的團隊憑著一款先進算法，在一場圖像篡改偵測國際比賽中擊敗1,500多支隊伍，目前與阿里巴巴合作開發更強大的偵測工具。

眼看未為真

周教授是澳大人工智能與機器人研究中心代主任，也是智慧城市物聯網國家重點實驗室（澳門大學）的成員。他說：「許多被篡改的圖像不但肉眼無法察覺，連電腦程式也偵測不到。」

圖像篡改偵測算法有如專業偵探，察覺到旁人不為意的蛛絲馬跡。這些算法通常會分析圖像的噪聲分佈和其他特徵，尋找線索。「如果一幅圖像未經篡改，整幅圖的噪聲分佈通常會保持一致。」

2019年起，研究團隊獲澳門科學技術發展基金資助，開展一項關於準確分析噪聲和提取圖像特徵的研究項目，其成果有助開發偵測算法，令篡改過的圖像無所遁形。

探微知著

2021年初，周教授的團隊參加由清華大學和阿里巴巴合辦的「安全AI挑戰者賽（第五期）」，在「篡改賽道」勇奪冠軍，也在「檢測賽道」獲得季軍。在「篡改賽道」，團隊修改了20張證件類圖像上的資訊，例如身份證上的姓名和出生日期。他們會分析圖像中真實部分的噪聲，同時參考被篡改部分的背景細節，最後在被篡改部分添加一層自適應噪聲，用來躲避人工智能工具的偵測。他說：「我們是1,534支參賽團隊中最成功的圖像篡改者。」

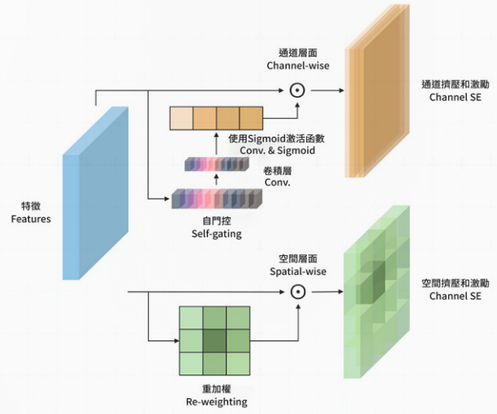
比賽期間，他們也訓練出一款新的偵測算法。它經過深度學習數以萬計的圖像，不出半秒就能偵測出圖像被篡改的位置，準確度遠超對手。這款算法特點是採用了一個多網絡架構的空間通道感知模組，能夠準確地提取圖像特徵。

產學合作

憑著矚目的表現，周教授的團隊獲阿里巴巴贊助加強算法。周教授說，網上購物平台每日都要驗證大量網店的牌照，確保賣家都是合資格的商戶。面對高解像度的圖像時，現有算法一般可以準確偵測出經篡改的圖像，但處理低解像度圖像，例如是經社交媒體或通訊軟件壓縮過的圖像，往往束手無策。

研究團隊正在參與「阿里巴巴創新研究計劃」，開展為期一年的「抗媒體傳輸的高魯棒偽造圖像檢測與定位研究」，旨在設計更高效的偵測算法，即使目標圖像曾被不同媒介壓縮、調整大小、過濾或添加噪聲，仍能找出破綻。

周教授說，這項目是澳大在該領域與大型科技企業首次合作，有助他的團隊累積產學研合作經驗：「我們正在運用研究成果解決現實世界的商業問題，進展令人鼓舞。」



研究人員將SE-Block結構加入到神經網絡，提升其從圖像擷取資訊的效能。圖為SE Block的結構。

The structure of a Squeeze-and-Excitation Block. Such blocks are plugged into the neural network to improve its performance in extracting information from images.

周建濤教授（右）的團隊在由清華大學和阿里巴巴合辦的「安全AI挑戰者賽（第五期）」獲獎

A team led by Prof Zhou Jiantao (right) has won prizes at the Security AI Challenger Contest (Season 5), an algorithm competition organised by Tsinghua University and Alibaba.

周建濤教授運用團隊開發的算法，將一張食品經營許可證被篡改的部分偵測出來。

The algorithm developed by Prof Zhou Jiantao's team can detect the forged parts of an image of a food business licence

It has never been easier to create forged images, which are now very convincing. At the University of Macau (UM), the team of Associate Professor Zhou Jiantao in the Department of Computer and Information Science has developed a cutting-edge algorithm to detect such images. After defeating over 1,500 rivals at an international competition, they have continued to improve the algorithm under a project with the e-commerce giant Alibaba.

Seeing Is Not Believing

Prof Zhou is the interim head of UM's Centre for Artificial Intelligence and Robotics, as well as a member of the university's State Key Laboratory of Internet of Things for Smart City. 'In many images, the forged parts are undetectable to the naked eye, sometimes even to computer programmes,' he says.

Like a human detective, a good image forgery detection tool has to recognise details that others might overlook. In digital images, such details include noise and other features. 'For instance, if an image has never been altered, there should be a consistent noise pattern throughout it,' Prof Zhou says.

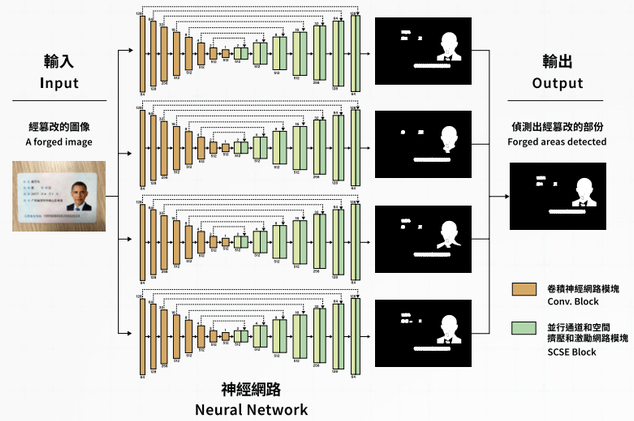
Since 2019, his team has developed new ways to accurately examine noise and extract features from images, in a project supported by the Macao Science and Technology Development Fund (FDCT). This project has inspired new algorithms for detecting forged images.

The Truth in the Details

In early 2021, Prof Zhou's team won the championship in the image forgery track, and the third prize in the detection track, at the Security AI Challenger Contest (Season 5). At this algorithm competition organised by Tsinghua University and Alibaba, the team altered 20 images, such as changing names and dates on ID cards, and added a special adaptive noise. 'We generated the noise after analysing background details and noise in the authentic parts, in order to hide the forgery traces from AI detection tools. We turned out to be the best forger among the 1,534 teams,' Prof Zhou says.

周建濤教授團隊運用澳大的智能超算中心來訓練算法。該中心提供多個GPU計算平台，可以執行深度學習任務和作為虛擬數據中心。

Prof Zhou Jiantao's team uses the Super Intelligent Computing Centre at UM to train their algorithms. The centre hosts GPU computing platforms which can run deep learning tasks and serve as virtual data centres.



周建濤教授團隊的算法可在半秒內偵測出圖像被篡改的位置

Prof Zhou Jiantao's team has developed an algorithm that can detect forged areas in an image in less than half a second

For the same competition, Prof Zhou's team also trained an algorithm that, after learning from tens of thousands of images, can detect forged areas in less than half a second. It outperformed most of its competitors largely due to a multi-network architecture that integrates spatial channel perception modules, which gives it an exceptional power for extracting features from images.

A Business Partnership

The team's performance has led to its collaboration with Alibaba to make the algorithm more robust. Every day, online marketplaces like Alibaba's need to verify countless business licenses to make sure they are dealing with legitimate sellers. Existing algorithms perform reasonably well in detecting forgery in high-resolution images, but they are not very effective with low-quality, smaller images, which have usually already been compressed by messaging applications or social media platforms.

Under the Alibaba Innovative Research Programme, the tech company has sponsored Prof Zhou's team to conduct a one-year project titled 'Research on Highly Robust Methods for Detecting and Locating Forgery in Images Transmitted Through Media'. It aims to develop an algorithm that can accurately detect forged parts of images even if they have been compressed by different media, resized, filtered, or contain added noise.

'This is UM's first collaboration in this field with a big tech company,' Prof Zhou says, adding that his team has gained valuable experience in business-university collaboration. 'We're applying our expertise to meet real-world business challenges, and have seen encouraging progress.'

鞏志國教授的團隊開發的手機程式能提供個人化行程推薦

Prof Gong Zhiguo's team has developed a mobile application that can plan personalised itineraries

社交媒體數據驅動智慧旅遊

Social Data Drives Smart Tourism

文/葉浩男、校園記者林程峰．圖/何杰平、部分由受訪者提供

Chinese & English / Davis Ip, UM Reporter Lam Cheng Fong · Photo / Jack Ho, with some provided by the interviewee

社交媒體每天產生大量時空數據，充分利用這些大數據可以推動旅遊業智能化。為了善用這些數據，澳門大學的研究人員正在開發一系列先進算法，藉此推動澳門成為智慧型世界旅遊休閒中心。

數據助旅客規劃行程

在智慧城市物聯網國家重點實驗室（澳門大學），數據挖掘專家、電腦及資訊科學系主任鞏志國教授正在與研究生研究「社交媒體數據流的在綫事件檢測與智能分層聚類技術」，其中一環是開發供旅客和業界使用的手機程式。項目在2019年起獲澳門科學技術發展基金資助。

鞏教授的團隊設計了一款手機程式，能夠推薦個人化的澳門行程，原理是分析旅客在社交媒體留下的「遊覽軌跡」，主要是他們在澳門到訪過的地點、時間和評論。鞏教授相信，提供更個人化的旅遊體驗有助延長旅客在澳遊覽的時間。「對初次來澳的旅客，我們也運用了遷移學習技術，通過分析他們在原居地的遊覽軌跡獲取其旅遊喜好，在他們抵達前就能推薦景點。」

與此同時，鞏教授的團隊開發了一些新算法分析社交媒體數據，能夠評估旅客心情、找出熱門的名勝和活動，以及識別和預測突發事件。「酒店、餐廳和博物館等旅遊場所都能採用這些技術，了解旅客需要，改善服務和拓展客源。」他的團隊也正研究用社交媒體數據，評估各區不同時段的旅客密度，為政府規劃交通及旅遊設施提供參考。

改良算法推動智慧旅遊

為方便市民和旅客出行、避開塞車，研究團隊將會推出另一款手機程式，數據來自40多個路口的攝錄鏡頭。程式能在地圖上即時顯示道路的擠塞程度和預測將來的路況，主要運用兩種機器學習方法，分別是能從圖像識別車輛數量和類型的「卷積神經網絡」，以及用來分析相關的時序數據的「循環神經網絡」。他們更在開發另一款運用機器學習模型的程式，預測巴士到站時間。

鞏教授說，他的團隊還在處理一些技術挑戰，其中一個是各大社交媒體開放數據的程度不一、數據格式各異，需要整合不同平台產生的數據。分析社交媒體數據時也會遇上語義分析的難題，需要令電腦更準確地理解有多種含義的單詞和句子：「我們的團隊將會繼續改進機器學習模型，在澳門為旅客創造更優質和智能的旅程服務。」

電腦程式顯示旅客的位置和心情

A computer programme shows the locations of tourists and their sentiments

鞏志國教授

Prof Gong Zhiguo

The massive data we create every day on social media holds the key to transforming the travel industry. At the University of Macau (UM), researchers are designing advanced algorithms which can help Macao become a smart world centre of tourism and leisure.

Tailor-made Tours for Everyone

Prof Gong Zhiguo is a data mining expert and head of UM's Department of Computer and Information Science. At the State Key Laboratory of Internet of Things for Smart City (University of Macau), Prof Gong and his students are designing mobile applications for tourists and the tourism sector. Their project, titled 'A Hierarchical Categorisation Model for Online Events Discovery from Social Media Data', has received support from the Macao Science and Technology Development Fund since 2019.

Among the many products resulting from their research is a mobile application that can recommend personalised itineraries for users. It works by analysing the 'travel trajectory' of the users on social media, which is largely a list of places they have travelled in Macao tagged with visiting times and comments. Prof Gong believes that providing more personalised travel experiences will encourage tourists to stay longer in Macao. 'Our app also uses transfer learning algorithms to analyse the travel preferences of visitors in their hometowns, so that it can recommend travel options once they arrive at Macao,' he says

The UM research team has also developed new algorithms that use social media data to evaluate the tourists' sentiments to identify their favourite places and activities, and to detect and predict emergent events. 'New technology allows hospitality venues such as hotels, restaurants, and museums to better understand what the visitors want and need, so that they can improve their services to attract more visitors,' says Prof Gong. Furthermore, the researchers have used social media data to calculate the density of tourists in different areas over the course of the day. Prof Gong says such statistics can inform government planning for tourist facilities and the transport system.

Better Algorithms for Tourism

To help residents and tourists get around the city while avoiding traffic jams, Prof Gong's research team plans to launch another mobile application, which sources data from cameras at over 40 junctions in the city. The tool can show real-time congestion levels on a map and make predictions accordingly. This mobile application is based on two machine learning methods: convolutional neural networks which can detect the number and types of cars from an image, and recurrent neural networks which can process temporal data. Also under development is a machine-learning-powered application for predicting bus-waiting times.

Prof Gong says that they are still tackling certain challenges to make better use of social data for smart tourism. These include the integration of data from different social media platforms, which provide varying degrees of data access and store their data differently. Moreover, he points to challenges in semantic analysis, such as enhancing the ability of computers to handle words and sentences that can have multiple meanings, a phenomenon known as polysemy. 'Our team will continue to improve our machine learning models, so that we can offer better and smarter travel experiences to tourists in Macao.'

澳大正在開發一系列先進算法，推動澳門成為智慧型世界旅遊休閒中心。

UM researchers are designing advanced algorithms which can help Macao become a smart world centre of tourism and leisure

中藥質量研究國家重點實驗室(澳門大學)
The State Kay Laboratory of Quality Research in Chinese Medicine (University of Macau)

制訂標準助推中醫藥國際拓展和澳門產業發展

Establishing Quality Standards to Promote Internationalisation of Chinese Medicine and Chinese Medicine Industry in Macao

文/盛惠怡、校園記者林程峰 · 圖/何杰平
Chinese & English / Debby Seng, UM Reporter Lam Cheng Fong · Photo / Jack Ho

為促進澳門經濟適度多元發展，澳門大學積極推動中醫藥產業發展，在2010年成立的中藥質量研究國家重點實驗室（澳門大學）是首間中醫藥領域的國家重點實驗室。實驗室在產業合作、人才培育、國際合作平台、中藥標準化和國際化等領域取得顯著成果，至今已為10多種中藥制訂國際質量標準，這些標準載入了《歐洲藥典》、《美國藥典》和《中國藥典》，助力中醫藥國際化。

助推中醫藥國際發展

2019年，中共中央、國務院印發《粵港澳大灣區發展規劃綱要》，當中提出支持澳門發揮中藥質量研究國家重點實驗室優勢，建立國際認可的中醫藥產品質量標準，推進中醫藥標準化和國際化。

中藥質量研究國家重點實驗室主任王一濤教授2002年來到澳大後，全力推動中醫藥的現代化、產業化和國際化。他表示：「中醫藥要在世界各地流通，必須有國際認可的質量標準。我們與海內外機構合作為中藥制訂標準，並且推進這些標準取得國際認可。」他舉例指出，實驗室與美國藥典委員會、歐洲藥典委員會和中國食品藥品檢定研究院分別建立聯合實驗室，已將10餘個中藥質量標準載入《美國藥典》、《歐洲藥典》和《中國藥典》。

中藥標準載入《美國藥典》

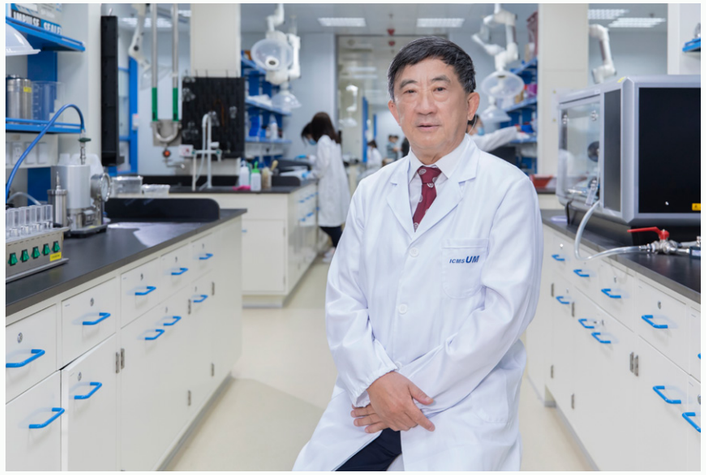
藥典是世界各國藥品的法典。《美國藥典》不僅是美國藥品和膳食補充劑的法定標準，也獲140多個國家或地區認可或採用。2012年起，澳大與美國藥典委員會成立中藥標準研究與開發實驗室，是全球首間與之開展同類合作的高等院校。雙方先後啟動關於三七、枸杞、蛹蟲草、人工蟲草菌粉、高良薑、鐵皮石斛、廣藿香和天麻等多種中藥的質量標準的制訂工作。目前《美國藥典》草藥集（USP-HMC）已經收載42項中藥標準。

中華醫藥研究院特聘教授、中藥質量研究國家重點實驗室副主任李紹平是國際知名的藥物分析學者，主要研究中藥質量控制與活性成分，2021年起任《美國藥典》草藥集東亞專家委員會委員，2020年及2021年連續兩年獲選英國《分析科學家》公佈的「全球最具影響力100位分析科學家」，也是自2013年以來唯一入選的中藥質量研究專家。

李教授的團隊提出了新的中藥質量控制策略，符合實際又滿足國際標準。他們已為中藥三七開發了一套高效實用的質量標準評價方法，並且建立了六個質量標準，載於《美國藥典—草藥集》和《美國藥典—膳食補充集》。

李教授說，中藥通常由成百上千種化合物組成，制訂中藥標準難於西藥標準。他舉例指出，中藥三七蘊含的皂苷可以散瘀，因此《中國藥典》將皂苷列為三七的質量標準指標。

三七也會用來止血，相關有效成分是三七素。他說：「根據臨床治療目的不同，同一中藥的質量指標應有不同。為《美國藥典》制訂三七的質量指標時，起初不少專家反對將三七素列為質量標準，但我們按臨床應用據理力爭，最終將三七素與皂苷並列為質量指標。」



王一濤教授
Prof Wang Yitao

澳大至今已為10多種中藥制訂國際質量標準
UM has established quality standards for a dozen Chinese medicinal plants

李教授還說：「習近平主席指出：『誰制定標準，誰就擁有話語權；誰掌握標準，誰就佔據制高點。』因此，率先為中藥於《美國藥典》制定質量標準十分重要。」

給中藥一張歐洲通行證

《歐洲藥典》是歐洲最重要的藥品質量檢測指導文獻，在39個歐洲國家有法律約束力。歐洲藥典委員會於2008年成立中藥專業委員會，已將五加皮、木通、當歸等超過80味中藥材的質量標準載入藥典，約佔其所載草藥總數的三分之一。

陳肖家是中華醫藥研究院助理教授，積極建立中藥質量分析方法和制訂中藥國際質量標準，曾為中藥麥冬的功效和質量制訂歐洲標準。她表示，中醫和西醫的理論體系完全不同，如果藥品沒有質量標準，雙方就像語言不通，無法合作和交流：「我們制訂重要標準，相當於為中藥簽發一張歐洲通行證，有助歐洲民眾加深了解中藥，以及買到和用到優質中藥。」

陳教授的團隊約於2015年起制訂麥冬的質量標準，2019年載入《歐洲藥典》。第一步是真偽鑒別：團隊先找出偽品，運用薄層色譜法與真品比對，了解兩者成份有何差異。第二步是利用高效液相色譜法及紫外分光光度法測定麥冬有效成分的含量，從而評價其質量優劣。第三步是向歐洲藥典委員會提交草案。該委員會就草案向歐盟成員國專家徵求意見，反覆修改，最後將標準載入《歐洲藥典》。她的團隊正與歐洲藥典委員會合作，制訂中藥餘甘子的質量標準，助力中醫藥進一步打入歐洲市場。

創建產學研創新平台

王一濤教授說，2020年10月澳門特區政府批准澳大與華潤集團、廣藥集團和中國中醫科學院等共同創立澳門中藥研發中心，中華醫藥研究院、國家重點實驗室和研發中心形成了三位一體的產學研創新體系，聚焦中醫藥研發及製造、成藥升級和國際化中藥健康產品研發，與業界共同孵化科技成果，推進澳門中醫藥產業發展。

2021年5月，珠海澳大科技研究院的中華醫藥及轉化醫學研發中心正式揭牌，標誌著澳大將通過中心推進大學的科技創新、澳門產業多元化，以及粵港澳大灣區國際科技創新中心的發展。王教授表示，中藥質量研究國家實驗室和澳門中藥研發中心正與入駐澳門的藥企一道，努力踐行澳門特別行政區行政長官賀一誠對澳大師生的囑託：充分發揮國家重點實驗室的引領作用，聚焦以中醫藥研發製造為切入點的大健康產業、高新技術產業等重點產業，完善產學研深度融合機制，走出一條澳大科研成果產業化的道路。

The University of Macau (UM) is a firm supporter of the Chinese medicine industry, a sector essential to the moderate diversification of Macao's economy. UM is home to the State Key Laboratory of Quality Research in Chinese Medicine (SKL-QRCM), China's first-ever state key laboratory in Chinese medicine. Over the years, the laboratory has made impressive progress in forging business partnerships, nurturing talent, creating platforms for international cooperation, and pushing forward the standardisation and internationalisation of Chinese medicine. Moreover, the laboratory has established quality standards for a dozen Chinese medicinal plants for authoritative publications such as *European Pharmacopoeia* (Ph. Eur.), *United States Pharmacopeia* (USP), and *Chinese Pharmacopoeia* (ChP), in order to create favourable conditions for Chinese medicine to succeed in the international market.

Promoting Chinese Medicine on the World Stage

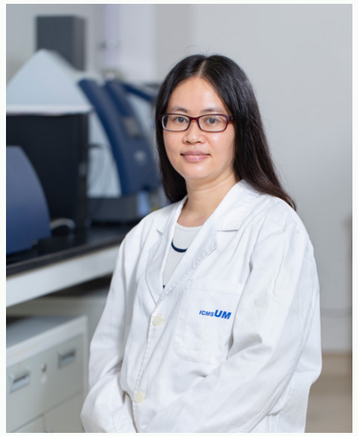
In 2019, the Central Committee of the Communist Party of China and the State Council unveiled the *Outline of the Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area*. The document pledges support for Macao to leverage the advantages of the SKL-QRCM, to establish an internationally recognised reference standard for Chinese medicine products, and to promote the standardisation and internationalisation of Chinese medicine.

SKL-QRCM Director Prof Wang Yitao, who joined UM in 2002, is committed to the modernisation, commercialisation, and internationalisation of Chinese medicine. 'For Chinese medicine to go global, it is necessary to establish internationally recognised quality standards,' says Prof Wang. 'At UM, we are working with domestic and overseas partners to create such standards and to make them internationally recognised.' He adds that his laboratory has established joint laboratories with all three regulatory bodies in the US, Europe, and China, namely the United States Pharmacopoeia Convention (USPC), the European Pharmacopoeia Commission (Ph. Eur. Commission), and the Chinese National Institutes for Food and Drug Control. The joint laboratories focus on creating standards for the USP, the Ph. Eur., and the ChP.

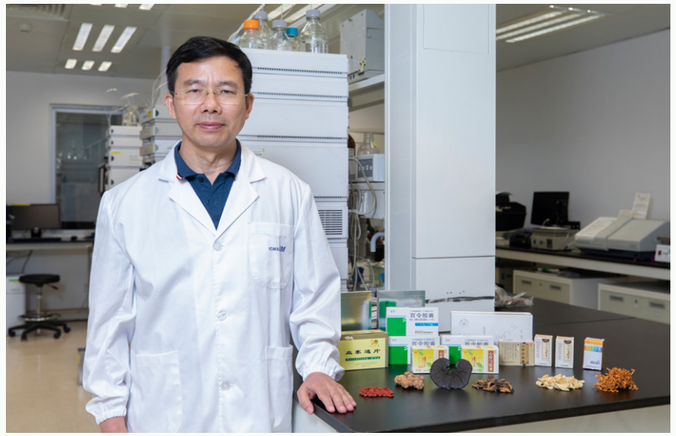
Standards for Chinese Herbs in the USP

A pharmacopoeia is a legally binding collection of standards and specifications for medicines. Not only is the USP document considered a national standard for drugs and dietary supplements in the US, it is also used in over 140 countries and regions in the world. In 2012, the SKL-QRCM signed an agreement with the USPC to establish a joint laboratory that tackles challenges in the development of international quality standards for Chinese medicines, making UM the first higher education institution to establish a joint laboratory with USPC. Both institutions have researched and established standards for Panax notoginseng (Sanqi), Lycium barbarum (Goji), Cordyceps militaris, powders of fermented Cordyceps sinensis, Galangal, Dendrobium officinale, Pogostemon cablin, Gastrodia elata, and other herbs. The USP currently contains the standards for 42 Chinese medicinal herbs.

SKL-QRCM Deputy Director Li Shaoping, who is a Distinguished Professor at UM's Institute of Chinese Medical Sciences (ICMS), specialises in quality control and active ingredient research. As a world-renowned scholar in pharmaceutical analysis, Prof Li has served on the Herbal Medicines Compendium – East Asia Expert Panel of the USPC since 2021. Prof Li has entered the list of the top 100 analytical scientists in the world for two consecutive years since 2020. He is also the



陳肖家教授
Prof Chen Xiaojia



李紹平教授
Prof Li Shaoping

first expert in quality control of Chinese medicine to enter the list since its publication in 2013.

For quality control in Chinese medicine, Prof Li's team has proposed practical strategies that meet international quality standards. Among their achievements are efficient and practical methods for evaluating the standards for Panax notoginseng, as well as six quality standards for the USP Herbal Medicines Compendium and the USP Dietary Supplements Compendium.

Prof Li says it is more challenging to establish quality standards for Chinese medicine than for western medicine because the former usually comprise hundreds of natural compounds. For example, the Chinese herbal medicine Panax notoginseng contains saponins, which are naturally occurring compounds that can dispel blood stasis. Therefore, the ChP lists saponins as one of the quality indicators for Panax notoginseng. According to Prof Li, it is also used to stop bleeding because it contains an active ingredient known as 'dencichine'. 'For the same Chinese herbal medicine, there should be different quality indicators for different clinical purposes,' says Prof Li. 'For example, we proposed including dencichine as a quality indicator for Panax notoginseng for the USP, but some experts were against this idea. However, we persisted and presented evidence from clinical practices. In the end, we convinced the opponents that both dencichine and saponins should be listed as quality indicators.'

Prof Li adds, 'President Xi Jinping has pointed out that whoever sets the standards has a bigger say, and whoever controls the standards occupies a strategic vantage point. So I believe it is vital to take the initiative to establish standards for chinese medicine for the USP.'

A 'European Visa' for Chinese Medicine

The Ph. Eur. is the most important reference for quality control of medicines in Europe, and is legally binding in 39 European countries. In 2008, the Ph. Eur. Commission established a working party on TCM (Traditional Chinese Medicine). The Pharmacopeia now includes quality standards for over 80 Chinese herbal medicines, such as Acanthopanacis gracilistyli cortex, Akebiae caulis mutong, and Angelicae sinensis radix, which accounts for about one-third of all herbs included.

ICMS Assistant Professor Chen Xiaojia is devoted to quality analysis of Chinese herbal medicine, in addition to creating international standards for such herbs. Her team has established the European standards for Ophiopogonis radix. Prof Chen says that the principles of TCM and Western medicine are vastly different. She adds that the two systems will not be able to interact with each other if there are no quality standards for medicines. 'The standards we established for Chinese herbal medicine are essentially their "visa" to Europe. The standards will allow people in Europe to understand Chinese medicine, and will make high-quality Chinese herbal medicine more accessible across the continent.'

In 2015, Prof Chen's team began to establish the quality standards for Ophiopogonis radix for Ph. Eur., and completed the project in 2019. In the beginning, the team established the standards for identification of the Chinese herbal medicine by comparing adulterated products with genuine ones using thin-layer chromatography. They then used high-performance liquid chromatography and ultraviolet–visible spectroscopy to determine the active ingredients of Ophiopogonis radix and to distinguish the good from the bad. They submitted a draft to the Ph. Eur. Commission, which then sought opinions from experts from EU countries. The commission included the final standard in the pharmacopoeia after revising the draft several times. In another push for Chinese medicine to Europe, Prof Chen is working with the commission to establish quality standards for Phyllanthi fructus.

New Platforms for Industry-Academia Collaboration

According to Prof Wang, the SAR government has approved the establishment of a TCM research centre in Macao, which is a joint project among UM, China Resources, Guangzhou Pharmaceuticals, and the China Academy of Chinese Medical Sciences. This centre will join SKL-QRCM and ICMS to study and produce Chinese medicine, improve the quality of patent drugs, and develop TCM products on a global scale. They will push forward the commercialisation of their research outcomes with industrial partners to promote the TCM sector in Macao.

In May 2021, UM established a research and development centre for Chinese medicine and translational medicine at the Zhuhai UM Science & Technology Research Institute. The centre will play a key role in UM's efforts to support technological innovations, the diversification of local industries, and the development of the Guangdong-Hong Kong-Macao Greater Bay Area into an international innovation and technology hub. Moreover, the SKL-QRCM and the new TCM centre in Macao will work with pharmaceutical companies to meet the expectations of Macao SAR Chief Executive Ho Iat Seng. Following his instructions on research commercialisation, UM will give full play to the leading role of its state key laboratories, support the health industry and high-tech industries with TCM as an initial focus, explore better mechanisms for industry-academia collaboration, and gain vital experience for the commercialisation of other UM research outcomes.

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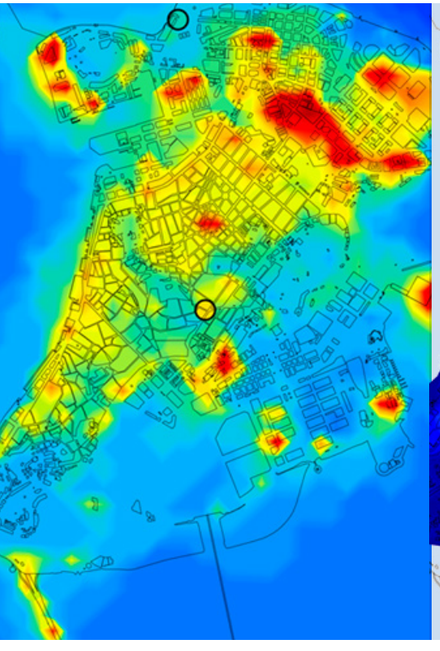
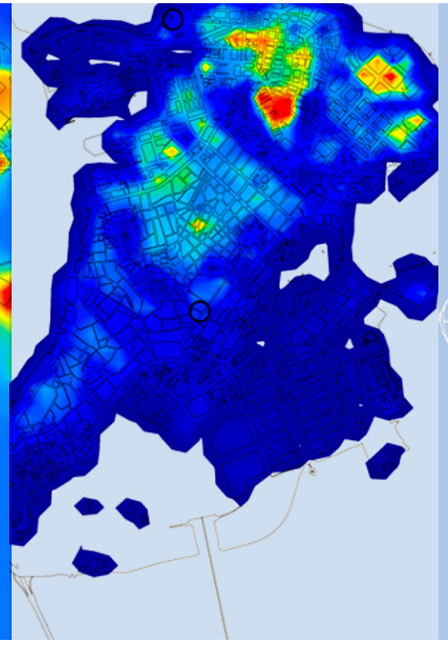
中華醫藥及轉化醫學研發中心揭牌
The inauguration ceremony for a research and development centre for Chinese medicine and translational medicine





區域海洋研究監測自然災害

Regional Oceanology Monitors Natural Disasters

文/林祖兒・圖/何杰平、部分由受訪者提供・英文翻譯/陳靜

Text / Judite Lam・Photo / Jack Ho, with some provided by the interviewee・English Translation / Ruby Chen

粵港澳大灣區是全球其中一個最大的港口區。作為大灣區中心城市之一，澳門正在加緊保護海洋生態環境和善用海洋資源，從而向可持續發展再進一步。在澳門大學，研究人員目前與不同機構合作開展區域海洋研究，聚焦海洋土木工程、海洋環境與生態和海洋災害防治。

重視區域海洋的科學發展

2015年，國務院為澳門特別行政區劃定85平方公里海域，給澳門的海事活動和海洋研究帶來新機遇。有見及此，澳大將區域海洋研究列為其「3+3+3+3」研究戰略佈局的重要一環。研究人員聚焦海洋多圈層動力與環境調節機制、濱海城市自然災害與工程，以及濱海環境治理與資源開發。

2021年8月，澳大首次與香港科技大學港澳海洋研究中心和廈門大學派出23名科研人員開展粵港澳大灣區夏季海洋綜合性科學考察，獲澳門海事及水務局支持。在考察的啟動儀式上，澳大校長宋永華教授說：「因應澳門特區政府對海洋利用、海洋防災減災與海洋環境保護的挑戰及重大需求，澳大注重區域海洋的科學發展及人才培養，鼓勵學科交叉，重點建設區域海洋新興研究領域。」

海洋土木工程

澳門為濱海城市，近幾年以及未來數十年將有不少大型海洋工程，包括建造跨海大橋、開挖海底隧道和填海造地等。這些重大基礎設施必須有良好的營運和維護，才可確保安全、延長壽命和真正推動經濟及社會發展。澳大土木及環境工程系主任、區域海洋研究中心代主任周萬歡教授說，他們準備聚焦沿海建築和跨海集群設施的系統性監測、全壽命評估和智能化維養，針對颱風等重大自然災害、海洋結構耐久性和填海區沉降等多種致災因素，開發智能化監測系統和專業仿真模擬分析，為重大基礎設施和土木工程的服役安全狀態提供全壽命周期風險評估與維養決策。

由於上述工程都會影響海域水體水質、生態環境和海洋生物多樣性，澳大也正與政府部門及企業合作，評估海洋工程的實質成效，促進在海洋環境與工程中的近海環境生態，城市自然災害防治和海洋工程等領域科研的協同發展。

海洋環境與生態

澳大也就大氣污染的檢測、實驗和模式模擬開展了多項研究，例如實時在線監測大氣污染物、在實驗室模擬大氣物理及化學過程、開發自適應空氣質量預報模型和全合一空氣質量模擬系統，同時對水質監察、污水處理和水資源進行研究。土木及環境工程系副教授黎永杰說：「我們主要基於澳門所在的大灣區西岸的位置，研究大氣、水體以及其他生態系統中污染物的排放和轉化，也會觀察澳門受海洋氣團的影響而造成污染物的遷移和轉變的過程。近年我們也跟大灣區各地的機構合作，旨在獲得更準確的空氣污染和水質數據，從而找出主要環境問題的根源，並為解決這些問題提供建議。要真正改變環境和生態，澳門不能獨善其身，必須與各方通力合作。」

澳門和其他沿海地區的空氣流動和空氣質量深受海洋影響。黎教授說，我們可以引入新的監測站和儀器，更有效地檢測空氣中污染物，例如微細粒子和揮發性有機物的具體化學成份：「我們的團隊利用氧化流通反應器，模擬大氣氧化過程對二次污染物（例如臭氧和二次顆粒物）生成的主要前體物和反應條件。我們可以將不同前體物輸入反應器，從而觀察空氣中有害物質和無害物質經過氧化後的變化，再作深入研究，從而制訂改善空氣質量的方案。我們也跟澳門環境保護局以及地球物理暨氣象局合作，分析澳門多年空氣污染的狀況和在一些管控措施實施前後的變化。我們也將在澳大校園設置監測站，結合實時和離線分析，詳細研究澳門空氣污染物的化學成分以及其轉化機制，提出改善措施。」

此外，水質監察與市民息息相關，黎教授指出：「澳門沿岸污水的鹽度較高，所以我們也有同

粵港澳大灣區夏季海洋綜合性科學考察隊成員將儀器放到海底，用來測試水質參數和採集水樣。

The Guangdong-Hong Kong-Macao Greater Bay Area summer marine research expedition team uses specialised equipment to collect water quality data and water samples

2021年8月，澳大首次與香港科技大學港澳海洋研究中心和廈門大學開展粵港澳大灣區夏季海洋綜合性科學考察。

In August 2021, researchers from UM, Hong Kong University of Science and Technology's Centre for Ocean Research in Hong Kong and Macau, and Xiamen University launch their first summer marine research expedition to the Guangdong-Hong Kong-Macao Greater Bay Area.

事正研究如何有效處理高鹽度的污水，包括從污水處理過程中產生的淤泥中回收可作為肥料的資源和其他有用物質，也會定期監測水質。澳門食水大多來自珠海，我們亦會於周邊研究機構合作，監測區域內的水質狀況變化，確保澳門的食水符合標準。」

海洋災害防治

澳門和鄰近地區時有颱風和暴雨，往往造成人命傷亡和財物損失，需要更有效地預測災害事件及其驅動因素，並且提出防災減災措施。研究相關問題多年的土木及環境工程系助理教授高亮說，澳門近年愈來愈受極端天氣影響，風暴潮次數及水浸高度顯著增加，因此她和其他研究人員開發了數值模擬模型，模擬這些災害的過程。「我們已經可以模擬河口尺度的風暴潮增水的過程和天文潮過程，每逢颱風都可計算出風暴潮和潮水位變化的過程。模型可以同步計算出排水管網絡當中的水動力過程，並可以進行3D展示，從而預視可能發生的災害場景和採取針對性措施。」

高教授也說，澳門半島的排水管網較為老舊，時有堵塞，因此他們也在研究提升排水系統的效率。「我們會按照研究結果建議增建泵站或一些較為高效的排水道和地下儲水池，用來快速排出雨水。參考其他城市治理雨水的經驗，我們的研究團隊也會提出多項針對工程的措施，例如提升隄防的設計標準，使雨水不易倒灌，減低洪水的影響。」

高教授認為，修建設施固然是防治災害的關鍵一環，但市民的防災意識同樣重要：「近年澳門社會各界的防災意識有所提高，特區政府也設置了紅色、黃色和黑色風暴潮警報，並宣傳各警報生效時應採取的措施。我們也會參考鄰近地區的預警系統和機制，希望從多方面向政府提出建議。」

The Guangdong-Hong Kong-Macao Greater Bay Area (GBA) is one of the largest port areas in the world. As one of the core cities in the GBA, Macao is taking a step further towards sustainable development by increasing its efforts to protect the marine ecosystem and optimise the use of marine resources. At the University of Macau (UM), researchers are working with various institutions in the field of regional oceanology, focusing on offshore civil engineering, the marine environment and ocean ecology, as well as marine disaster prevention and control.

Increased Investment in Regional Oceanology

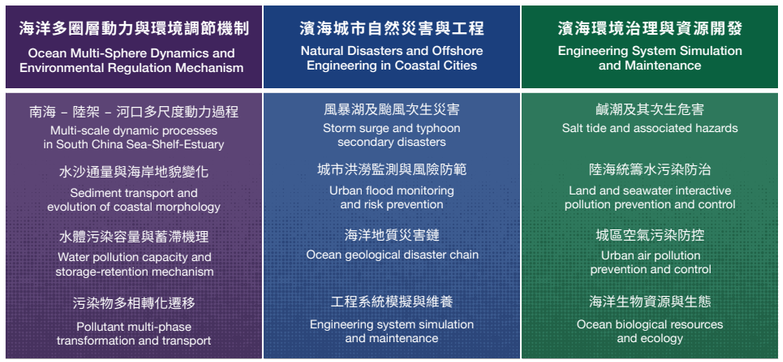
In 2015, the State Council demarcated a maritime space of 85 square kilometres under the control of the Macao Special Administrative Region, bringing new opportunities for maritime activities and marine research in Macao. In view of this, the university has made regional oceanology an important part of its '3+3+3+3' strategic research blueprint. Researchers are working on cutting-edge topics to help the government address challenges in the use of the ocean, marine disaster prevention and control, and marine environmental protection.

In August 2021, with the support of the Macao Marine and Water Bureau, 23 researchers from UM, Hong Kong University of Science and Technology's (HKUST) Centre for Ocean Research in Hong Kong and Macau, and Xiamen University launched their first summer marine research expedition to the Greater Bay Area. At the launch ceremony, UM Rector Yonghua Song said: 'We hope to help the Macao SAR government address the challenges in the use of the ocean, in the prevention and control of marine disasters, and in the protection of the marine environment. So we have identified regional oceanology as a key research area. We train young researchers and focus on emerging topics with an interdisciplinary approach.'

Offshore Civil Engineering

Macao is a coastal city. There have been many major marine projects in recent years and there will be more in the coming decades. These include the construction of sea bridges and underwater tunnels, as well as land reclamation. These major infrastructure projects must be well managed and maintained in order to ensure safety, extend their service life, and provide a real impetus to economic and social development. Prof Hannah Zhou Wanhuan, head of the Department of Civil and Environmental Engineering and interim head of the Centre for Regional Oceans, says she and her colleagues plan to focus on systematic monitoring, life cycle assessment, and smart maintenance of coastal buildings and sea-crossing clusters, and to develop smart monitoring systems and professional simulation analyses to address a variety of disaster-causing factors, such as major natural hazards like typhoons, durability of marine structures, and settlement of reclaimed land. Their work aims to provide life cycle risk assessment and maintenance decisions for the safety of major infrastructure projects and civil engineering works in service.

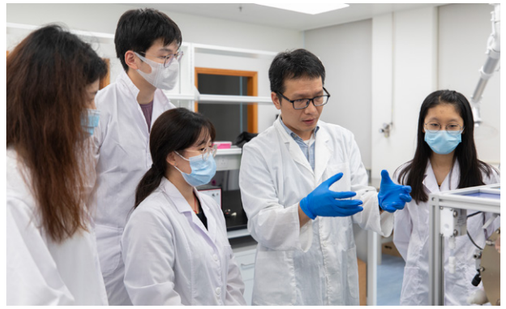
As all of the above-mentioned projects affect water quality, marine ecosystems, and marine biodiversity, the university is also working with government departments and companies to evaluate the actual effectiveness of marine projects and to promote research synergies in the fields of offshore environmental ecology, urban natural disaster prevention and control, and ocean engineering.



區域海洋研究中心的重點研究內容框架

The research framework of the Centre for Regional Oceans

周萬歡教授（右）
Prof Zhou Wanhuan (right)



黎永杰教授（右二）
Prof Li Yongjie (2nd from right)

Marine Environment and Ecology

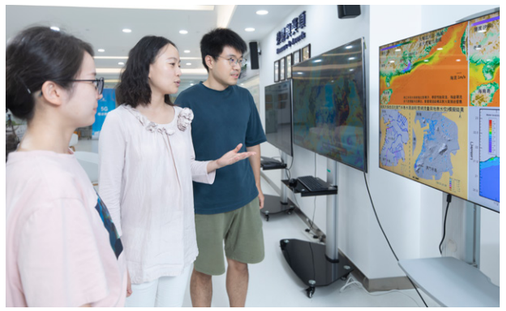
The university is also conducting research on atmospheric pollutant detection, experimentation, and modelling, such as real-time online monitoring of atmospheric pollutants, laboratory simulations of atmospheric physical and chemical processes, development of an adaptive air quality prediction model and an all-in-one air quality modelling system, as well as research on water quality monitoring, sewage treatment, and water resources. Associate Professor Li Yongjie of the Department of Civil and Environmental Engineering says: ‘Macao is located in the west of the Greater Bay Area, and we are studying the emission and transformation of pollutants in the atmosphere, water bodies, and other ecosystems, as well as observing the migration and transformation of pollutants in Macao due to the influence of maritime air masses. In recent years, we have also been working with organisations across the Greater Bay Area to obtain more accurate data on air pollution and water quality in order to identify the root causes of major environmental problems and provide recommendations to address them. To make a real difference to the environment and ecology, Macao cannot do it alone; it must work in partnership with all parties.’

Air flow and air quality in Macao and other coastal areas are heavily influenced by the sea. ‘We can introduce new monitoring stations and instruments to more effectively detect the chemical constituents of air pollutants such as fine particles and volatile organic compounds,’ says Prof Li. ‘Our team has used oxidation flow reactors to simulate the main precursors and reaction conditions for secondary pollutants such as ozone and secondary particulate matter during the atmospheric oxidation processes.’ He adds: ‘We can feed different precursors into the reactor and observe the changes in the air after the oxidation of harmful and non-harmful substances, and then develop solutions to improve air quality. We are also working with the Environmental Protection Bureau and the Meteorological and Geophysical Bureau to analyse the state of air pollution in Macao over the years and how it has changed before and after the implementation of some control measures. We will also set up a monitoring station on the UM campus to study the chemical constituents of air pollutants in Macao and their transformation mechanism, using both real-time and offline analysis, in order to make recommendations for improvement measures.’

Water quality has a direct impact on our daily lives. Prof Li explains: ‘The salinity of Macao's coastal sewage is relatively high, so our colleagues are also studying how to effectively treat high-salinity wastewater, including how to recover resources for fertiliser and other useful substances from the sludge produced during the wastewater treatment process. We also monitor water quality on a regular basis. Macao's water mostly comes from Zhuhai, and we will also work with neighbouring research institutes to monitor the changes in water quality in the region to ensure that Macao's water meets drinking water standards.’

Marine Disaster Prevention and Control

Typhoons and rainstorms in Macao and neighbouring regions often result in loss of life and property. So it is important to predict natural disasters and their drivers more effectively, and to develop prevention and control measures. Assistant Professor Gao Liang of the Department of Civil and Environmental Engineering has studied this issue for many years. She says that she and other researchers have developed numerical models to simulate the processes of these disasters, as Macao has been increasingly affected by extreme weather in recent years, with a significant increase in the number of storm surges and flood heights. ‘We have been able to simulate estuary-scale storm surges and astronomical tides, and we can calculate storm surge and tide level changes for each typhoon,’ she says. ‘The model can simultaneously calculate the hydrodynamic processes in the drainage systems and display them in 3D to anticipate possible disaster scenarios and take targeted measures.’



高亮教授（中）
Prof Gao Liang (middle)

Prof Gao adds that the drainage system in the Macao Peninsula is relatively old and sometimes becomes clogged, so they are also looking into improving the efficiency of the drainage system. ‘Based on the findings of our study, we will recommend the construction of additional pumping stations or more efficient rising mains and underground storage tanks for faster drainage of storm water,’ says Prof Gao. ‘We will also draw on the experience of other cities in storm water management and propose a number of measures, such as upgrading the design standards for sea walls and breakwaters to minimise flood damage.’

While Prof Gao admits that building facilities is a key part of disaster prevention and control, she believes raising public awareness about disaster prevention is equally important. She says, ‘In recent years, there has been an increase in public awareness of the importance of disaster prevention in Macao, and the government has launched a colour-coded storm surge warning system, which uses red, yellow, and black to indicate different levels of storm surges. It has also publicised actions to be taken when each level of warning is in effect. We will also study the early warning systems and mechanisms of our neighbouring regions so that we could propose suggestions to the government.’

掃二維碼
觀看訪談片段
Scan the QR codes to watch the interviews

為儘快提升研究水平和服務澳門發展所需，澳大不斷拓展和海內外相關機構合作。已經簽訂科研協議的合作方有青島海洋科學與技術試點國家實驗室、葡萄牙阿爾加維大學、中山大學、海洋污染國家重點實驗室（香港城市大學）、海岸和近海工程國家重點實驗室、污染控制與資源化研究國家重點實驗室、南方海洋科學與工程廣東省實驗室（珠海）、珠江水利科學研究院、港珠澳大橋管理局、澳門自來水有限公司和蘇伊士（亞洲）有限公司。澳大在2020年更與中國首個專門從事海洋科學研究的國立機構——中國科學院海洋研究所合作，成立海洋環境與工程聯合實驗室。

To advance marine research and support the sustainable development of Macao, UM has signed scientific research agreements with institutions at home and abroad, including the Pilot National Laboratory for Marine Science and Technology (Qingdao), the University of Algarve in Portugal, Sun Yat-sen University, the State Key Laboratory of Marine Pollution (City University of Hong Kong), the State Key Laboratory of Coastal and Offshore Engineering, the State Key Laboratory of Pollution Control and Resource Reuse, Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), Pearl River Water Resources Research Institute, Hong Kong-Zhuhai-Macao Bridge Authority, Macao Water Supply Company Ltd, and SUEZ (Asia) Limited. In 2020, the university established a joint laboratory of marine environment and ocean engineering with the Institute of Oceanology under the Chinese Academy of Sciences, the first national institution dedicated to marine science in China.

胡偉星：培養大數據時代的公共行政人才

Richard Hu — Nurturing Public Administration Professionals in the Big Data Era

文/葉浩男 · 圖/何杰平
Chinese & English / Davis Ip · Photo / Jack Ho

澳門特區政府正在推動公共行政改革，急需擁有新技術和新思維的人才，從而把握大數據時代的機遇，改善公共服務。因應新需求，澳門大學社會科學學院院長、澳大發展基金會政治學與公共政策特聘教授胡偉星過去兩年推動大學開展了多項新課程和計劃。

提升公務人員領導力和專業技能

澳大在1989年開辦首屆公共行政學士學位課程，推動公務員本地化，為澳門回歸祖國作好準備，其後逐漸增加不同層次的課程，30多年來培養了大批公共行政人才。

胡教授說，澳門現在要把握粵港澳大灣區建設的機遇和運用科技改善公共服務，對公共行政的要求與日俱增。2019年12月，賀一誠就任澳門特區行政長官，指出公共行政改革是首要處理的工作。2020年9月，澳大成立公共行政培訓中心，委任胡教授為該中心行政委員會主席、法學院稅兵教授為中心主任。胡教授表示：「澳大是澳門唯一的綜合性公立大學，有責任也有條件為特區培養具前瞻視野和創新思維的公務人員。」

胡偉星教授
Prof Richard Hu

胡教授在2019年中加入澳大，之前是香港大學政治與公共行政學系主任，在港大任教近22載，不時應香港公務員事務局的邀請為公務員培訓課程授課。他認為港澳兩地的公務人員培訓都較為零散，缺乏類似內地、新加坡和英國等地較為全面的公務人員培訓院校。「因此，我們的公共行政培訓中心採取了更系統性、眼光更長遠的方式來培訓澳門公務人員，提升他們的領導力和專業技能。」

2020年9月起，公共行政培訓中心開辦了三屆公務人員領導力培訓班，每屆為期三個月，每屆有約30名不同部門的公務人員參與脫產培訓，也在澳大校園住宿。培訓內容有四大模塊：一）憲法和基本法深度培訓，提升對國家和澳門的認同與忠誠；二）公共行政專業知識，提升工作能力；三）國情教育，著重了解與澳門和粵港澳大灣區息息相關的國家政策和發展；四）大數據和區塊鏈等新科技在公共行政的應用。學員也曾有機會與司局長面對面交流，到政府各部門和到杭州、深圳實地考察。

胡教授滿意培訓班的成效：「這些公務人員對政府運作有了更深入、更全面的認識，能站在更高的角度思考改善公共行政。」他又相信，他們在培訓班拓展的人脈有利日後跨部門合作：「澳門公務人員較難調職，很少跨部門轉換職位。在這三個月，他們難得放下日常工作與其他部門的同事相處，有機會了解彼此部門的運作。」

新課程孕育英才

胡教授也推動社會科學學院開辦新的學位課程，包括專業型的公共行政博士學位課程、理學碩士學位（數據科學）課程的「智慧政務」範疇，以及文學碩士學位（傳播學）的「視覺傳播」範疇。學院還計劃與海內外知名院校合辦本科生和研究生課程，塑造更豐富的學習經歷。

在香港大學，胡教授所在的政治與公共行政學系開辦了大中華地區首個英文授課的公共行政學博士（DPA）課程，來到澳大後他創辦了區內首個中文授課的公共行政博士學位課程，為政府、企業和非政府機構孕育英才。「該課程側重理論與實踐相結合，澳門和鄰近地區的學生可以繼續全職工作，晚間和週末到澳大研習，畢業前也能在職場發揮所學。」

胡偉星教授在澳大公共行政培訓中心與學生交流
Prof Richard Hu talks to students in the Public Administration Training Centre at UM

胡教授也表示，數據科學和人工智能在公共行政的應用日趨廣泛，需要更多掌握新科技的公務人員，但澳門公共行政體系缺乏數據科學人才，有礙推動數據處理和數據共享文化。「因此，數據科學碩士課程的『智慧政務』專業範疇教導學生處理和分析數據，以及將分析結果圖像化呈現，這些都是新一代公務人員所需的重要技能。」

此外，澳大社會科學學院與浙江大學公共管理學院在2021年7月成立智慧政務聯合研究中心。胡教授說，浙江省在大數據和智慧政務方面走在全國前列，不少成果源於浙大。「在新的聯合研究中心，我們會開發高效的方式，推動政府部門共享數據、以數據支持政策的制訂和評估、探索雲技術的新用途，為市民提供更便捷的公共服務。」

連結國際關係研究和大灣區發展

加入澳大以來，胡教授每天都有不少行政工作，但無阻他繼續研究國際關係。2021年7月，他與三位學者合著的《Contesting Revisionism: China, the United States, and the Transformation of International Order》（爭辯修正主義：中國、美國和國際秩序的轉變）由牛津大學出版社出版。

胡教授說，傳統的國際關係理論認為新興大國是「修正主義國家」，它們會挑戰現有大國（守成大國）和推翻既有國際秩序，不少西方學者和政策制訂者依此將發展

澳大社會科學學院與浙大公共管理學院成立智慧政務聯合研究中心
UM's Faculty of Social Sciences and Zhejiang University's School of Public Affairs of School unveil a joint research centre for smart government

胡偉星教授的研究方向包括將國際關係研究與大灣區發展連結起來
Prof Richard Hu is trying to connect scholarship in international relations and the development of the GBA

迅速的中國標籤為「修正主義國家」。這本新書提供大量證據駁斥此說。這本書通過比較中美兩國對國際關係基本原則和制度的遵守，兩國對國際條約和國際組織的參與程度，兩國與其他國家交往模式以及他們在聯合國機構的投票行為，指出新興大國並非必然是「修正主義國家」，而美國作為一個守成大國，卻在不斷破壞二戰後建立的國際秩序。

胡教授說：「一個國家是否修正主義國家，取決於它在現有國際秩序的持份（stake）程度和在這種秩序下它的利益所在。很多證據顯示，中國堅定支持以聯合國體系為核心的國際秩序，過去數十年中國在這個國際秩序下取得巨大發展和經濟利益，近年也愈來愈積極參與全球治理體系，可見中國並非一個傳統國際關係理論所講的『修正主義國家』。」

在社會科學學院，胡教授身兼學院轄下的粵港澳大灣區研究中心主任。中心的研究方向包括將國際關係研究與大灣區發展連結起來，例如從歐盟國家的實踐汲取有助大灣區協同發展的經驗。胡教授解釋，在「一國兩制」原則下，粵港澳三地的經濟和法律制度不同，如要進一步推動區內貨物、資本和人員流動，或可參考歐盟社會處理類似問題的解決方案：「這些不僅是國際關係學者的研究方向，也是值得大灣區各地政府和智庫思考借鑒的課題。」

To support the Macao SAR government's administration reforms, the University of Macau (UM) is nurturing the next generation of public administration professionals with the right skills and mindsets to provide better public services in the big data era. To meet this end, Prof Richard Hu, dean of the UM Faculty of Social Sciences and Distinguished Professor of Politics and Public Policy of the University of Macau Development Foundation, has been working over the past two years with academics across UM to launch new programmes and projects.

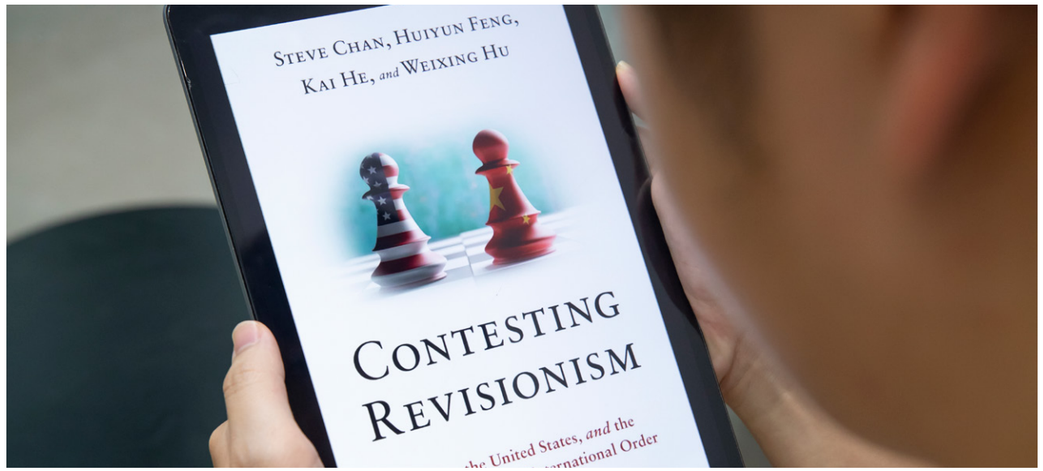
Leadership and Skill Training for Civil Servants

UM has over three decades of excellence in providing professional education in public administration, starting in 1989 with its first undergraduate programme in the field. The initial focus was to support the localisation of the civil service during the period of transition leading up to Macao's handover. Over the years, the university has continued to launch public administration programmes at different levels.

Today, Macao needs to capitalise on the opportunities brought about by the development of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), and to use advanced technologies to provide better public services, making greater demands on public administration. After assuming office in December 2019, Chief Executive Ho Iat Seng made civil service reform a top priority. To support his agenda, UM established its Public Administration Training Centre in September 2020, with Prof Hu appointed as the chair of the centre's executive committee, and Prof Shui Bing of the Faculty of Law as its director. 'As the only local comprehensive public university, UM has the responsibility, and is perfectly positioned, to nurture forward-looking civil servants who can think outside the box,' says Prof Hu.

Before joining UM in mid-2019, Prof Hu was the head of the Department of Politics and Public Administration at the University of Hong Kong (HKU), where he taught for nearly 22 years. In Hong Kong, Prof Hu also provided skills training courses to civil servants at the invitation of the Civil Service Bureau of the Hong Kong SAR government. He says that in both Hong Kong and Macao, civil servant training and skills development in government is too fragmented to support meaningful changes. The two cities also lack a comprehensive civil service training college comparable to those in mainland China, Singapore, the United Kingdom, and other countries and regions. Therefore, the Public Administration Training Centre at UM takes a more structured and systematic approach to providing professional and leadership skills training for civil servants in Macao.

Since September 2020, Prof Hu and his colleagues have conducted three editions of a three-month course for civil servants, who took paid time off to live and study on the UM campus. Each cohort included approximately 30 students from different



胡偉星教授與三位學者合著的《Contesting Revisionism: China, the United States, and the Transformation of International Order》在2021年7月出版

Prof Richard Hu's book *Contesting Revisionism: China, the United States, and the Transformation of International Order*, co-authored with three political scientists, was published in July 2021.

public entities. The course comprised four parts: 1) An in-depth understanding of the constitution of the People's Republic of China and the Basic Law of the Macao Special Administrative Region, which aims to enhance participants' loyalty and sense of belonging to the nation and the SAR; 2) Advanced public administration skills to help civil servants work more effectively; 3) Education in the state of the nation, especially developments and policies related to Macao and the GBA; 4) New technologies such as big data analytics and blockchain and their applications in public administration. The students also had the opportunity to exchange ideas with senior government officials, visit various local government departments, and take field trips to technology hubs in China such as Hangzhou and Shenzhen.

'I was very pleased to see the growth of the civil servants in our course,' says Prof Hu. 'Now they have a much deeper and broader understanding of how the government works and what can be improved.' He also highlights the importance of the personal networks built during the course to cross-departmental collaboration. 'Due to some rather strict restrictions on staff movement, civil servants in Macao don't usually switch their departments. Our course allows them to take a break from routine tasks to spend three months together, so that they can learn more about other departments.' says Prof Hu.

New Programmes for High-Level Professionals

Led by Prof Hu, the FSS has also launched a few new programmes in recent years, including a Doctor of Public Administration (DPA) programme, a Specialisation in Smart Governance for the Master of Science in Data Science Programme, and a Specialisation in Visual Communication for the Master of Arts in Communication Programme. He says the faculty is also working closely with well-known universities in mainland China and abroad to jointly offer undergraduate and postgraduate programmes.

At HKU, Prof Hu's Department of Politics and Public Administration launched a DPA programme in English, which was the first of its kind in the Greater China region. At UM, he played a leadership role in launching the first professional DPA programme (in Chinese) in the region. 'Our programme was specifically designed to nurture future leaders, not only for the government, but also for companies and non-governmental organisations,' says Prof Hu. 'The programme combines theory and practice and the courses take place in the evenings and on weekends. So students from Macao and neighbouring regions can complete the programme while working full-time, and they don't have to wait until they graduate to make a real difference in the workplace.'

Prof Hu adds that with the integration of data science and artificial intelligence into public administration, today's civil servants need to be more tech-savvy than ever. However, there is a lack of data skills in the local government, which is a barrier to developing a mature approach to working with or sharing data. 'Therefore, the Smart Governance Specialisation in the data science programme will provide students with vital skills in handling, analysing, and visualising data,' says Prof Hu. 'We hope they can turn large data sets into insights that can inspire better public services.'

Moreover, the FSS and the School of Public Affairs of Zhejiang University (ZJU) launched a joint research centre for smart government in July 2021. Prof Hu says that ZJU has been instrumental in the use of big data and smart governance in Zhejiang province, which is at the forefront in these areas in China. 'At the joint lab, we will explore better ways to share data with the government, support policymaking and policy evaluation with data, and apply cloud technologies to make public services simpler and more accessible to the public.'

Connecting IR Studies to GBA Development

Despite heavy administrative duties, Prof Hu has continued with his research in international relations (IR). In July 2021, his book, *Contesting Revisionism: China, the United States, and the Transformation of International Order*, co-authored with three political scientists, was published by Oxford University Press.

In this new book, Prof Hu challenges the conventional IR theory that sees rising nations as revisionists seeking to overthrow the existing international order or to clash with an existing superpower(s) (otherwise known as status-quo states). Prof Hu says many scholars and policymakers in the West believe that China fits this traditional description of a revisionist power. The new book rejects this claim with empirical evidence. By comparing the US and China's adherence to the fundamental principles and institutions of international relations, the two countries' participation in international treaties and organisations, their patterns of engagement with other countries, and their voting practices in United Nations bodies, Prof Hu and his fellow authors suggest that a rising power is not necessarily revisionist. Moreover, they argues that the US, as a status-quo power, has continued to undermine the international order which was established in the aftermath of the Second World War.

'Whether a rising power is revisionist depends on how much stake a country has in the current international order, and what benefits it stands to gain from it.' says Prof Hu. 'A lot of evidence suggests that China is a strong supporter of the international order with the UN System at its core. Under this international order, China has seen huge developments and economic gains in the past several decades. In recent years, we have also seen China's increased participation in global governance and international bodies. These facts all point to one conclusion: China is not revisionist as described in the conventional international relations theory.'

Prof Hu is also trying to connect scholarship in international relations and public administration in Macao and the GBA. As the director of the FSS Centre for the Guangdong-Hong Kong-Macao Greater Bay Area Studies, Prof Hu seeks to draw valuable lessons from international practices, especially those in the European Union, to inform further integration within the GBA.

Under the 'One Country, Two Systems' principle, Guangdong, Hong Kong, and Macao follow different economic and legal systems despite being parts of the same country. To promote the flow of goods, capital, and personnel across the GBA, Prof Hu is studying how countries in the European Union have designed and implemented practical solutions to related issues. 'These are not only research topics for IR scholars, but also important issues the governments and think tanks in the GBA should consider,' says Prof Hu.

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王慶節談哲學與人生

Wang Qingjie on Philosophy and Life

文/張愛華、資深校園記者林霞遠．圖/何杰平、部分由受訪者提供．英文翻譯/陳靜

Text / Ella Cheong, Senior UM Reporter Charlotte Lin · Photo / Jack Ho, with some provided by the interviewee · English Translation / Ruby Chen

甚麼是哲學？哲學學甚麼？學哲學的人有何特質？希望哲學在澳門這座城市有更廣泛影響力的澳大哲學與宗教學特聘教授王慶節，如何闡釋這些問題？

鑽研哲學逾40年

王慶節教授的辦公室位於人文學院四樓，方正明亮的辦公室內，電腦桌、小茶几、椅子扶手上堆滿了他正在閱讀和在工作中參閱的書籍，其中也包括他自己著述和翻譯的書籍。一面牆上掛著一幅中國哲人老子騎著青牛出關的畫。我們就在這哲味濃厚的氛圍下訪問王教授。

溫文爾雅的王教授，聊起哲學與人生卻字字鏗鏘，眼神銳利，閃著智慧的光芒。

王教授於1977年參加高考，翌年年初入讀南京大學哲學系，是文革後的第一批大學生。談及他如何開始接觸哲學，他說：「人生有很多道路，但往往不是我們有意去選擇的。用海德格爾的話來說，人往往是『被拋』到某個情境之中。我跟哲學的相遇，大概也是生命中這樣一種『被拋』的情狀。」

上大學那些年，思想解凍，大量西方哲學思潮湧入中國，產生巨大的社會影響。王慶節自小學習德文，早已閱讀一些德國哲學家的原文著作，深受哲學家思想的影響。大學畢業後，王慶節考入北京大學哲學系攻讀研究生課程，其後赴美國杜蘭大學深造哲學博士，在美國的大學留學和教學超過13年。2000年他到香港中文大學任教，2019年應聘到澳大。由考上大學至今，王教授苦心孤詣鑽研哲學逾40載，他笑說：「據說要真正進入某一領域並成為專家，至少要投入一萬個小時的時間，我應該是遠遠超過了這個數字。」

中西方哲學研究

王教授多年來，專注研究當代西方哲學，尤其是德國現象學哲學；東西方比較哲學、倫理與道德哲學等。近著有《從「親臨存在」到「自在起來」—海德格爾思想的林中迷津》(2020年)，《道德感動與儒家示範倫理學》(2016年)，《海德格爾與哲學的開端》(2015年)，《海德格爾：翻譯、理解與解釋》(2017年，合編)，《倫理、法律與中國傳統》(2019年，主編)。他也翻譯了我們這個時代最著名的哲學家海德格爾的一些哲學經典著作，包括《形而上學導論》(2017年，新譯本)，《康德與形而上學疑難》(2012年)等。也曾在上世紀80年代參與翻譯其名著《存在與時間》(1987年)和近年參與主編《海德格爾文集》(2018年，30卷)。

王慶節教授(左)在校內講座上分享哲學研究

Prof Wang Qingjie (left) gives a philosophy lecture at UM

現象學哲學是王教授研究西方哲學的起點。他近年的研究較多集中在比較哲學和東西方倫理思想傳統的比較上，譬如他在《道德感動與儒家示範倫理學》中結合了中西方道德哲學中的主要概念、原則、理論框架等，重新解釋儒家哲學的當代意義。

有學者認為，王教授提出的作為儒家倫理學之哲學基礎的「道德感動」說，對當代情感主義倫理學和儒家倫理學的開展皆具有重要的意義。王教授說：「我們在生活中會遇到各種各樣的挑戰，從中可以提煉出一些現象來做哲學的思考和討論，探索其意義。譬如中文裡『感動』這個詞語，我們經常使用，但過去很少有人把它作為一個特別的哲學範疇或哲學概念加以分析和討論，其實它在未來中國倫理學的建構中可能是一個非常重要的概念。又譬如孔子提出的『親親相隱』的道德兩難，這不僅和我們日常的道德評判和司法實踐相關，也涉及對道德形上學之本質的思考。關於這些道德兩難的哲學思考，古今中外都有。我們可以通過中西方倫理學比較研究的方式來進行探討，提出不同的解釋，這也是我研究東西方比較哲學的樂趣和意義所在。」

甚麼是哲學？

哲學(philosophy)是兩個古希臘字「愛」(philia)與「智慧」(sophia)所組成，原意就是「愛智慧」。經常有學生問王教授：哲學是甚麼？他每次都言簡意賅地回答：「哲學就是對智慧和知識的愛。一方面，哲學是追求智慧，追求所有知識的知識性基礎，這是最根本的東西，另一方面，哲學之精神更體現在這種根基性發問的『愛』之中，這種『愛』是我們人類科學批判和創新行為的最初動力。」

王教授認為哲學雖然古老，但實際是一門很貼近生活的學問。「像柏拉圖、亞里士多德、孔子、老子、釋迦牟尼這些偉大的哲學家，兩千多年過去了，他們的思想，竟然一直還有這麼多人去讀，讀了之後還能激發我們有新的思考，這本身就是個奇跡，這說

王慶節教授的部分著作

Some works by Prof Wang Qingjie

明我們今天的生活需要哲人思想，這是其有大價值的證明。我們只要想想，我們今人寫的東西，哪怕是現在非常時髦流行的東西，10年、20年之後還有多少人會去讀？這些偉大的哲學思想是我們人類文化的精華部分。當然，經過了這麼長的時間，難免會產生很多歷史、語言、文化和思想背景上的差別，使人們想要讀懂他們實在不容易，這也是我們需要哲學系的一個原因。」

王教授還指出，哲學教給人們的不僅是一門知識，更是不同的思維方式和獨立的人生態度。他說：「讀哲學的學生，在一群人中比較容易彰顯出某種特別的氣質，因為讀哲學的人思考問題會深刻一點，系統一些，講邏輯，重推論。最重要是他們往往對生活追求獨特的理解，堅持批判的立場。在我們的一生中，每個有知識的人都需要具備一些哲學的品質和素養。現在，愈來愈多的人開始明白哲學對未來生活的重要，而哲學教育正好可以為新世代年輕人提供這些能力與素質的學習和訓練。」

哲學研究團隊

王教授在2019年來到澳大任教並出任哲學與宗教學系主任，2021年起任人文學院副院長。他表示，人文學院擁有實力雄厚的國際師資團隊，在不同領域都取得過卓越的成就，「以哲學與宗教學系為例，整個師資團隊的主要研究方向聚焦在東西方比較哲學、西方哲學史、中國哲學、宗教哲學，以及社會政治哲學等。比較起周圍的哲學與宗教系科，我們的團隊聲名在外，小而精，力量比較強，中西合璧，教學經驗也非常豐富。」

澳門歷史上一直是東西方交匯的口岸和窗口，400多年前，耶穌會會士經澳門進入內地，對中西文化、科學、哲學和宗教都有交流和融合。王教授曾對孔子的西文譯名Confucius做過研究。他说：「Confucius這個譯名其實就是經澳門帶到西方國家。今天的澳門仍然起到這個重要的中西思想文化交流的橋樑作用，比較以往更多是『入口』的作用，我希望澳門哲學隨著團隊的擴大，日後能更多發揮『出口』的作用。」

王教授還希望利用大學跨學科的平台，吸引不同專業的學生修讀哲學，「希望未來10年哲學能在澳門這塊地方產生更廣泛的影響力，對我們的年輕人有更大的吸引力和感召力。」

What is philosophy? What do philosophers study? What qualities do philosophers share? In this article, Prof Wang Qingjie, head of the Department of Philosophy and Religious Studies at the University of Macau (UM), shares his answers to these questions.

Studying Philosophy for Over 40 Years

Prof Wang's office is located on the fourth floor of the Faculty of Arts and Humanities (FAH) building. Inside his office, there is a computer desk, a small end table, and several chairs weighed down with piles of books. On one wall hangs a painting of the famous Chinese philosopher Laozi riding a black-green buffalo into the west. It appears to be a perfect setting for interviewing a modern philosopher.

Prof Wang took China's national college entrance examination in 1977 and was admitted to the philosophy department of Nanjing University in early 1978, becoming a member of the first batch of university students after the Cultural Revolution. Asked about his introduction to the world of philosophy, he says, 'There are many paths in life, but often you don't choose them consciously. To borrow Heidegger's words, you are often "thrown" into the world. My introduction to philosophy is probably one of those "thrown" situations in life.'

During his university years, constraints on freedom of thought began to be lifted, and different schools of Western thought flooded into China, creating an enormous impact on society. Having studied German since his childhood, Wang began to read the original works of some German philosophers and was deeply influenced by their ideas. After graduating from college, he went on to study a postgraduate programme in the Department of Philosophy at Peking University and earned a PhD in philosophy from Tulane University in the United States later. He studied and taught philosophy in the US for more than 13 years before returning to China in 2000 to teach at the Chinese University of Hong Kong. In 2019, he joined UM. 'It is said that it takes at least 10,000 hours of learning and practice to achieve mastery in a field. I think I have far passed that mark after having spent over 40 years in the field,' says Prof Wang.

East-West Comparative Philosophy

Over the years, Prof Wang has focused on contemporary Western philosophy, particularly German phenomenology, East-West comparative philosophy, as well as ethics and moral philosophy. Books he authored or edited recently include *From Dasein to Ereignis-Heidegger's Way of Thinking* (2020); *Moral Affection and Confucian Exemplary Ethics of Virtue* (2016), *Heidegger and Beginning of Philosophy* (2015), *Heidegger: Translation, Interpretation and Understanding* (2017), and *Virtue, Law and Their Traditions in China* (2019). He has also translated some contemporary Western philosophical classics from German into Chinese, such as *A New Translation of Einfuehrung in die*

王慶節（右二）在北京大學哲學系攻讀碩究生課程

Wang Qingjie (2nd from right), with his friends at Peking University, taken when he was studying a postgraduate programme in the Department of Philosophy.

王慶節教授曾在美國留學和教學超過13年

Prof Wang Qingjie studied and taught philosophy in the US for more than 13 years

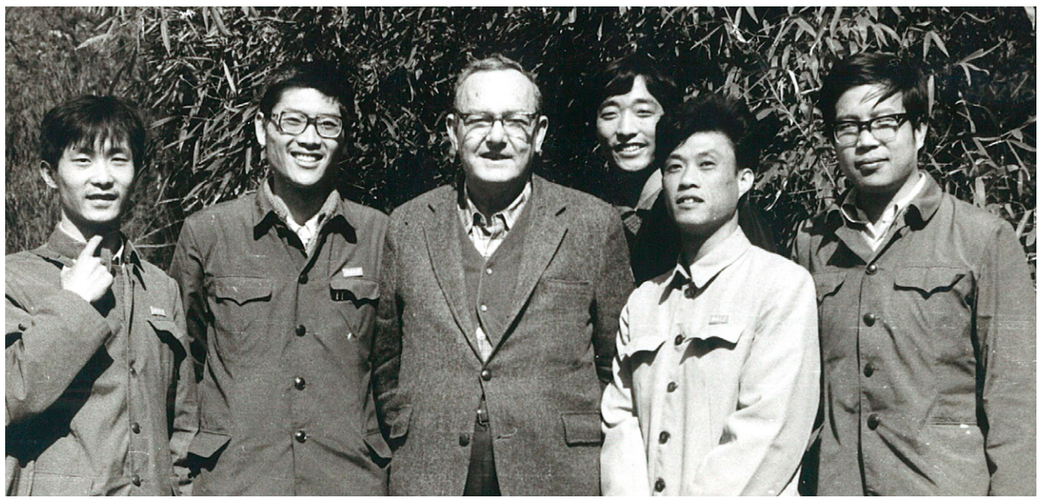
Metaphysik (2017) and *Kant und das Problem der Metaphysik* (2012). He was the co-translator of Heidegger's *Sein und Zeit* (1987). In recent years, he co-edited the Chinese version of *Major Works of Martin Heidegger* (30 volumes) (2018).

Phenomenology is the starting point in Prof Wang's study of Western philosophy. In recent years, his research has focused more on comparative philosophy and Eastern and Western theories of ethics. For example, in his book *Moral Affection and Confucian Exemplary Ethics of Virtue*, he combines the main concepts, principles, and theoretical frameworks of Chinese and Western moral philosophy to reinterpret the relevance of Confucianism to modern society.

Some scholars believe that Prof Wang's theory of 'moral affection', which serves as the philosophical foundation of Confucian ethics, is of great significance to the development of contemporary emotionalist ethics and Confucian ethics. 'In our lives, we will encounter various challenges, which we can use for discussion and explore their new philosophical meanings,' says Prof Wang. 'For example, the commonly used Chinese word "being morally moved", or "affection", has rarely been analysed or discussed philosophically, when in fact it may be a very important concept in Chinese philosophy. Another example is the moral dilemma posed by the well-known Confucius debate on "kin concealment", which not only has relevance to moral judgments and judicial practices in our daily lives, but also involves Confucius's philosophical reflection on the complexity of human moral nature. These moral dilemmas should be found in both West and East, in both ancient and modern times, and they keep driving us to think and to live more deeply and critically. We can explore them by comparing Chinese and Western moral metaphysics, and then propose different explanations, which is also why I study comparative philosophy.'

What Is Philosophy

The word 'philosophy' is made up of two ancient Greek words: '*philia*' and '*sophia*', which originally meant 'love' and 'wisdom'. Prof Wang is often asked by his students: 'What is philosophy?' He always replies, 'Philosophy as love of wisdom is not only a love of any kind of knowledge, but also a search for the foundation of all knowledge and values. More importantly, it focuses more on "love" than on "wisdom" or "knowledge". This "love" is the original motivation for scientific criticism and innovation.'



王慶節(右三)在北京大學就讀時與同學接待圖靈獎和諾貝爾經濟學獎得主赫伯特・西蒙(左三)

Wang Qingjie (3rd from right), his fellow students at Peking University and Herbert Simon (3rd from left), an influential scientist who won the Turing Award and the Nobel Prize in Economics.

According to Prof Wang, philosophy has much closer relevance to our daily lives than we realise. 'The teachings and the wisdom of those greatest philosophers, such as Confucius, Laozi, and Buddha in the East, and Plato and Aristotle in the West, are so profound,' he says. 'These old texts have existed for more than 2,000 years, and they are still widely read and never cease to inspire. This is itself a miracle, and it proves that philosophy is needed in modern life. To put it into perspective, how many texts written by contemporary author will continue to be read 10 or 20 years from now? Not too many I'm afraid, no matter how popular they are now. The teachings of those great philosophers are the gem of the collective cultural heritage of mankind. Of course, there is inevitably historical, linguistic, and cultural distance that makes them very difficult for us to learn today, and that is why we need to have a department of philosophy.'

Prof Wang says: 'Philosophy teaches not only knowledge, but more importantly, different ways of thinking and an independent attitude towards life. Students of philosophy are more likely to have qualities that make them stand out from a crowd because they are trained to think and act more rationally, creatively, critically, and reflectively. Most importantly, they tend to seek a unique and independent understanding of life itself, and they also tend to maintain critical thinking. Every educated person needs to have a certain degree of philosophical literacy. More and more people are beginning to realise the importance of philosophy to their future life, and a good education in philosophy could provide learning and necessary training for future generations in the coming new age.'

A Philosophy Team

Prof Wang joined UM in 2019 as the head of the Department of Philosophy and Religious Studies. In 2021, he took on the new role as the associate dean of the FAH. He says the FAH has a strong faculty team that has achieved excellence in a variety of fields. 'Take the Department of Philosophy and Religious Studies for example. The department mainly focuses on East-West comparative philosophy, the history of Western philosophy, Chinese philosophy, philosophy of religion, and socio-political philosophy,' says Prof Wang. 'Compared to similar departments in Macao's surrounding regions, our team is relatively small but very strong, with a good mix of Eastern and Western scholars and teaching experience.'

王慶節教授在校內講座上與學生分享哲學研究

Prof Wang Qingjie discusses philosophy with UM students

Macao has historically been a port connecting the East and the West. Over 400 years ago, the Jesuits arrived in mainland China via Macao, promoting East-West integration and interaction in culture, science, philosophy, and religion. Prof Wang researched once on the history of Western translation of Confucianism , and he told us that the name 'Confucius' was actually brought to the West through Macao. 'I hope that with the expansion of our faculty team, Macao will become more of an "exporter", rather than merely a "importer", of philosophy and philosophical ideas,' he says.

Prof Wang also hopes to encourage more students to study philosophy. He says: 'I hope that philosophy will achieve broader impacts in Macao, and will become more attractive and appealing to young people in the future.'

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新冠疫情與犯罪及其治理

The COVID-19 Pandemic and Its Effect on Crime and Its Control

文/徐建華
Chinese & English / Jianhua Xu

新冠疫情爆發至今已近兩年，疫情結束仍遙遙無期。對疫情中出現的各種社會問題的反思是廣大社會科學工作者的任務。在犯罪學界，不少學者都在積極研究疫情對於犯罪及其治理的影響。疫情初期，全球多地進行封鎖和居家隔離。封鎖限制了人類的流動，從而在很大程度上減少了人與人接觸型犯罪的發生。在整體上來說，被封鎖地區，在封鎖期間，總的犯罪率都出現了下降。而與疫情相關的一些類型的犯罪則呈現上升趨勢，比如與口罩相關的詐騙犯罪、因為居家隔離而導致家庭暴力、在一些歐美國家出現的對亞裔仇恨犯罪都有所增加。

在新冠疫情爆發初期，我和我的研究團隊就注意到一系列因疫情而導致的犯罪問題，如口罩詐騙、過度執法、疫情對整體犯罪率的影響以及歧視和仇恨犯罪。在我們進行的一系列研究中，其中一篇名為《新冠疫情下華語社會中污名、歧視與仇恨犯罪》的文章於2021年初在學術期刊《亞洲犯罪學》發表。在這個研究中，我們探討了在華語社會中出現的對不同群體的污名、歧視與仇恨犯罪等現象，並且從個體層面的心理恐懼、社會層面的種族歧視以及不同國家或地區之間的政治關係三個維度來分析引發污名、歧視以及仇恨犯罪的原因。

在研究中，我們發現在中國內地被污名與歧視的群體從最早的武漢人、湖北人逐漸轉向以非洲人為主體的外國人。而在其他國家與地區，被歧視的物件從中國人逐漸蔓延到華人和亞裔。對所有群體的歧視背後，是人們對感染病毒的恐懼。作為一種未知而缺乏有效治療手段的新式病毒，人們很擔心被感染。在這種恐懼之下，尋找一個「替罪羊」成為大眾普遍的一個心理反應。雖然這樣的做法是不對，但它確實是人類社會普遍存在的一個現象。如果未來還會有類似的瘟疫發生，某些特地的人群會可能會再次受到污名或歧視。類似的情況在人類歷史上屢次發生，很遺憾是歷史總是在重複上演。

當污名、歧視與暴力等現象發生在不同種族之間時，感染病毒的心理恐懼不再是唯一原因，而種族主義則扮演著相當重要的角色。在中國廣州出現的對短暫的對非洲人的歧視以及在美國社會持續不斷的對亞裔歧視，也都是有著種族主義借助新冠疫情再次復發的背影。在大多數社會當中，都存在著不同程度的種族主義。在正常情況下，種族主義可能不會表現得那麼明顯。但如果有特定的時間和事件觸發了它，則可能會再次出現，而新冠疫情正是這個觸發機制。

個體的歧視與仇恨犯罪往往也不是在一個真空環境中發生，不同國家與地區之間的政治與意識形態的衝突起著重要作用。在香港、台灣出現的因疫情對內地人的歧視，在美國出現的對華人和亞裔的歧視，也都有著政治和意識形態的衝突的影響。我們研究發現，在世界衛生組織將此次疫情更名為COVID-19之前，很多地區都在使用「武漢肺炎」這一含歧視性的名稱。但是，世界衛生組織更名之後，澳門幾乎沒有媒體繼續使用「武漢肺炎」這一名字，而在香港、台灣以及海外的華文媒體，即使到現在依然有媒體使用這一具有歧視性的名稱。媒體關於疫情名稱使用的背後，體現出來的是中國內地與澳門與之間相對和諧，而與香港、台灣關係相對緊張的政治關係。在美國，即使特朗普已經下台，政治因素依然影響著部分美國民眾對中國以及新冠疫情的看法。近期，拜登政府已經出台《新冠仇恨犯罪法案》(COVID-19 Hate Crimes Act)來打擊針對亞裔的暴力犯罪與歧視行為。但要解決仇恨犯罪問題可能仍有待時日，因為對於那些受著種族主義和政治意識形態影響的民眾來說，他們的仇恨情緒不過是中美之間緊張政治局勢的一種反映。

新冠疫情是二戰以來影響人類生活最重大的事件。不同的學科都在從不同的角度來探討疫情對社會生活方方面面產生的影響。犯罪學家們不但在研究疫情對犯罪本身產生的影響，也研究疫情對犯罪治理手段所產生的影響。人類愈來愈生活在一個監控和自我監控的時代，當全球都在邁向一些學者所謂之的監控資本主義的時候，新冠疫情如何加速了這一進程？為控制疫情，一些地方實施了為期不等的隔離和封鎖。一些民眾會順從，而另一些人可能會直接或間接挑戰這些措施。是甚麼因素造成不同人群的應對策略以及從中我們如何來理解國家和社會的關係？這些問題都是我和我的團隊正在進行的研究，希望有機會再次和大家分享。

Nearly two years into the COVID-19 pandemic, reflecting on the various social issues that emerged during this period remains an important task for many social scientists. Within the criminological community, many scholars are studying the impact of the epidemic on crime and its governance. At the beginning of the pandemic, lockdowns and home quarantines were imposed in many parts of the world. Most places experienced a drop in overall crime rates during periods of lockdown since human mobility was restricted, which largely reduced the incidence of physical crimes. Some types of crime associated with the outbreak, however, showed an upward trend, such as mask-related fraud, domestic violence due to home isolation, and hate crimes against Asians in some Western countries.

In the early days of the COVID-19 outbreak, my research team and I discovered many crime problems arising from the outbreak, such as mask fraud, excessive law enforcement, the impact of the outbreak on overall crime rates, and discrimination and hate crimes. One of the studies we conducted, titled 'Stigma, Discrimination, and Hate Crimes in Chinese-Speaking World amid Covid-19 Pandemic', was published in the *Asian Journal of Criminology* in early 2021.

In this study, we explored the phenomena of stigma, discrimination, and hate crimes against different groups in Chinese-speaking societies and analysed the causes from three dimensions: psychological fear at the individual level, racial discrimination at the social level, and geopolitical tensions between different countries and regions.

In our study, we found that the stigmatised and discriminated groups in mainland China gradually shifted from the people from Wuhan/Hubei in the early stages to foreigners, particularly Africans. In other areas of the world, the focus of discrimination expanded from Chinese nationals towards people of Asian descent. Behind this discrimination lies the fear of contracting this unknown and highly contagious virus, and the search for a 'scapegoat' has become a common psychological response. Although such behaviour is immoral, this phenomenon is typical of most societies. Unfortunately, history repeats itself since such patterns can be found throughout the history of civilisation. If similar plagues occur in the future, certain populations may likely be stigmatised or discriminated against again.

When stigma, discrimination, and violence occur between different races, the fear of

infection is no longer the sole motivation; racial prejudices also play a significant role. The short-lived discrimination against Africans in Guangzhou, China, and the ongoing discrimination against Asians in the United States are manifestations of resurging racism during the pandemic. Varying degrees of racial prejudices exist in most societies. Under normal circumstances, such prejudices may not be pronounced. However, racism becomes apparent if there is a specific triggering time and event, and in this case, the COVID-19 pandemic was the trigger mechanism.

Since individual discrimination and hate crimes often do not occur in a vacuum, political and ideological conflicts between countries and regions should not be neglected. The discrimination against mainland Chinese in Hong Kong and Taiwan, and against Asians in the US were fuelled by pre-existing political and ideological conflicts. We found that before the WHO officially named the virus COVID-19, the stigmatised name 'Wuhan pneumonia' was used in many regions. However, after the WHO name designation, no media in Macao used 'Wuhan pneumonia', while in Hong Kong, Taiwan, and overseas Chinese media, it is still used to this day. The labelling of the virus reflects the harmonious relations between mainland China and Macao and the relatively tense relationships with Hong Kong and Taiwan. In the US, political factors still influence the population's perception of China and the pandemic even after the Trump administration. Recently, the Biden administration has introduced the COVID-19 Hate Crimes Act to combat violent crimes and discrimination against Asians. Nonetheless, the problem of hate crimes will likely not be solved anytime soon, because the hatred motivating those offenders can be seen as a reflection of the escalating political tensions between the US and China.

The COVID-19 pandemic is the most significant global event since World War II. Different academic disciplines are assessing the impact of the pandemic on all aspects of social life from a variety of perspectives. Criminologists are not only studying the impact of the pandemic on crimes but also on the means of crime control. As humanity lives in an era of increasing surveillance and self-monitoring, how did the COVID-19 pandemic accelerate this process in a world that is moving toward what some scholars call 'surveillance capitalism'? From lockdowns to vaccinations, governments around the world have gone to great lengths to control the pandemic. Some populations will comply, while others may directly or indirectly challenge these measures. What factors contribute to the coping strategies of different populations and how did this pandemic renew our understanding of the relationship between the state and society? These are the questions my research team and I are trying to address; we hope to share more findings with you in the future.

徐建華，澳大社會學系副教授、系主任，研究興趣包括犯罪與越軌社會學、警務、被害人學、城市社會學以及澳門社會研究。

Xu Jianhua is an associate professor and head of the Department of Sociology at UM. His research interests include the sociology of crime and deviance, policing, victimology, urban sociology, and Macao studies.

在澳門推動哥德文學研究

Developing Gothic Scholarship in Macao

文 Text / Nick Groom, William Hughes
中文翻譯 Chinese Translation / 葉浩男 Davis Ip

澳門大學正在迅速成為一個研究哥德文學、藝術、電視劇和電影的國際學術中心。

哥德傳統是一個起源於17世紀英國的文學和藝術流派，某種程度上最初是一場政治運動，後來成為對歐洲一系列文化變革的回應。這些文化變革與工業化的加速和歐洲啓蒙運動所帶來的觀念革新有關。哥德小說的特色是生動傳神地描繪壯闊險峻的景觀、呈現或暗示超自然現象、以及刻劃極端的性格和情感。

澳門讀者對早期的哥德文學作品或許比較陌生，相關的著名作家包括英國的霍勒斯．沃波爾、安．拉德克利夫和馬修．路易斯。但其實很多耳熟能詳的小說和20世紀及21世紀的電視劇和電影都深受哥德小說的影響，包括瑪麗．雪萊的《科學怪人》和伯蘭．史杜克的《德古拉》。

哥德傳統也是浪漫主義運動和前拉斐爾派的先驅。浪漫主義運動中湧現的英語詩人包括威廉．華茲渥斯、塞繆爾．泰勒．柯勒律治、約翰．濟慈、珀西．比希．雪萊和拜倫勳爵。哥德傳統也深深影響了其他國家的作家，例如德國的歌德和席勒、法國的雨果和卡斯頓．勒胡（他們的作品《孤星淚》和《歌聲魅影》都被改編成歷久不衰的哥德音樂劇），以及美國作家愛倫．坡、史蒂芬．金和安妮．萊斯。不少香港、韓國、日本和菲律賓的當代電影也深受哥德傳統的影響。

我們在2020年1月加入澳大後，一直與澳大人文學院的同仁和世界各地的知名學者緊密合作，共同創建名為「UMGothic」的歌德研究網絡。2020年5月27日，我們在Zoom平台上舉行了一場線上研討會，正式啟動「UMGothic」。我們在會上討論了它的願景，特別是人文社科領域的研究如何創造性和批判性地回應環境保護主義和人類健康福祉等全球議題，針對這些主題，我們邀請澳大各領域的學者提出有興趣開展研究的方向。

其後，於2020年6月30日，我們又舉行了另一場名為「CoronaGothic」的網上會議，內容更具針對性和時效性，聚焦大規模爆發的流行病，特別是新冠肺炎疫情，以及與之相關的文化和議題。會議由社會科學學院的Tim Simpson教授主持，人文學院時任助理院長Victoria Harrison負責做會後總結。作學術報告的學者有英國布里斯托大學的David Punter、英國赫特福德大學的Samantha George、愛爾蘭都柏林三一學院的Darryl Jones、意大利基耶地-佩斯卡拉大學的Mariaconcetta Costantini、英國埃克塞特大學的Corinna Wagner和Steve Hinchliffe，以及筆者。人文學院教授Matthew Gibson提出新詞彙「CoronaGothic」，並成為會議論文集的標題，該論文集在2020年12月獲國際知名期刊《Critical Quarterly》刊載，已獲不少學術刊物引用。

繼成功舉辦「CoronaGothic」後，人文學院的盧傑教授在2020年10月31日舉辦了另一場Zoom網上會議，名為「哥德在菲律賓」，主持人是泰國曼谷朱拉隆功大學的Katarzyna Ancuta。作學術報告的學者有菲律賓大學宿霧分校的Marie Rose B. Arong、德拉薩大學的Genevieve L. Asenjo和Shirley O. Lua、馬尼拉雅典耀大學的Edgar Calabia Samar和Louie Jon A. Sanchez，和菲律賓大學迪里曼分校的Thomas Leonard Shaw，吸引了眾多國際觀眾在線收看。盧傑教授是菲律賓哥德文學研究的前沿學者，正在編輯一本該主題的文集。

2021年2月26日，UMGothic在網上舉行第四次活動，名為「哥德的未來」，由人文學院的陳時鑫教授主持。與以往三次活動不同的是，這次活動面向新興學術領域。英國曼徹斯特城市大學的Dale Townshend教授發表主題演講，隨後，與會的博士生、剛畢業的博士和新晉研究人員也紛紛發表演講，澳大博士生陳飛代表澳大做了有關哥德小說和科幻小說的演講。其他與會者還包括英國埃克塞特大學的Henry Bartholomew、英國赫爾大學的Ali Cargill、英國曼徹斯特都會大學的Maartje Weenink、英國赫特福德大學的Daisy Butcher、英國伯明翰大學的Emily Vincent、英國倫敦大學伯貝克學院的Janette Leaf、德國多特蒙德大學的Sarah Neef、英國巴斯斯巴大學的Oliver Robertson-Sivyer和英國謝菲爾德大學的Lauren Nixon。

UMGothic的第五次活動以「/Incarceration/Lockdown/」（監禁/封鎖）為題，討論新冠疫情導致的封鎖的影響，

在2021年7月3日舉行，匯聚美國、英國、歐洲其他國家和亞洲各領域的學者和研究者。出席的澳大學者有人文學院的Damian Shaw教授，會議由西安交通利物浦大學Tom Duggett教授主持，講者來自英國埃克塞特大學、英國公開大學、香港大學、馬來西亞莫納什大學、德國馬爾堡大學、丹麥奧爾胡斯大學和美國東北大學。

展望將來，我們會繼續在《今日澳大》和UMGothic的社交媒體專頁（Twitter：@UMGothic、Facebook：UMGothic）等平台宣傳相關活動。近期我們計劃舉辦關於「小說家伯蘭．史杜克的跨國影響」的專題討論會和一場關於學術出版的圓桌會議，期望支持新晉研究人員。UMGothic歡迎澳大所有學科的同仁提出有關舉行會議和研討會的建議，也期望在策劃活動、宣傳活動和提議出版項目等方面提供建議和幫助。與此同時，我們還銳意發展新的研究方向，包括分析哥德文學在澳門文化乃至粵港澳大灣區文學、電影和藝術中的地位。

The University of Macau (UM) is fast becoming an international centre for the study of the Gothic tradition in literature, art, television, and cinema.

The Gothic originated in 17th-century England, in part as a political movement, before developing as a reaction to the cultural changes associated with increasing industrialisation and the intellectual challenges of the European Enlightenment. Gothic fiction is characterised by the evocative description of sublime and menacing landscapes, by the presence or suggestion of the supernatural, and by extremes of characterisation and emotion.

Though the writings of early writers in the Gothic tradition – such as Horace Walpole, Ann Radcliffe, and Matthew Lewis – may well be unfamiliar to readers in Macao, others – such as Mary Shelley, the author of *Frankenstein*, and Bram Stoker, who wrote *Dracula* – composed novels that have undoubtedly shaped not only the fiction but also the television and cinema of the 20th and 21st centuries.

The Gothic is also an important precursor to the Romantic movement associated with Anglophone poets such as Wordsworth, Coleridge, Keats, Shelley, and Byron, the Pre-Raphaelite movement of artists and writers, and strongly influenced the works of German writers such as Goethe and Schiller, French authors including Hugo and Le Roux (both of whom have inspired enduring Gothic musicals: *Les Misérables* and *The Phantom of the Opera*), and American writers and poets from Edgar Allan Poe to Stephen King and Anne Rice. The genre has also had a significant impact upon contemporary film in Hong Kong, Korea, Japan, and the Philippines.

Since their appointment to the university in January 2020, UM professors Nick Groom and William Hughes have worked closely with colleagues within the Faculty of Arts and Humanities, and with eminent scholars across the world, in order to develop a new research network for the study of Gothic: UMGothic. UMGothic was launched with a Zoom symposium on 27 May 2020, chaired by Prof Tim Simpson (FSS), in which the aspirations of the new research network were discussed – specifically in considering how research in the humanities and social sciences can respond creatively and critically to global issues, from environmentalism to health and well-being, and to connect with other communities around the world; expressions of interest were invited from across the university.

A more substantial online conference followed this introductory event on 30 June 2020, this being a highly topical and timely consideration of the culture and issues surrounding pandemics in general and the COVID-19 outbreak in particular. Provocatively entitled 'CoronaGothic', the event was chaired by Prof Victoria Harrison, then assistant dean of the FAH. The symposium's substantial international audience engaged with presentations delivered by David Punter at the University of Bristol, Samantha George at the University of Hertfordshire, Darryl Jones at Trinity College Dublin, Mariaconcetta Costantini at Università degli studi G.D'Annunzio Chieti Pescara, Corinna Wagner and Steve Hinchliffe at the University of Exeter, as well as Nick Groom and William Hughes at UM. The neologism 'CoronaGothic' was coined by FAH professor Matthew Gibson, and became the title of the published version of the conference which appeared in a special issue of the prestigious internationally refereed journal *Critical Quarterly* in December 2020, and has already been cited in academic publications.

The success of 'CoronaGothic' led to a further online conference, organised by FAH professor Jeremy de Chavez, who drew on his specialist research into Gothic in Philippine culture. Hosted again on Zoom, 'Gothic in the Philippines' took place, appropriately enough, on Halloween – 31 October 2020 – and was chaired by Katarzyna Ancuta of Chulalongkorn University, Bangkok. Prof de Chavez was joined by Marie Rose B Arong at the University of the Philippines, Cebu, Genevieve L Asenjo and Shirley O Lua at De La Salle University, Manila, Edgar Calabia Samar and Louie Jon A Sanchez at Ateneo de Manila University, and Thomas Leonard Shaw at the University of the Philippines, Diliman. Their presentations again attracted a sizeable international audience. Prof de Chazez is currently editing an essay collection on the topic, and is at the forefront of scholarship addressing Gothic in the Philippines.

The fourth event organised by UMGothic differed from its predecessors in that it was specifically orientated towards emerging scholarship. Titled 'The Future of Gothic', it took place online on 26 February 2021, and was chaired by FAH professor Tan See Kam. Following a keynote address by Prof Dale Townshend at Manchester Metropolitan University, an international audience received presentations from a cohort of current PhD students, recent doctoral graduates, and early career researchers. UM was represented by Chen Fei, a doctoral candidate whose research embraces both Gothic and science fiction, and the other participants were Henry Bartholomew at the University of Exeter, Ali Cargill at the University of Hull, Maartje Weenink at Manchester Metropolitan University, Daisy Butcher at the University of Hertfordshire, Emily Vincent at the University of Birmingham, Janette Leaf at Birkbeck, University of London, Sarah Neef at TU Dortmund University, Oliver Robertson-Sivyer at Bath Spa University, and Lauren Nixon at the University of Sheffield.

The fifth UMGothic event took place on 3 July 2021. This event, ' / Incarceration / Lockdown / ' drew together scholars and researchers from the United States, United Kingdom, Europe, and Asia working in a variety of fields to discuss the implications of lockdowns caused by the pandemic. UM was represented by FAH professor Damian Shaw, and the symposium was chaired by Prof Tom Duggett at Xi'an Jiaotong-Liverpool University, with speakers drawn from: in the UK, the University of Exeter and the Open University; in Asia, the University of Hong Kong and Monash University Malaysia; in Europe, the University of Marburg and Aarhus University; and in the US, Northeastern University.

Details of future events will be published in Morning Express: UM Today, and updates will be available via the @UMGothic twitter feed and on the UMGothic Facebook page. In the immediate future, plans are in place for a symposium on the transnational presence of Bram Stoker, and for a roundtable on academic publishing, specifically aimed at supporting early career researchers. UMGothic welcomes conference and symposium proposals from colleagues working in any discipline within the university, and can offer advice and assistance in organising and publicising events as well as proposing works for publication. We are particularly keen on developing new research directions that consider the place of Gothic in the culture of Macao specifically, and in the literature, cinema, and arts of the Greater Bay Area more generally.

Nick Groom教授於2020年加入澳大英文系，此前是英國埃克塞特大學英文教授。他也曾在芝加哥大學和史丹福大學擔任客座教授，亦曾於布里斯托大學和牛津大學任教。Nick Groom教授至今編撰了20多本著作，包括2018年出版的《Vampire: A New History》和2012年出版的《The Gothic: A Very Short Introduction》。

Nick Groom joined UM in 2020 as a professor of literature in English. He was previously a professor of English at the University of Exeter, has held visiting professorships at the University of Chicago and Stanford University, and has also taught at the University of Bristol and the University of Oxford. He has written or edited over 20 books, including *The Vampire: A New History* (2018) and *The Gothic: A Very Short Introduction* (2012).

William Hughes教授於2020年加入澳大英文系，此前在英國巴斯斯巴大學擔任醫學人文和哥德文學教授。他是20多本書籍的作者或編輯，著作包括2019年出版的《Suicide and the Gothic》和2018年出版的《Key Concepts in the Gothic》，下一本著作《The Dome of Thought: Phrenology and the Victorian Popular Imagination》將於2022年面世。

William Hughes joined UM in 2020 as a professor of literature in English. He was previously a professor of medical humanities and Gothic literature at Bath Spa University. He is the author or editor of more than 20 books, including *Suicide and the Gothic* (2019) and *Key Concepts in the Gothic* (2018). His next book, *The Dome of Thought: Phrenology and the Victorian Popular Imagination,* will be published in 2022.


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