



澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

UM RESEARCH

澳大 研究

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校長寄語

「學科交叉、融合創新」是當前科技發展的重要趨勢，科學的突破、顛覆性的技術、複雜問題的解決常常通過不同學科的交叉融合產生。在這個背景下，澳門大學鼓勵研究者打開學科邊界，大力推進跨學科研究，通過營造在不同知識和領域探索的創新文化，為突破性發現和進步培育沃土。

學科融合的力量在於能夠匯集來自各個領域的專家，帶來思想的碰撞和交流的盛宴。這種協同作用可以激發創造力，並帶來在單一學科範圍內難以實現的突破。從生物醫學和材料學的融合來應對癌症治療的挑戰，到社會科學和腦科學技術的融合來研究社會問題，澳大的研究人員採用跨學科方法，為社會發展做出重要貢獻。

回首 2022，在中央及特區政府的大力支持、社會各界的關懷以及全體師生的共同努力下，澳門大學在研究領域取得了一系列豐碩成果。我們在國際固態電路會議（集成電路設計領域的最高級別學術會議）入選了 15 篇論文，位列世界第一；獲得科學探索獎這一重大獎項，以及作為高校牽頭承擔國家重點研發計劃項目，均為澳門首獲；我們的智能機器人和數據科學技術亦為澳門的抗疫做出了貢獻。在本期雜誌中，您將了解這些前沿的科學技術和研究背後的故事。

展望未來，澳門大學將始終面向國家和澳門所需，發揮澳大所長，以「立足澳門，共建灣區，融入國家，走向世界」為發展定位，精準聚集特色學科，著力開展前沿研究。讓我們擁抱追求卓越的創新精神，繼續突破知識的界限！

校長
宋永華



Rector's Message

“Interdisciplinary integration and innovation” has set a significant trend in the advancement of science and technology through recognising that scientific breakthroughs, disruptive technologies, and solutions to complex problems are often the result of the convergence of diverse disciplines. It is within this context that the University of Macau actively encourages researchers to transcend traditional disciplinary boundaries and embrace interdisciplinary research. By fostering an innovative culture that promotes exploration across various fields of knowledge, we aim to cultivate a fertile ground for ground-breaking discoveries and advancements.

The power of interdisciplinary integration lies in its ability to bring together experts from various fields, fostering a rich exchange of ideas, methodologies, and approaches. This synergy sparks innovation, ignites creativity, and leads to breakthroughs that would be unattainable within the confines of a single discipline. From the convergence of biomedicine and materials to address cancer treatment challenges, to the fusion of social sciences and brain science and technology to tackle societal issues, our researchers have embraced interdisciplinary approaches and made significant contributions to society.

Looking back at 2022, the University of Macau has achieved a series of fruitful research results. These accomplishments were made possible through the full support of the Central Government and the SAR Government, and all sectors of the society, and the joint efforts of academic staff and students. UM ranked the first in the world with a total of 15 papers accepted at the 70th International Solid-State Circuits Conference (ISSCC), the highest-level academic conference in the field of integrated circuit design. We were listed for the Xplorer Prize 2022 and the National Key R&D Programme, both for the first time in Macao. Our intelligent robots and data science technology also contributed to Macao's fight against the pandemic. In this issue, you will have the opportunity to delve into the cutting-edge science and technology and inspiring stories behind the research.

Looking forward, UM will continue to orient itself towards the needs of the country and Macao, and bring existing advantages into full play. Positioned as a university with firm roots in Macao, the University will actively participate in the development of the Greater Bay Area, align with national development strategy, and reach out to the world. We will concentrate our efforts on the University's distinctive disciplines and commit ourselves to cutting-edge research. Together, let us embrace the spirit of innovation driven by our pursuit of excellence, and continue to push the boundaries of knowledge!

Rector
Yonghua Song



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專題故事 科技創新

Feature Stories
Science and Technology
Innovation

微電子研究：從 0 到 1，追求卓越

From 0 to 1: Pursuing Excellence in Microelectronics Research

1992年，從澳大副校長（全球事務）、微電子研究院院長馬許願講座教授寫下科技學院的一份報告書開始，微電子研究在澳大已砥礪前行30餘年。從白手起家、籍籍無名到如今的碩果累累、全球領先，澳大的微電子研究踐行「用心一者事竟成」，保持專注並不斷突破。馬教授說：「研究正如人生，也是一趟旅程，並沒有終極目標。榮譽只是過去的勳章和前進的動力，我們的初心始終是站在世界前沿。」

Microelectronics research at UM has been forging ahead for over 30 years. In 1992, Rui Martins, Vice Rector (Global Affairs), Director and Chair Professor of the Institute of Microelectronics, presented a report for the Faculty of Science and Technology. Since then, UM has grown from a newcomer to a global leader in microelectronics research. UM remains dedicated to achieving breakthroughs and embodies the saying, "Where there is a will, there is a way". Professor Martins states, "Similar to life, research is a journey, not an ultimate goal. Honours merely serve as tokens of past achievements and as motivation to push forward. Our aim is to continuously stand at the forefront of the global stage."

ISSCC論文發表量全球第一

在素有「芯片奧林匹克大會」之稱的第70屆國際固態電路研討會（ISSCC）上，澳大共有15篇論文入選，成為全球論文發表數量第一的機構；同時，馬教授獲得1954年至2023年間ISSCC論文最高貢獻者的榮譽；此外，微電子研究院博士後研究員邵海軍獲IEEE固態電路學會頒予「博士生成就獎」，嘉許其於微電子領域上的傑出研究。

今屆ISSCC會議主題是「建立在70年的固態電路設計創新之上」，澳大提交的論文涵蓋了數據轉換、無線通訊、電源轉換、語音信號處理等多個領域，全都與物聯網、人工智能、大數據等重要新興議題有關。

「對於澳門這樣一方小土來說，這是一項意義重大的成果。我們的對手是清華大學、代爾夫特大學、三星電子、因特爾這樣的頂尖高校和企業，競爭非常激烈，但我們努力做到了世界前沿。」馬教授說。



馬許願教授和麥沛然教授獲ISSCC論文最高貢獻者榮譽

Professor Rui Martins and Professor Pui In Mak Receives the Honour of Top ISSCC Paper Contribution

科學探索獎，澳門首獲！

2022年9月，第四屆「科學探索獎」獲獎名單揭曉，澳大模擬與混合信號超大規模集成電路國家重點實驗室主任、微電子研究院副院長（研究）麥沛然教授獲獎，是澳門首位和唯一獲此殊榮的學者。

麥教授的獲獎項目為「無電池智能電子芯片」，可為國家解決大規模物聯網發展的技術瓶頸——人手換電池和電池不環保兩個問題。麥教授談到，「我們現實生活中的很多場景都佈滿了大量電子設備，而這

些電子設備都是電池驅動的，只要其中一個設備沒有電，整個系統都有可能失效，這時就需要人手去檢查和更換電池。物聯網時代，大多數場景的電子設備都是海量的，人手逐個更換電池是很難的。而無電池智能電子芯片，能夠通過採集很小的光能、動能來代替電池，在使用過程中就可以收集能量。這對於國家想要發展物聯網應用，減少電池損耗和對環境的污染，都是有意義的。」

好平台創造「小奇跡」

2010年12月，在國家科技部和澳門科學技術發展基金的支持下，澳大獲批成立模擬與混合信號超大規模集成電路國家重點實驗室。隨著2014年澳大正式遷入橫琴新校園，微電子研究也迎來了新的發展階

段。2018年，微電子研究院的成立為擴大招生規模，培養更多專業人才創造了有利條件。目前，實驗室已有20多位教學人員，超過200名碩博士研究生。麥教授說，「我們現在有這麼好的平台，可以招聘更多老



芯片測量實驗平台
IC Measurement Platform

共同努力的結果。在好的平台上面跑，效率肯定會更高。這是過去三十年發展創造出來的小奇跡。」

「第一個10年，我們可以說是白手起家，當時澳大在微電子領域籍籍無名，想要吸引頂尖的研究人員來到澳大幾乎不可能，那麼我們能做的就是努力培養本地人才，並一代一代地傳承下去。很多當年的學生，現在已經成為實驗室的教授。」馬教授說。

澳門土生土長的李家明助理教授，就是其中一個優秀代表。他在2017年以澳大「濠江學者」身份應邀到哈佛大學擔任兩年的訪問學者。期間，他與哈佛大學進行跨學科研究合作，利用先進的集成電路技術

及採用平行處理實驗樣本手段，研發出初代的小型化快速核磁共振實驗平台。回到澳大後，他在該技術上進行深入研究，他領導的研究團隊於2022年在著名國際期刊IEEE Transactions on Circuits and Systems-I: Regular Papers發表文章《小型化核磁共振系統的收發器集成電路設計方法》並成為該期刊2022年8月的亮點。這是一項在全世界引發關注的創新技術，可解決傳統核磁共振成像設備體積大、笨重、成本高的問題，在生物醫療行業應用前景廣闊。



大灣區為成果轉化賦能

粵港澳大灣區作為中國經濟發展的重要引擎和戰略支點，擁有著豐富的人才資源、完善的基礎設施和廣闊的市場空間，優良的創新生態為成果轉化提供了更多可能。目前，澳大模擬與混合信號超大規模集成電路國家重點實驗室在橫琴粵澳深度合作區（下稱「深合區」）掛牌實驗室分部並設立微電子研發中心，在深圳的河套深港科技創新合作區設立澳門大學集成電路微電子研究院，形成一個跨城市、跨體系的平台，通過發揮三地優勢，為國家人才和技術的長遠發展及大灣區協作做出貢獻。

澳大孵化企業——迪奇孚瑞生物科技有限公司就設立在與校園一牆之隔的深合區。該公司成立於2018年，在澳大「五位一體」科研成果轉化體系的支持下，將大學的創新技術成功轉化為產品。公司以數字微流控技術為核心，致力於開發精準自動化體外診斷設備，應用領域包括醫療疾病診斷、動植物病害檢測、健康指標檢測、進出口檢驗檢疫、食品安全檢測等。公司近年發展迅猛，規模已達70餘人。

科研是一場馬拉松

「做科研，你永遠無法預知結果。」談及科研，馬教授分享了他在博士期間的故事，當時導師給他佈置了一個小問題進行研究，他們都認為問題很簡單，只需要一個月就能解決。「但當我真正做研究時，我才發現並不是我們想的那樣，我花了一年的時間才提出新的思路和架構，找到解決方案。最終，我將這些成果發表在學術會議和期刊上，已經是5年之後的事。」

「做科研需要『不為繁華易初心』的信念，因為現在年輕人的選擇太多了，短平快的誘惑很多，但做科研可能是一項馬拉松，只有對知識的渴求達到極致，將科研當做一項人生追求，才有足夠的耐心去克服一個核心的小問題，這個耐心可能需要持續10年。」麥沛然教授說。



澳大研究團隊參加國際固態電路研討會
UM Research Team at ISSCC

Ranking First Worldwide in the Number of Papers Accepted at ISSCC

At the 70th International Solid-State Circuits Conference (ISSCC), known as the “Chip Olympics”, 15 papers from UM were accepted, ranking UM the first among worldwide institutions in microelectronics research. Professor Martins received the honour of being named a Top ISSCC Paper Contributor for the period between 1954 and 2023. In addition, Haijun Shao, a postdoctoral fellow of the Institute of Microelectronics, was awarded the “Doctoral Achievement Award” by the IEEE Solid-State Circuits Society in recognition of his outstanding research in the field of microelectronics.

In line with the theme of this year’s ISSCC, “Building on 70 Years of Innovation in Solid-State Circuit Design”, the

papers submitted by UM cover topics of high interest. These include data conversion, wireless communications, power conversion, and voice-signal processing, all of which are associated with emerging research areas, such as the Internet of Things, artificial intelligence, and big data.

“This is a significant achievement for a small place like Macao. Our competitors are top universities such as Tsinghua University and Delft University and companies such as Samsung Electronics and Intel. The competition is fierce, but we strive to be at the top of the world.” Professor Martins adds.

Xplorer Prize, First in Macao!

In September 2022, the list of the recipients of the Xplorer Prize 2022 was released. Professor Pui In Mak, Director of the State Key Laboratory of Analog and Mixed-Signal VLSI (UM) and Deputy Director (Research) of the Institute of Microelectronics, was among those honoured. He is the first and only scholar from Macao to receive this prize.

Professor Mak’s awarded project is titled “Battery-less Intelligent Electronic Chips,” which aims to address two key challenges in the widespread development of the Internet of Things in China: manual battery replacement and the environmental impact of batteries. Professor Mak states, “Our daily life is filled with electronic devices that rely on batteries for power. When a single device runs out of power, the entire system may stop working, requiring manual inspection and battery replacement. In the era of the Internet of Things, such scenarios are common, making manual checks and replacements highly challenging. Our battery-less intelligent electronic chips offer a solution by harnessing light energy and

kinetic energy from their surroundings during operation. This advancement has significant implications for the development of Internet of Things applications, reducing battery waste, and mitigating environmental pollution in our nation.”



麥沛然教授獲「科學探索獎」

Professor Pui In Mak Receives the Xplorer Prize

A Great Platform for Small Miracles

In December 2010, with the support from the Ministry of Science and Technology of China and the Macao Science and Technology Development Fund, UM received approval to establish the State Key Laboratory of Analog and Mixed-Signal VLSI (UM). With the official opening of UM’s new campus in Hengqin in 2014, microelectronics research at UM entered a new stage of development. The year 2018 witnessed the establishment of the Institute of Microelectronics, creating favourable conditions for expanding enrollment and nurturing more talents. Currently, the Laboratory has a team of over 20 academic

staff members and over 200 master’s and PhD students. Professor Mak states, “We now have a great platform that enables us to attract more faculty members. Chip research at UM is recognised as a distinguished field with international acclaim. It has gradually established a brand, thanks to the collective efforts of the University, faculty, and students. Working within an outstanding platform undoubtedly enhances efficiency. That’s why we have created miracles through the development in the past 30 years.”

Committed to Nurturing Local Young Talents

“During our first decade, we started from scratch. At that time, UM was unknown in the field of microelectronics, making it difficult to attract top researchers and students. Our solution was to work hard to train local talents and pass down knowledge from one generation to the next. It is gratifying to see that many students from that era are now serving as professors of the Laboratory.” affirms Professor Martins.

Assistant Professor Ka Meng Lei, a Macao native, stands as an exceptional representative. In 2017, as a Macao Fellow of UM, he was sent to Harvard University as a visiting scholar for two years. During his time there, he collaborated with researchers at Harvard University on an interdisciplinary research project focused on developing a parallel nuclear magnetic resonance (NMR) platform

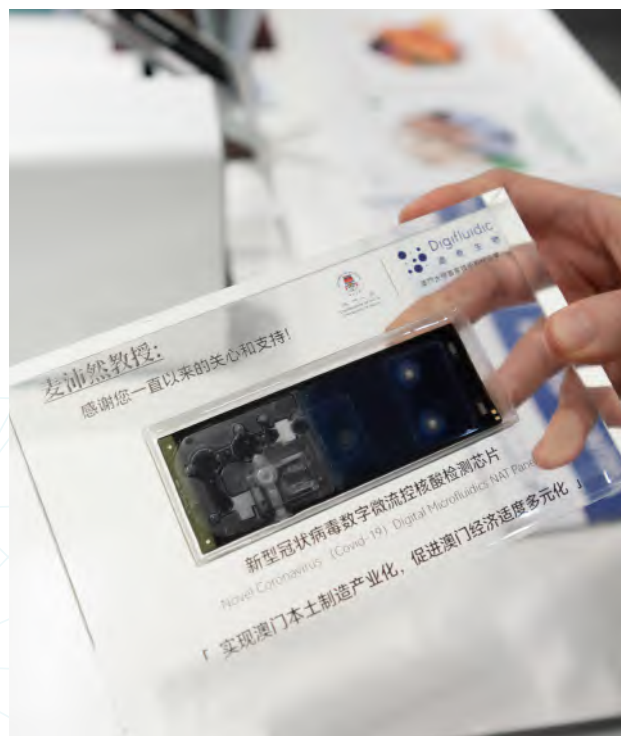
that integrated advanced microfluidic, magnetic-sensing, and integrated circuits technologies. Since his return to UM, he has conducted intensive research on this technology. His research team published the paper titled “Miniaturization of a Nuclear Magnetic Resonance System: Architecture and Design Considerations of Transceiver Integrated Circuits”. The paper was published by the renowned international journal IEEE Transactions on Circuits and Systems–I: Regular Papers (IEEE TCAS-I) and selected as a highlighted paper of the journal in August 2022. This innovative technology has garnered global attention as a potential solution to the challenges posed by large, bulky, and expensive conventional MRI devices. It offers promising applications in the biomedical industry.

Empowering Research Translation in the Greater Bay Area

The Guangdong-Hong Kong-Macao Greater Bay Area (GBA) is a significant engine and strategic pivot for China's economic development. It boasts abundant talent resources, comprehensive infrastructure, and massive market opportunities. The thriving innovation ecosystem within the region opens up new possibilities for translating research outcomes into practical applications. In line with this, the State Key Laboratory of Analog and Mixed-Signal VLSI (UM) has established a branch and an R&D Centre in the Guangdong-Macao In-Depth Cooperation Zone in Hengqin (the Hengqin Cooperation Zone). Additionally, the Institute of Microelectronics for Integrated Circuits of the University of Macau has been established in the Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone in Hetao. These initiatives create a cross-city and cross-system platform that leverages the strengths of the three regions. It will contribute to the long-term development of national talent and technology and foster collaboration within the GBA.

Digifluidic Biotech Ltd., a spinoff company of UM, was established in 2018 in the Hengqin Cooperation Zone. With the support from the University's “5 in 1” research results translation system, the company has successfully translated UM's innovative technologies into products. Digifluidic's core technology is digital microfluidics, and its main product is an automatic nucleic acid analysis system. The company is committed to developing precise automatic in vitro diagnostic equipment for use in fields such as medical disease diagnosis, animal and plant

disease detection, health index detection, import/export inspection and quarantine, and food safety detection. Over the years, the company has experienced rapid growth and currently employs more than 70 members.



新型冠状病毒数字微流控核酸检测芯片
Covid-19 Digital Microfluidics NAT Panel

Scientific Research: A Marathon

“You can never predict the outcomes of research,” says Professor Martins when discussing his work. He shared a story from his doctoral studies when his supervisor assigned him a problem to investigate. Initially, they believed it was a simple matter that could be resolved within a month. “However, as I delved into the research, I discovered that it was not as I had anticipated. It actually took me a year to develop new ideas, structures, and solutions. Eventually, it was five years later when I presented the findings at an academic conference and published them in a journal.”

“The pursuit of research demands that we remain true to our original aspirations,” states Professor Mak. “In today’s society, young people are faced with numerous choices and temptations for quick and effortless gains. Yet, research is akin to a marathon. Only when one’s thirst for knowledge is at its pinnacle and they view research as a lifelong pursuit can they possess the necessary patience to overcome a small but core obstacle in the long run, which could span over a decade or longer.”



馬許願教授
Professor Rui Martins

創新技術服務澳門

Innovative Technologies Serving the Macao Community

智能機器人技術近年發展迅猛，在生產、生活、教育、醫療、金融等各個領域為人類提供全方位的幫助和服務，目前已成為人類社會中不可或缺的一部分。澳大科技學院徐青松教授十多年來帶領團隊研發創新智能機器人，服務民生和社會。

Intelligent robot technology has experienced significant advancements in recent years, offering a wide range of assistance and services in areas including manufacture, daily life, education, healthcare, and finance. It has become an indispensable component of human society. Professor Qingsong Xu, from the Faculty of Science and Technology at UM, has led a team for over a decade in the development of intelligent robots to serve individuals and society.



澳門大學科技學院

The Faculty of Science and Technology of UM

「消毒智多星」——為公眾健康保駕護航

2020年新冠疫情洶湧襲來，面對疫情壓力，澳門公共場所的消毒只能依靠人力這種傳統方式解決，加重了感染風險。徐青松教授帶領團隊研發專用於公共場所消毒的智能機器人——「消毒智多星」，以降低市民在公

共場所的染疫風險，為公眾健康保駕護航。該款機器人從零件、程式、外觀設計到組裝，全部由研究團隊一手包辦，能夠有效控制成本，並申請多個相關專利，項目亦獲得澳門科學技術發展基金的專項支持。

疫情期間，「消毒智多星」投放在包括核酸檢測站、酒店、醫院、口岸設施、政府辦公室、學校設施、社區中心等人流密集的多個場所，提供義務消毒服務，助力抗疫，服務社群。徐教授表示，「消毒智多星」能夠快速地全方位消毒和自主避障，目前已從1.0版本迭代到4.0版本，可做到10分鐘消毒100平方米的空間，消毒殺菌效果達到99%。通過產學研合作，澳大已成功將該項技術實現產業化，並廣泛應用，造福社會。



消毒智多星在2022年9月舉辦的第8屆澳門工展會承擔消毒滅菌工作
A Smart Cleaner Took over the Disinfection and Sterilization Work at the 8th Macau Industrial Products Show in September 2022

大數據、物聯網、人工智能被稱為構建智能世界的技術金字塔。數據已經成為推動社會發展的重要資源。近年，澳門大學制定了「3+3+3+3」的科研戰略佈局，將數據科學列為大學的跨學科交叉領域之一，並成立數據科學研究中心。通過推進數據科學的發展，促進各領域之間的交流和合作，實現更多的跨學科融合，推動社會的發展和進步。

Big Data, the Internet of Things (IoT), and Artificial Intelligence (AI) are often referred to as the technology pyramids for building an intelligent world. Data has become a vital resource for driving social development. In recent years, UM has formulated a “3 + 3 + 3 + 3” research strategic layout, with data science being one of the University’s interdisciplinary areas. The establishment of the Centre for Data Science aims to advance the field of data science, foster collaboration and knowledge sharing among diverse disciplines, encourage interdisciplinary integration, and contribute to societal development and advancement.

助力澳門數字化疫情防控

2022年6月，澳門爆發新一輪疫情，為建設數字化防疫體系，澳大研究團隊和澳門衛生局開展合作，研發出「新冠疫情熱點分析系統」。為加快疫情防控，澳大研究團隊與病毒賽跑，在短短兩週內研發出此系統，這背後是澳大研究團隊日以繼夜的努力。該系統使公眾能夠獲得實時的疫情訊息，並進行熱點分析和計算作為個人風險評估的參考。

該系統中的熱點計算核心算法是由澳門大學智慧城市物聯網國家重點實驗室參與研發的全世界最快的熱點計算技術 (LibKDV) 支撐。這一系統不僅向民眾提供獲知和主動報告疫情資訊的渠道，而且還降低政府防疫資訊成本並且極大提高防疫效率。

新冠疫情熱點分析系統

談及此系統的建立緣由，科技學院副教授、數據科學研究中心主任余亮豪表示：「疫情比較嚴重的時候，公眾對於疫情是非常緊張的，市民可能知道疫情非常嚴峻但是不知道病例的分佈情況以及每個地方的

嚴重程度，因此我們就想，可不可以用我們的技術給市民畫地圖來顯示每個區域的嚴重程度，讓市民知道各個區域的現時狀況。」

“Smart Cleaners” - Safeguarding Public Health

With the emergence of the Covid-19 pandemic in 2020, the risk of infection increased as the conventional approach to disinfecting public areas in Macao has been relying heavily on human labour. This has triggered Professor Qingsong Xu and his team to take the lead in developing an intelligent robot named “Smart Cleaner” to mitigate the risk of infection in public space and safeguard community wellness. The team handled all aspects of the robot’s development, including component design, programming, module creation, appearance design, and assembly, resulting in cost-effective production. The project has received dedicated support from the Macao Science and Technology Development Fund and obtained a number of patents.

During the pandemic, “Smart Cleaner” played a pivotal role in crowded locations, including nucleic acid testing stations, hotels, hospitals, port facilities, government offices, school premises and community centres. Voluntary disinfection service was provided, aiding in the battle against the outbreak and serving the community. Professor Xu emphasised that “Smart Cleaner” boasts comprehensive disinfection capabilities and obstacle avoidance technology. Evolving from version 1.0 to version 4.0, it can disinfect 100 m² of space within 10 minutes, achieving a remarkable 99% rate of disinfection and sterilization. Through industry-university-research collaboration, the University has successfully achieved technology translation and widely implemented it for the benefit of society.



徐青松教授研究團隊與「消毒智多星」
Professor Qingsong Xu and His Team with "Smart Cleaner"

Boosting Macao's Efforts in Covid-19 Outbreak Prevention and Control

In June 2022, Macao experienced a new round of outbreak of pandemic. To build a digital pandemic prevention system, a research team of UM and Macau Health Bureau collaborated to develop the “Macao COVID-19 HotSpot Map”. As a result of UM research team’s relentless efforts, the system was developed in just two weeks in a race

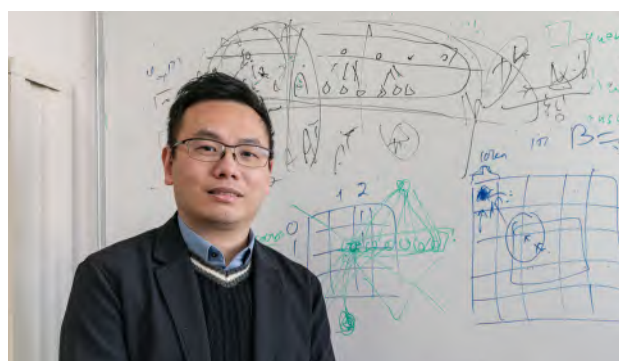
against the virus to speed up the prevention and control of the pandemic. The map enables the public to access real-time pandemic information of Macao, allowing for hotspot analysis and calculation as a reference for individual risk assessment.

The system's hotspot computing core algorithm is supported by the world's fastest hotspot computing technology (LibKDV), with the State Key Laboratory of Internet of Things for Smart City of UM as one of the collaborators. This system not only offers

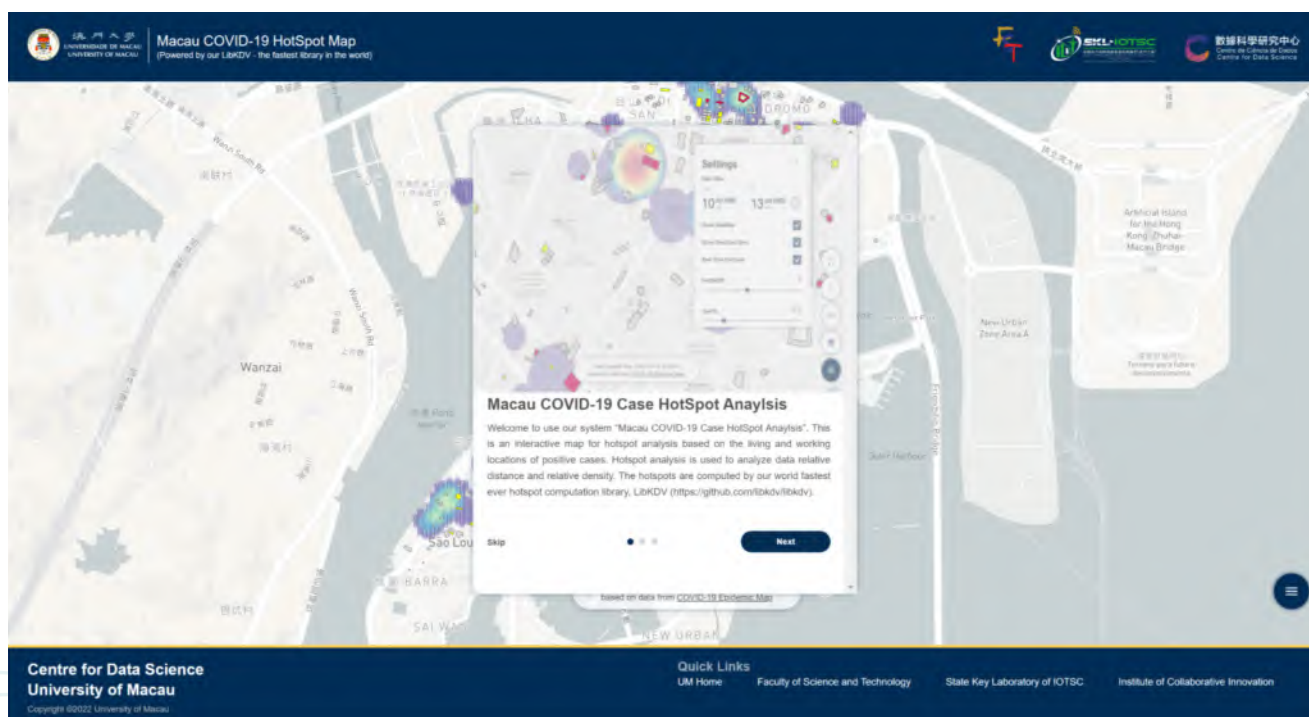
the public a platform to stay informed and report pandemic information proactively but also reduces the government's cost of disseminating pandemic information and significantly enhances pandemic prevention efficiency.

Macau COVID-19 HotSpot Map

Regarding the establishment of this system, Leong Hou U, an Associate Professor of Faculty of Science and Technology and the Director of the Centre for Data Science, affirms, "The public has shown great concern regarding the pandemic situation. However, while they may be aware of the severity of the pandemic, they often lacked information about the case distribution and severity level in different areas. Therefore, we thought of utilising our technology to develop an accessible map that would indicate the severity levels in each region. This way, the public would be able to gain an instant and clear understanding of the current situation across various areas."



余亮豪教授
Professor Leong Hou U



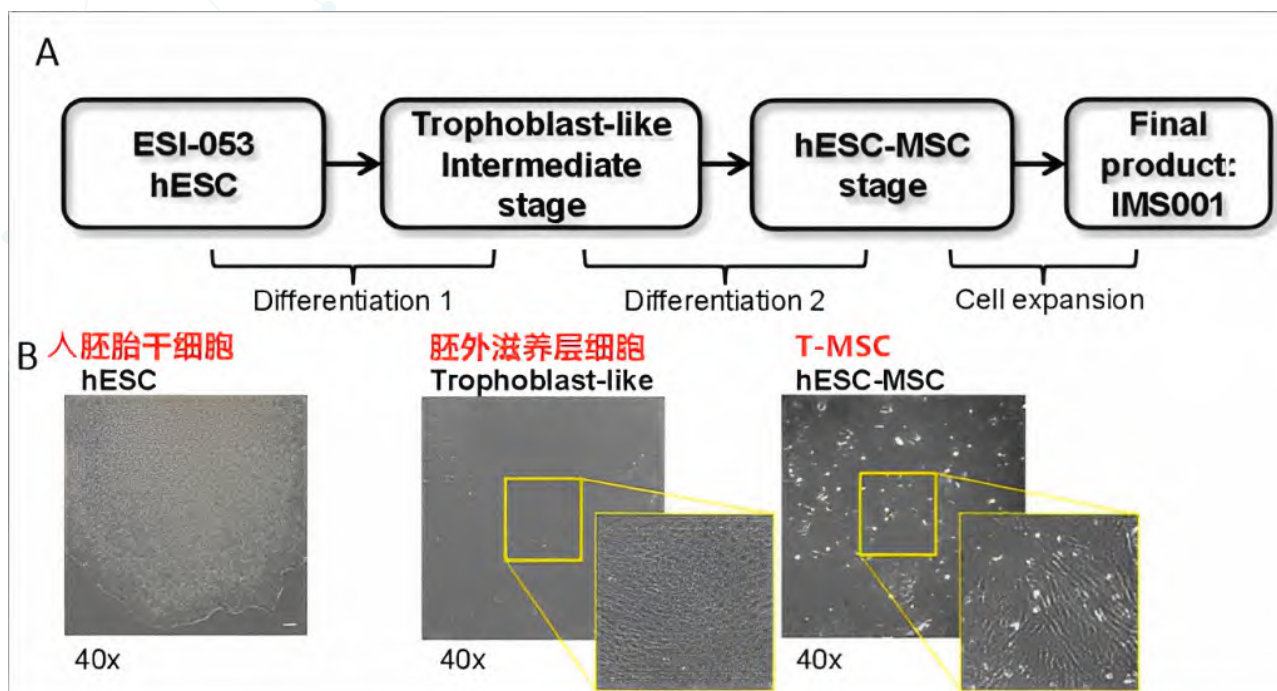
新冠疫情熱點分析系統
Macau COVID-19 HotSpot Map

推動幹細胞成藥的技術評價體系建設

Establishing an Assessment System for Stem Cell-Based Medication

幹細胞是生命和健康的種子細胞，可以千變萬化，被形象地比喻為「孫悟空」。近年來，幹細胞治療技術在全球快速發展。幹細胞在癌症治療、器官移植、皮膚美容等多個領域都具有極大的發展潛力和臨床應用價值，已成為生命科學領域的重要方向之一，受到業界的廣泛關注。2022年，澳門大學健康科學學院副院長（研究）、特聘教授兼項目首席科學家徐仁和申報的項目獲國家重點研發計劃「幹細胞研究與器官修復」立項資助。這是澳門首個獲批的由澳門高校牽頭承擔的國家重點研發計劃項目。此項目將推進國家幹細胞成藥的標準化和規範化，項目成果有利於中國幹細胞產業的長期健康發展，提升中國在幹細胞治療領域的水準和國際競爭力。

Stem cells are often known as the “seed cells” of life and health because of their ability to transform into various cell types. They are often compared to the “Monkey King”. In recent years, stem cell therapy technology has experienced rapid global development, with significant potential for advancement and clinical applications in various fields such as cancer treatment, organ transplantation, and skincare. As a result, it has emerged as a key focus in the life sciences sector and garnered extensive attention from that industry. In 2022, a project proposed by Renhe Xu, Associate Dean (Research) and Distinguished Professor of the Faculty of Health Sciences (FHS), received funding from the National Key Research and Development Programme for “Stem Cell Research and Organ Repair”. This project marks the first initiative led by a higher education institution from Macao that has been listed in the National Key Research and Development Programme. The research outcomes will contribute to the standardisation and regulation of stem cell-based therapeutic approaches, promoting the long-term and healthy growth of the stem cell industry in China. Additionally, it will enhance China’s capabilities and international competitiveness in this field.



T-MSC 是由人胚幹細胞經滋養層細胞中間體定向分化而來

T-MSC Differentiation from hESC via Trophoblast-like Cells

具備顯著成藥性的 T-MSC 獨特技術

間充質幹細胞（MSC）是一種多能幹細胞，具有自我更新和多向分化能力。由於其再生能力和免疫調節特性，多種功能和潛在的治療價值而引起公眾和學術界的廣泛關注。

徐教授團隊創造性地開發了由人胚幹細胞經胚外滋養層細胞分化為間充質幹細胞（T-MSC）的技術。徐教授指出，傳統上，都是從臍帶、胎盤、骨髓、脂肪甚至牙髓得到MSC，依賴於捐獻。也就是說，

捐獻後用完就沒了，所以不容易成藥。而我們開發的T-MSC，因其上游的人胚幹細胞可以無限增殖和分化，具備源源不斷的量產能力，且容易質控。這意味着T-MSC幹細胞具備較高的成藥性，可為疾病治療持續提供質量穩定的幹細胞藥物，解決了成體MSC難以成藥的難題。據此，徐教授和投資人在美國康乃狄克州和中國橫琴聯合成立了愛姆斯坦生物科技公司，推進T-MSC的臨床應用。

二十餘年專注研究幹細胞

幹細胞研究被認為始於1960年代，由加拿大多倫多大學的Ernest McCulloch和James Till最早證實了體內幹細胞的存在。1998年，美國威斯康辛大學的James Thomson教授，首次從人類早期胚胎建立了人胚幹細胞株。這種多能幹細胞可以源源不斷地分化成人體各種組織和細胞，被稱為醫學上的重大突破，成為「再生醫學」的里程碑。徐教授於1999年加入Thomson教授團隊，是威斯康辛大學WiCell 研究所的最早研究人員。2014年，徐仁和教授加入澳大，深化他對MSC基礎和應用研究的探索。

專注幹細胞研究20餘年，徐教授在幹細胞領域取得了多項重大突破。他是人胚幹細胞無動物成分培養技術的最早發明者。他還發明了常溫儲運幹細胞的新技術，此技術能令幹細胞在常溫下儲存7天以上而不失生物活性，打破傳統局限，開啓了幹細胞常溫儲運的新篇章。此外，他還發明了T-MSC治療多發性硬化症和促進脂肪移植、T-MSC球軟膏治療皮膚創傷如糖尿病足等技術。



幹細胞球儲存容器

The Vessel Used to Store Stem Cells in Spheroids

澳門首獲國家重點研發計劃立項

2022年，徐仁和教授申報的項目「間充質幹細胞治療移植宿主病等重大疾病的監管和評價的技術體系研究」獲國家重點研發計劃「幹細胞研究與

器官修復」立項資助。這是澳門首個獲批的由澳門高校牽頭承擔的國家重點研發計劃項目。該項目由澳大牽頭，與中科院廣州生物醫藥與健康研究院、中山大

學、上海泰楚生物科技有限公司、上海科技大學和南方醫科大學南方醫院的研究團隊聯合申報。項目聚焦不同來源的MSC，包括由人胚幹細胞分化而成的T-MSC和人類捐獻的骨髓MSC，治療移植物抗宿主病和膝骨關節炎等重大疾病，建立其基礎、非臨床和臨床研究的監管和技術評價體系。

徐教授坦言，「在幹細胞治療領域最大的挑戰是，不同於化學藥，細胞藥是一個活的藥物，時刻在發生變化，所以質量波動很大，影響因素也很多，故很難保證細胞藥質量的一致性，也缺少非臨床和臨床應用的系統技術標準，增加了治療標準化和監管的難度。我們在前期對MSC的質控和應用有多年的研究，積累了許多經驗，為我們團隊贏得這個國家重點項目奠定了重要基礎。」



徐仁和教授
Professor Renhe Xu

讓再生醫學的研究陣容更強大

談及自己的實驗室，徐教授十分興奮。他稱其為「事業之家」和「夢想之家」，沒有這個「家」，就不會產生令人自豪的科研進展，也難以培養新一代的年輕科學家。他期待澳大能招聘更多幹細胞和再生醫學專家、教授，讓該領域的力量更加強大，成為大灣區的一個再生醫學創新高地。徐教授於2019年牽頭成立了澳門幹細胞研究協會（MSSCR），旨在提升澳門幹細胞研究人員的交流和影響力，促進大灣區幹細胞研究的發展，增加大眾對再生醫學的了解。2022年，澳大健康科學學院聯合該協會，舉辦了「第一屆粵港澳大灣區轉化醫學國際會議暨第四屆澳門幹細胞研討

會」。研討會以線上結合線下形式舉行，吸引了400多名來自美國、新加坡、內地和澳門的著名學者、生物醫學專家、業界人士、科研人員及學生參與，就轉化醫學及幹細胞研究的前沿進展及臨床應用展開深入討論。

徐仁和教授表示：「我們取得的成果離不開國家科技部、自然科學基金、澳門科學技術發展基金、橫琴粵澳深度合作區和澳大長期以來的大力支持。我們有信心按質按量地完成國家的重點研發項目，讓幹細胞研究成果盡快向臨床推進，解決一些重要疾病治療的難點和痛點，真正惠及病人。」

T-MSC, Stem Cells with Significant Druggability

Mesenchymal stem cells (MSC) are multipotent stem cells that can self-renew and differentiate into multiple cell types. Their regenerative and immunomodulatory properties, along with their diverse functions and therapeutic potential, have garnered significant attention from the public and academia.

Professor Xu and his team have innovatively developed a technique for deriving MSC from human embryonic stem cells (hESC) via trophoblast-like cells into pluripotent stem cells (T-MSC). Traditionally, MSC are obtained from

sources such as umbilical cords, placentas, bone marrow, fat, and even dental pulp. However, these sources rely on donations, making it challenging to have a sufficient supply for drug manufacture. In contrast, T-MSC, derived from hESC have infinite proliferation and differentiation capabilities, allowing for controllable quality and mass production. This means that T-MSC have a high potential for druggability, providing a stable supply of stem cell-based medications for disease treatments. This breakthrough overcomes the barriers associated with

the difficulty of developing somatic MSC into medicine. As a result, Professor Xu and investors jointly established Emstein Biotechnology Co., Ltd in Connecticut, USA and

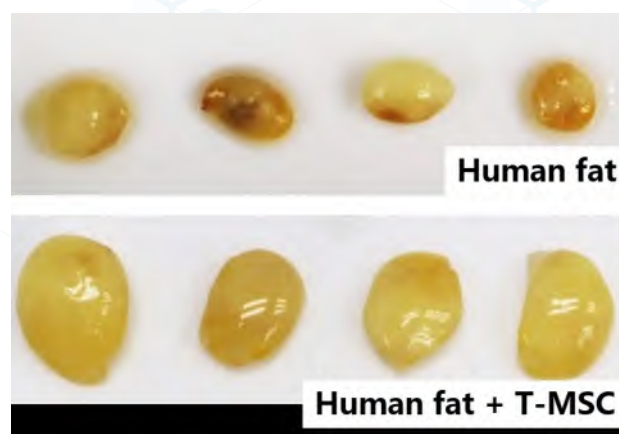
Hengqin, China, to promote the clinical application of T-MSC.

Over 20 Years of Stem Cell Research

Stem cell research is considered to have begun in the 1960s, when Ernest McCulloch and James Till of the University of Toronto in Canada first demonstrated the existence of multipotent stem cells. In 1998, Professor James Thomson from the University of Wisconsin in the United States successfully cultivated stem cell lines from early human embryos for the first time. This kind of pluripotent stem cells can continuously differentiate into various tissues and cells of the human body. It was a groundbreaking achievement in medical history and a milestone in “regenerative medicine”. Professor Xu, who joined Professor Thomson's research group in 1999, played a crucial role as an early researcher at the WiCell Institute based at the University of Wisconsin. In 2014, Professor Xu joined UM to embark on a deeper exploration of basic and applied research in MSC.

With over 20 years of dedicated focus on stem cell research, Professor Xu has achieved a number of significant breakthroughs in the field. Notably, he is credited as the pioneer of the animal-ingredients-free culture technique for embryonic stem cells. Furthermore, he has developed a revolutionary technology for storing and transporting stem cells under ambient conditions.

This innovation enables stem cells to be viably stored for over 7 days, surpassing traditional limitations and ushering in a new era of human stem cell storage and transportation. Additionally, Professor Xu has invented applications of T-MSC for treating multiple sclerosis, promoting fat engraftment, and using T-MSC spheres for treating skin wounds such as diabetic foot ulcers.



MSC提高脂肪移植後的存活率
The Use of MSCs Enhances Fat Engraftment

The First Project from Macao listed in National Key R&D Programme

In 2022, Professor Xu's project titled “Study of Technical Systems for the Monitoring and Assessment of the Treatment of Graft Versus Host Disease and Some Other Important Diseases with Mesenchymal Stem Cells” was funded by the National Key R&D Programme “Stem Cell Research and Organ Repair”. It was the first project led by a higher education institution from Macao that has been listed in the National Key R&D Programme. The project was jointly submitted by researchers from the Guangzhou Institutes of Biomedicine and Health of the Chinese Academy of Sciences, Sun Yat-sen University, Shanghai Taichu Biotechnology Company Limited, ShanghaiTech University, and Nanfang Hospital of Southern Medical University. The project focuses on MSC from different sources, including those differentiated from human T-MSC and those isolated from human bone marrow via donation, for treating diseases such as graft-versus-host diseases and knee osteoarthritis. It also aims to establish

monitoring and assessment systems for basic research as well as clinical and non-clinical research on MSC.

Professor Xu adds, “The greatest challenge in the field of stem cell therapy lies in ensuring consistent cell quality and establishing standardized clinical application guidelines. Currently, there are no universally recognised regulations in place. Stem cell therapy is subject to stringent regulation by the government, as opposed to traditional medicine where chemical drugs play a significant role and their quality is relatively stable. Stem cells, on the other hand, represent a ‘living’ medicine that is constantly evolving, making their management highly complex. Based on our extensive experience in stem cell research, we are able to promote the adoption of our technical evaluation system as a guiding standard for the utilisation and control of stem cells.”

Strengthening the Research Lineup in Regenerative Medicine

Professor Xu expresses great enthusiasm when talking about his laboratory, referring to it as his "career home" and "dream home". Without the "home", there would be no excellent research progress, and it would be difficult to train a new generation of young scientists. He hopes UM would recruit more experts and professors in stem cell and regenerative medicine, so as to strengthening research in the field and make UM a regenerative medicine innovation hub in the Greater Bay Area. In line with this vision, he has taken the lead in establishing the Macau Society for Stem Cell Research (MSSCR), which aims to promote the exchange and influence of researchers in Macao and facilitate development of stem cell research within the Greater Bay Area. In 2022, the Faculty of Health Sciences jointly organised the First Guangdong-Hong Kong-Macao Greater Bay Area International Conference on Translational Medicine and the Fourth Macao Stem Cell Symposium with MSSCR. This event attracted over 400 participants, including renowned scholars,

biomedical experts, industry practitioners, researchers, and students from various regions, combining online and offline meetings. During the event, attendees engaged in discussions regarding the latest advancements in translational medicine, stem cell research, and the clinical application of research findings in these domains.

Professor Xu affirms, "The outputs we obtained benefit from the continuous support provided by the Ministry of Science and Technology, the Macao Science and Technology Development Fund, the Hengqin Guangdong-Macao In-Depth Cooperation Zone, and UM. We are confident that we can complete the National Key R&D programme in accordance with both quality and quantity, so that the results of stem cell research can be applied to the clinics as soon as possible. This will help solve problems in treating important diseases, ultimately benefiting patients."



徐仁和教授和研究團隊

Professor Renhe Xu and his research team

益智素：將中藥推向國際

UM-ND-1: Bringing Chinese Medicine to the World

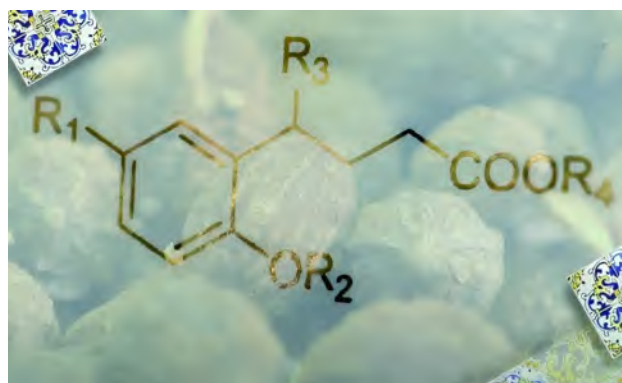
澳門大學中華醫藥研究院副院長李銘源教授及團隊歷時十餘年，自主研發帕金森氏症的全新分子「益智素（UM-ND-1）」。這種源於「四大南藥」益智仁（*Alpiniae Oxyphyllae Fructus*）中的全新化學成分為緩解帕金森氏症病情進展和改善早晚期帕金森氏症帶來了新的思路。該項目獲得澳門科學技術發展基金企業創新研發資助及重點研發專項資助。2014年，在時任葡國總統席爾瓦（Aníbal Cavaco Silva）和時任澳門特區政府社會文化司司長張裕的見證下，澳大與葡萄牙的生物製藥公司TechnoPhage簽署合作協議，正式展開中醫藥方面的合作，並就「益智素」研發達成合作協議。同時，團隊開發不同成分、劑型的藥品和保健品，將成為由中藥的單體化合物開發為國際膳食補充劑的首例，也將是抗神經退行性疾病藥物開發的重要突破。

Professor Ming Yuen Lee, Associate Dean of the Institute of Chinese Medical Sciences, and his team have dedicated over 10 years to the development of a novel molecule, "UM-ND-1", for Parkinson's disease. This innovative compound, derived from *Alpiniae oxyphyllae Fructus*, one of the "Four Great Traditional Medicines in Southern China", offers promising prospects for alleviating the progression and symptoms of Parkinson's disease in both early and late stages. In 2014, in the presence of the then Portuguese President, Aníbal Cavaco Silva, and the then Secretary for Social Affairs and Culture of the Macao SAR, Cheong U, UM entered into a collaboration agreement with a Portuguese biopharmaceutical company, TechnoPhage, to officially commence joint R&D of "UM-ND-1". The team is also working on the development of pharmaceuticals and nutraceuticals utilising different ingredients and dosage forms. This result marks the first instance of transforming a monomeric compound from Chinese medicine into an international dietary supplement, representing a significant breakthrough in the field of neurodegenerative disease therapeutics.

傳統中藥「益智仁」引關注

益智仁是中國「四大南藥」之一。古時益智仁也被稱為「狀元果」，藥如其名，益智仁不僅可抗衰老、抗氧化、降糖，在神經保護和認知改善方面效果突出。李教授團隊歷時十餘年，通過現代科學的方法，如用「靶標」細胞和動物做系統篩選，從益智仁中提取全新的化學成分，並將其命名為「益智素」。

「益智素」的發現與提取為中藥現代化和創新中藥研發提供了新思路。談及研究歷程，李教授坦言，當時與許多中醫師一起探討與老年疾病治療相關的中藥材，並從二十多種中藥中選出益智仁並提取出益智素，實屬不易。



益智素
UM-ND-1

有效預防及改善帕金森氏症

帕金森氏症作為全球第二大慢性神經退化疾病，全球患病人數超過700萬，中國有超過300萬帕金森氏症患者，佔全球帕金森氏症患者近50%，居世界第一。當前，市場上未有預防和抑制帕金森氏症效果理想的健康產品或藥物。帕金森氏症是影響中樞神經系統的慢性神經退化疾病，患者表現為運動功能減弱、步態異常、肢體僵硬和失智等。帕金森氏症目前無法治愈，初期症狀常用L-多巴治療。隨著病情惡化，神經元持續流失，隨之藥物劑量增加，但藥量增加也會帶來副作用。而對於藥物無效的嚴重患者，還要考慮更深層次的手術治療。這些治療給患者本身帶來更大的痛苦。

李教授及其團隊提取出的全新結構小分子「益智素」，在研發階段的動物實驗數據顯示出良好的神經保護效果，可抑制神經元細胞的缺失或死亡，減少多

巴胺的降低，有效緩解帕金森氏症病情進展和改善早期帕金森氏症。研究結果引起世界各地研發機構的關注，並被媒體廣泛報導。



益智仁和益智素相關產品

Alpiniae Oxyphyllae Fructus and UM-ND-1 Related Products

將中藥成果推向國際化

談及與葡萄牙主力藥物生產公司 TechnoPhage 的合作，李教授說，「其實在益智素項目合作之前，我和他們已經有合作。他們看到我們發表的一篇文章，於是來向我們諮詢相關的技術問題。之後，公司隨當時的葡國總統訪澳，我們又有了進一步的接洽，最終促成了益智素的合作。」

目前，澳大的「益智素」已獲批歐美、日本和中國的多項專利，並且已完成益智素新藥申請中的活性藥物成分（API）的工藝生產及化學成分生產和控制（CMC），正在推進益智素中美兩國新藥臨床實驗

申請（IND）。同時，團隊已完成益智仁膳食補充劑膠囊的 GMP 生產，已獲批美國食品藥品監督管理局（FDA）新膳食成分（NDI）許可，正推進益智仁膳食補充劑膠囊的全球市場推廣。

澳大「益智素」從基礎研究到成果轉化，離不開澳門特區政府與澳門科學技術發展基金的大力支持。澳門搭建了與葡語系國家的友好交流合作平台，對推動澳門乃至大灣區中醫藥成果的現代化與國際化起到了關鍵作用。

年輕人應走出「舒適圈」

李銘源教授既是卓越的科學家，又是深受學生尊敬愛戴的老師，同時在產學研合作也取得了突出的成果。談及如何平衡平常的忙碌生活，他向我們分享了他的人生哲學——吃好睡好多做運動，並專注在最重要的事情上。他也分享了他在學生時期曾參加10年壁球聯賽的經

歷。他表示，比起贏得比賽，在球場上處於劣勢時的拼搏過程更富啟發性，因為每一球都需要集中意志，小心不要失去每一分、每一球，同時還需一直堅持，想盡辦法改變戰術以獲得更好的下一球。無論結果是贏是輸，一身的汗水和隊友相聚的珍貴時刻更讓他感到滿足。

李銘源教授的研究團隊有十多人，團隊氛圍亦十分活躍歡樂。談及學生培養，李教授說：「可能對於現在的大多數年輕人來說，大家的學習生涯都太順利了，遇到事情的時候就會感到焦慮。現在社會環境越來越『捲』，各行各業都面臨很多新的衝擊，年輕人更加要

跳出自己的舒適圈。」他還鼓勵學生多嘗試、多探索、多參與跨學科研究，學習與不同學科合作，激發更多創新科研思維，也可以積極參與校內的交換生計劃與交流項目，以增強自己的綜合能力。



第四屆中國—葡語系國家天然藥物和生物多樣性資源研討會暨中醫藥研究與產業發展國際論壇（澳門）

The Fourth Sino-CPLP Symposium on Natural Medicine and Biodiversity Resources & the International Forum on Research and Development of Traditional Chinese Medicine Industry (Macao)

Alpiniae Oxyphyllae Fructus: A Treasure of Traditional Chinese Medicine Attracting Attention

Alpiniae oxyphyllae Fructus is one of the "Four Great Traditional Medicines in Southern China". In ancient times, it was also known as the "fruit of schloars". As its name suggests, it not only possesses anti-aging, antioxidant, and hypoglycemic effects but also demonstrates exceptional neuroprotective and cognitive-enhancing capabilities. Professor Lee and his research team has devoted over 10 years to extract a novel chemical composition from the Alpiniae oxyphyllae Fructus using modern scientific methods, such as systematic screening with "target cells" and animals. They named this extracted chemical "UM-ND-1".

The groundbreaking discovery and extraction of "UM-ND-1" have ignited new possibilities for the modernisation and innovation of Chinese medicine. Reflecting on this research journey, Professor Lee expressed the challenges of collaborating with numerous Chinese herbalists to investigate medicinal herbs targeting geriatric diseases. From over 20 varieties of Chinese herbs, the selection of Alpiniae oxyphyllae Fructus and the subsequent extraction of "UM-ND-1" required meticulous effort.



李銘源教授與研究團隊

Professor Ming Yuen Lee and His Research Team

Effective Prevention and Improvement of Parkinson's

Parkinson's disease affects over 7 million people worldwide and is the second-largest chronic neurodegenerative disorder. This disease impacts the central nervous system, resulting in diminished motor function, abnormal gait, limb stiffness, and cognitive decline. There are more than 3 million people suffering from Parkinson's in China, which accounts for nearly 50% of Parkinson's patients worldwide and ranks the first in the world. Unfortunately, no medications are available on the market that can effectively prevent or suppress Parkinson's disease. At present, a cure for Parkinson's remains elusive, with initial symptoms treated via L-dopa. As the disease progresses and neuronal loss occurs, medication dosages are increased, which leads to

adverse effects. In severe cases where medications prove ineffective, patients may consider more invasive surgical interventions which bring additional pain and discomfort.

The newly developed structured small molecule, "UM-ND-1," extracted by Professor Lee and his team, has demonstrated promising neuroprotective effects in animal testing during the R&D stage. The molecule has shown the ability to inhibit the loss or death of neuronal cells, reduce the decline of dopamine, effectively alleviate the progression of Parkinson's disease, and improve both early and late-stage symptoms. The study's findings have garnered attention from research institutions worldwide and have received extensive media coverage.

Bringing Chinese Medicine to the World

Detailing the collaboration with TechnoPhage, a leading pharmaceutical company in Portugal, Professor Lee remarks, “We collaborated with the company before the ‘UM-ND-1’ project. They read an article we had published and approached us with technical inquiries. Subsequently, during their visit to Macao with the then President of Portugal, we had further discussions that eventually paved the way for the collaboration.”

To date, “UM-ND-1” has obtained several patents in Europe, the United States, Japan, and China. The production processes for the active pharmaceutical ingredient (API) and chemistry, manufacturing and controls (CMC) have been completed as part of the new drug application. The team is currently advancing the investigational new drug application (IND) for “UM-ND-1” in China and the US. Additionally, the team has successfully completed the good manufacturing practice (GMP) production of dietary supplement capsules of “UM-ND-1”, which has received approval from the U.S. Food and Drug Administration (FDA) as a new dietary ingredient (NDI). Efforts are underway to promote the global marketing of the capsules.

From the initial research to the translation of “UM-

ND-1”, the Macao SAR Government and the Science and Technology Development Fund have provided continuous support to the project. Macao has established a platform for friendly exchange and collaboration with Portuguese-speaking countries such as Portugal, as well as playing a crucial role in promoting the modernisation and internationalization of Chinese medicine in Macao and the Greater Bay Area.



益智素相關專利

UM-ND-1 Related Patents

Encouraging Young Talents to Venture Beyond Their “Comfort Zones”

Professor Lee is not only an outstanding scientist but also a highly respected and beloved teacher among students. He has also made remarkable achievements in industry-university-research collaboration. When talking about how to balance a busy life, he shared his life philosophy with us: getting proper nutrition, having sufficient sleep, exercising regularly, and focusing on what truly matters. He also shared his experience of participating in a squash league for 10 years when he was a student. He emphasises that the process of overcoming challenges on the court is more inspiring than the outcome itself. It takes concentration and perseverance not to lose any shot or score. Adapting tactics to achieve better shots is also crucial. Regardless of winning or losing, he finds fulfilment in the sweat and the precious moments shared with his teammates.

Professor Lee leads a research team comprising more than ten members, fostering a lively and joyful atmosphere. “In today’s world, many young people have enjoyed relatively smooth academic journeys, which may leave them feeling anxious when confronted with challenges. Given the prevailing culture of involution, it is essential for young people to venture beyond their ‘comfort zones’,” remarks Professor Lee. He further encourages students to embrace new experiences, embark on exploratory endeavours, and engage in interdisciplinary research. Emphasising the importance of collaboration across different disciplines, he underscores the potential for cultivating innovative scientific thinking. Additionally, Professor Lee advises students to actively participate in the University’s exchange programmes as a means to enhance their comprehensive skills and abilities.

碳量子點：拓開腫瘤免疫治療新世界

Carbon Quantum Dots: Unlocking a New Frontier in Immunotherapy

癌症是危及人類健康最主要的殺手之一。當前，全球癌症新發病例每年近2000萬例，中國的新發癌症患者病例約佔全球的四分之一。癌症的免疫治療是近年的熱門話題。絕大多數癌症是部分正常細胞受刺激之後基因變異成癌細胞，其外觀形狀與正常細胞十分相似，因此免疫系統無法準確識別癌細胞，從而無法使用其自身力量清除癌症惡疾。澳門大學研究團隊創造性地將碳量子點材料運用到腫瘤免疫治療領域，開發出一系列癌症免疫治療的特異技術，並致力於推進其臨床治療應用。

Cancer is one of the deadliest diseases affecting human health, with nearly 20 million new cancer cases reported globally each year, and China alone accounts for approximately a quarter of these cases. Cancer immunotherapy has emerged as a rapidly developing field in recent years. The majority of cancers originate from genetic mutations in normal cells, triggered by various stimuli. As a result, cancer cells closely resemble normal cells in their external appearance, making it challenging for the immune system to accurately identify and eliminate them. A research team from UM has made innovative use of carbon quantum dot materials in the field of tumour immunotherapy. They have developed a series of specific technologies for cancer immunotherapy and are committed to advancing their clinical application.

從「沒意思」到「有意義」

碳量子點材料與澳大的結緣源於幾年前的一場學術報告。當時，曲松楠教授作為中國科學院長春光學精密機械與物理研究所的研究員受邀來到澳大進行學術講座，分享碳量子點材料光學性質的研究成果。

「這個特性在發光材料中很普遍，我聽完覺得沒什麼意思，也沒體會到有什麼讓我特別感興趣的著重點。」澳門大學應用物理及材料工程研究院院長湯子康講座教授說。

講座結束後，曲教授來到湯教授的辦公室專門介紹了他關於碳量子點的另一個與生物學關聯的實驗，即給小鼠從皮下兩側分別注入腫瘤，再通過靜脈注射碳納米材料混合針劑，並用激光照射其中一側的塊狀癌症組織。一段時間後，小鼠兩側的腫瘤都奇跡般地消失了，但對小鼠沒有造成生理傷害。這一發現引起了湯教授極大的興趣，對於腫瘤治療來說，這可能是一項有重大意義的醫學現象。



碳量子點制劑
Carbon Quantum Dot Preparation



湯子康教授
Professor Zikang Tang

跨界合作 科學驗證

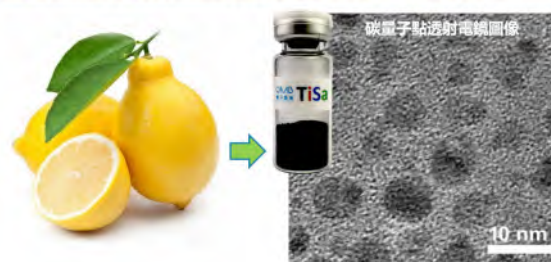
經過一番考慮後，曲教授決定加入湯教授的研究團隊，並圍繞碳量子點可能產生的免疫效應做進一步研究。最初，湯教授和曲教授無法從生物學角度解釋腫瘤消失的原因，於是，他們想到了和健康科學學院院長鄧初夏講座教授合作。鄧教授是腫瘤研究領域的國際頂級科學家，在乳腺癌的發生發展、耐藥和轉移機制方面做了長期深入的研究，並有獨到的見解。曲教授說，「生物醫學領域專業知識的缺乏對我們來說

是一個很大的考驗，而跨學科合作很好的解決了這個問題。」隨後，合作團隊分別用體內自生腫瘤的小鼠（非接種腫瘤，以排除外界因素影響）和在無免疫系統的裸鼠進行對照實驗，實驗結果證明了碳量子點的免疫作用。「物理材料和生物醫學的跨度實在太大。但通過跨學科合作，我們的研究團隊以嚴謹的生物實驗確切地論證了腫瘤免疫治療的詳盡機理。科學的方法是非常重要的。」湯教授強調。

碳量子點有何優勢

碳量子點的最大優勢就是它的生物兼容性和安全性，湯教授和曲教授團隊以可食用的檸檬酸為主要原料，製備無毒、易代謝、生物相容的碳量子點，原料豐富且成本較低。如能順利進入臨床試驗，初步估計碳量子點腫瘤免疫治療成本可以控制在大約 20 萬人民幣。澳大研究團隊將深入研究分子生物機制、劑量療程及標準化批量製劑碳量子點材料，並致力推進此新興腫瘤免疫治療方法進入臨床應用，解決腫瘤免疫治療這一世界性難題。

以可食用的檸檬酸為主要原料，製備無毒、易代謝、生物相容的碳量子點

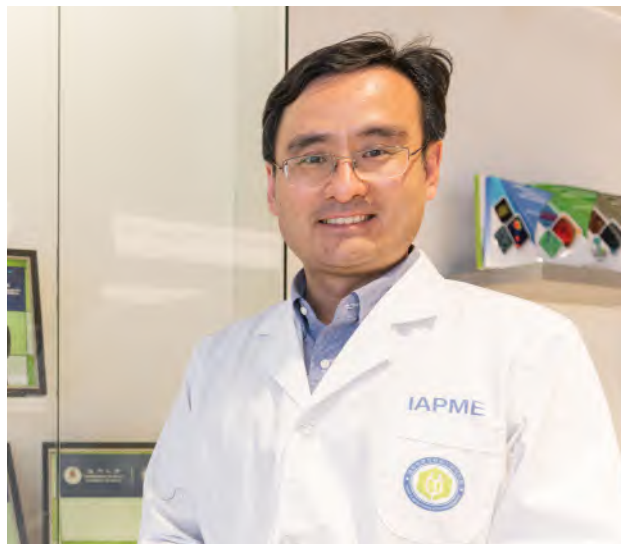


以可食用檸檬酸製備碳量子點
Carbon Quantum Dots Produced from Citric Acid

科學家要有大視野和大格局

在湯教授看來，自己所做的研究能否為人類社會、為科學界做出貢獻是第一位的，最重要的是在自己的研究領域有突破性的創新。湯教授說：「就好像生產一樣，如果大家都去生產飯盒，別人做圓的，你做方的，你的貢獻突出嗎？大家轉向做拖把，你也跟著去做拖把，明顯是毫無特色的，但是如果你去研發一款全自動拖把，那便是你的創新點。」

曲教授表示，湯教授是對他影響和幫助很大的良師益友。「湯教授的洞察能力和前瞻視野極強，為我的研究打開了新的空間。他早已是材料領域的頂尖專家，但近幾年還在不斷跳出自己的領域，學習和鑽研生物醫學的知識。我們的材料要應用到臨床，要做產業化都需要有不同的思維方式，這也是他一直跟我們說的，眼界要放得更寬廣。」曲教授說。



曲松楠教授
Professor Songnan Qu

From “Meaningless” to “Meaningful”

The connection between carbon quantum dot materials and UM began several years ago when Professor Songnan Qu, a researcher from the Changchun Institute of Optics, Fine Mechanics and Physics of the Chinese Academy of Sciences, was invited to UM to share his research findings on the optical properties of carbon quantum dots. “These properties were quite common in luminescent materials, and I didn’t find the lecture particularly intriguing to me,” says Chair Professor Zikang Tang, Director of the Institute of Applied Physics and Materials Engineering at UM.

After the lecture, Professor Qu paid a visit to Professor Tang’s office to share another experiment he had

conducted using carbon quantum dots, which had intriguing implications for biology. In this experiment, mice were injected with tumours on both sides of their skin and then treated with a mixture of carbon nanomaterials followed by laser irradiation on one side of the cancerous tissue mass. Astonishingly, after a certain period of time, the tumours on both sides of the mice disappeared completely, leaving no physiological damage. This groundbreaking discovery hinted at a remarkable medical phenomenon with potential implications for tumour treatment and ignited Professor Tang’s interest.

Interdisciplinary Cooperation Backed by Scientific Verification

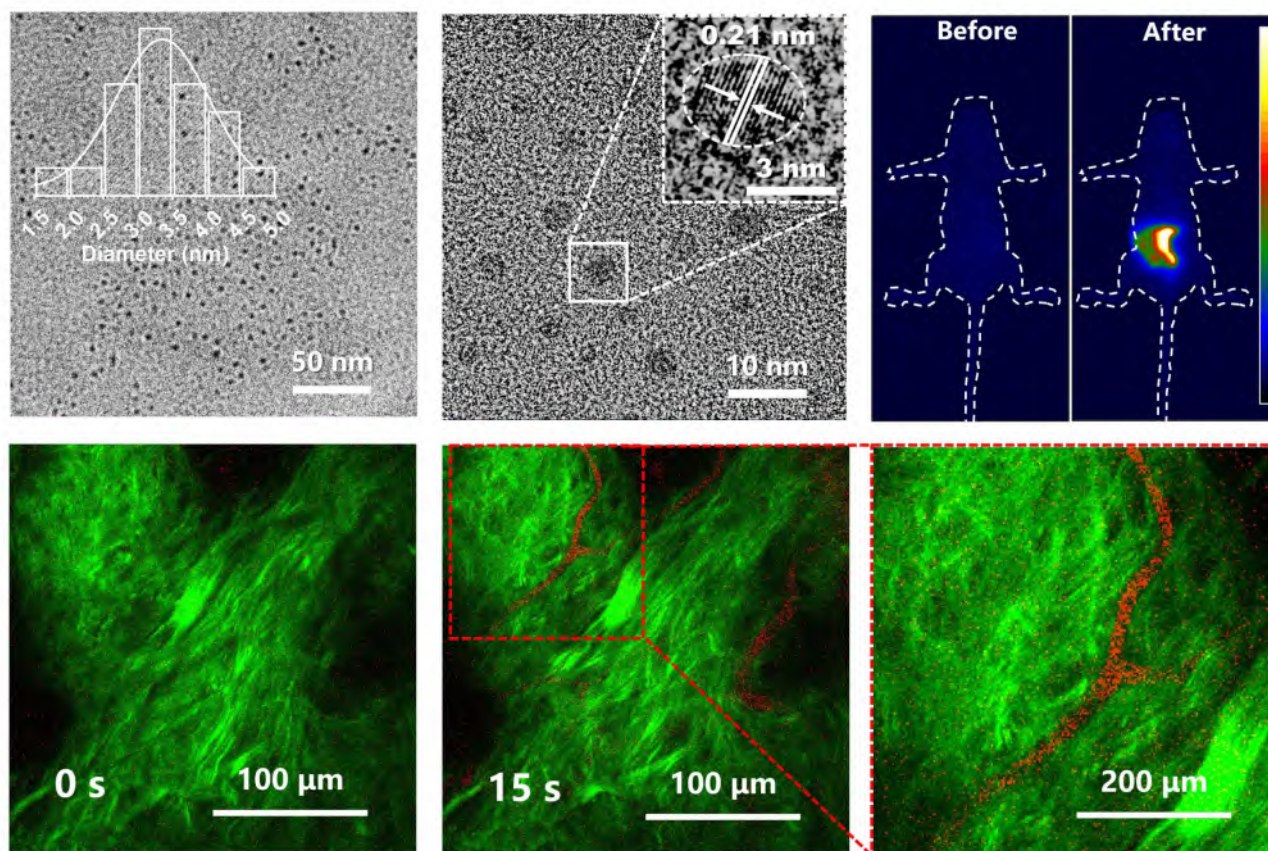
After careful consideration, Professor Qu decided to join Professor Tang’s research team to further investigate the potential immune effects of carbon quantum dots. Initially, they were unable to explain the biological basis for the tumour disappearance. They then decided to seek collaboration with Chair Professor Chuxia Deng, Dean of the Faculty of Health Sciences. He is a top scientist in oncology research worldwide and renowned for his expertise and insights into breast cancer development, drug resistance, and metastasis mechanisms. Professor Qu explained, “The lack of biomedical expertise posed a big challenge, and interdisciplinary collaboration

proved to be a perfect solution.” The collaborative team then conducted control experiments using mice with spontaneously developed tumours (without external inoculation) and nude mice lacking immune systems. The experimental results provided evidence of the immune effects of carbon quantum dots. “The gap between physical materials and biomedicine is substantial. However, through interdisciplinary collaboration, our research team successfully unraveled the intricate mechanisms of tumour immunotherapy via rigorous biological experiments. The scientific approach is of utmost importance,” Professor Tang emphasized.

Advantages of Carbon Quantum Dots

The biocompatibility and safety of carbon quantum dots are their greatest advantages. Professor Tang and Professor Qu's team utilised citric acid as the primary raw material to synthesise non-toxic, easily metabolisable, and biocompatible carbon quantum dots. These dots are readily available and relatively cost-effective. If the clinical trial proves successful, the cost of carbon quantum dot tumour immunotherapy could be controlled at around

RMB 200,000. The research team at UM will continue investigating the molecular biological mechanisms, dosage regimens, and standardised batch production of carbon quantum dots. The team aims to advance this emerging tumour immunotherapy approach into clinical application, addressing the challenging issue of tumour immunotherapy worldwide.



碳納米點的納米結構、小鼠活體成像及耳部雙光子血管造影

The nanostructure of carbon nanodots, in vivo imaging in mice, and two-photon angiography of the ear

Embracing a Broad Vision and Comprehensive Perspective in Research

From Professor Tang's perspective, the potential contribution of his research to both society and the scientific community is his first priority. He believes that achieving breakthrough innovation in his field is the primary focus. Professor Tang explains, "Similar to the realm of production, if others are manufacturing round lunch boxes and you decide to produce square ones, your contribution would appear pointless. If others shift to making mops and you follow suit, there is nothing exceptional about it. On the other hand, if you develop a fully automated mop, that becomes your point of innovation."

Professor Qu describes Professor Tang as a mentor and friend who has had a profound impact on him. "Professor Tang's discernment and forward-thinking vision have opened up new dimensions in my research. While he has long been an esteemed expert in the field of materials, he has also ventured into the realm of biomedical science in recent years. He constantly reminds us that it requires a different mindset to apply our materials in clinical and industrial settings. We need to embrace a broader vision," states Professor Qu.

區域海洋研究：揚帆起航正當時

Regional Oceans Research: Setting Sail for New Horizons

2015年，中央政府將澳門特別行政區海域面積明確為85平方公里，標誌著澳門特區對周邊海域取得正式管轄權。近年，澳門大學制訂了「3+3+3+3」的科研戰略佈局，將區域海洋研究列為澳門大學的重點發展方向之一。隨著2020年澳門大學區域海洋研究中心的正式揭牌，海洋研究在澳大的新故事由此啟航……

In 2015, a watershed area of 85 square kilometres was granted to Macao SAR by the Central Government, marking the formal assumption of jurisdiction over the surrounding waters by the Macao SAR. In recent years, UM established a “3+3+3+3” strategic research layout and made regional oceans one of the key research areas of the University. With the official inauguration of the Centre for Regional Oceans in 2020, the story of oceanography at UM has set sail for new horizons…



考察船啟航

The Expedition Vessel Sets Sail

研究海洋是澳門的天然屬性

澳門地處珠江口西岸，與南中國海相鄰，是一座「泡在水裡」的城市。海洋在澳門的經濟、文化和環境中扮演著重要角色。澳門水域的開發利用、海岸帶環境保護及防災減災一直都是社會焦點。海洋帶來的極端天氣事件（如颱風、風暴潮）及海洋生態環境保護（如氮磷污染物防治）對澳門的旅遊業乃至整個城

市的發展都有很大影響。同時，澳門對海洋空間和海洋資源的需求不斷增長，極需開展海洋研究，科學利用和管理海洋資源。澳大力推動區域海洋研究，從全球招攬優秀海洋研究人才，聚焦海岸帶健康及防災減災，並為澳門海洋環境可持續發展做出貢獻。

面向前沿科學與本地需求的海洋研究

澳門大學科技學院副教授、海洋科學及技術系主任、區域海洋中心代主任徐傑表示，澳大區域海洋中心的研究方向既面向前沿科學問題，也兼顧澳門本地的實際需求。澳大 2022 年成立了海洋科學及技術系，是推動海洋研究的又一里程碑。在物理海洋方面，澳大研發的大灣區河口陸架高分辨率模擬系統，能夠準確模擬大灣區多尺度水動力過程，為物質運輸和海洋

環境研究提供模型基礎。在海洋生態環境方面，澳大著力研究大灣區氮磷污染物的生態危害及污染防治。在防災減災方面，澳大研發了一個模擬颱風、風暴潮和洪澇過程的平台，推進近岸風暴潮遙感觀測，為海洋災害提前預警並輔助決策。此外，澳大還發展海洋技術這一研究方向，包括海洋觀測設備、海洋通信技術、水下智能無人設備等。



2022年11月，澳大舉辦海洋科學及技術系成立儀式

UM Established Department of Ocean Science and Technology in November 2022

陸海統籌促進大灣區協同發展

陸海統籌是將陸地和海洋資源有機結合起來，採取統一規劃、協同發展的方式，促進陸海經濟發展和生態保護的一種新型的區域發展模式。例如，研究澳門周邊海域氮磷污染的生態危害及其防治，需要從氮磷污染物的來源著手，而很多氮磷污染物來自於陸地的人類活動。比如在農業生產過程中，大量化肥的使用，化肥中含有很多氮元素，未被利用的氮元素隨降雨衝入河道。另外，城市污水含有大量氮磷污染物。因此，上游的人類活動排放的氮磷成為了下游氮磷污染物輸入來源，導致水體富營養化，藻類大量繁殖，引發紅潮和水體缺氧，有時造成水生動物（魚、蝦）大量死亡。要解決這一問題，不僅是下游地區要做污染治理，也要對上游地區的氮、磷污染物的排放進行

管治，這就需要陸海統籌考慮及大灣區各個城市之間的協同合作。

粵港澳大灣區具有漫長海岸線，海域面積約佔陸地總面積30%，具有天然海洋屬性，既是「一帶一路」建設的重要支撐，肩負著打造現代海洋產業基地和探索構建「海洋命運共同體」的使命，也是大灣區可持續發展的保障。澳大與大灣區多所高校和科研機構開展合作，包括中國科學院南海海洋研究所、香港科技大學、中山大學、南方海洋科學與工程廣東省實驗室（珠海）、南方科技大學等。除開展區域海洋合作研究，澳大亦積極與各科研機構開設博士生聯合培養課程，為大灣區提供更多海洋領域的高端人才資源。

國際合作助力中葡科技中心建設

2022年9月，澳大牽頭成立中國與葡語國家海洋研究聯盟，吸引了19所來自中國、葡萄牙、巴西、安哥拉和莫桑比克在海洋研究領域最具影響力的高校及科研機構加盟。聯盟將積極響應特區政府建設「中葡科技中心」的號召，充分發揮澳門特區作為中國與葡語國家之間的橋樑作用，積極參與構建「海洋命運共同體」，推動在海洋科技、海洋環境保護等方面的交

流和合作。

「去年，澳大舉辦了首屆聯盟理事會會議和首屆港澳海洋論壇，吸引了逾70名來自中國與葡語國家的精英高校及機構成員參與。今年疫情放開之後，我們將推動中國與葡語國家在海洋領域開展更多實際性合作和深度交流。」徐傑教授說。



2022年9月，中國與葡語國家海洋研究聯盟舉行線上成立儀式

The Inauguration Ceremony of the China-Portuguese Speaking Countries Ocean Research Alliance was held in September 2022

做海洋研究是辛苦又幸福的事

談及出海考察的經歷，徐傑教授顯得很興奮，他認為辛苦是一方面，但只要是自己喜歡的研究就值得不畏艱辛去做。「做海洋研究首先一定是要有興趣，因為海上工作是很辛苦的。與在陸地上工作不同，由於海上經常遇到風浪，多數人會暈船，經常我們一邊吐一邊幹活。出海的時間通常是幾個星期到幾個月，難免會感到孤獨，需要有很強的內驅力才能堅持下來。」



徐傑教授
Professor Jie Xu

Macao's Natural Connection to Oceans Research

Macao is located on the west coast of the Pearl River and is adjacent to the South China Sea. It is a city “immersed in water,” and oceans play an important role in shaping Macao’s economy, culture, and environment. The development and utilisation of Macao’s waters, the protection of the coastal zone, and disaster prevention and mitigation have long been main priorities for the society. Extreme weather such as typhoons and storm surges, as well as the preservation of marine ecosystems such as addressing nitrogen and phosphorus pollution, have profound impacts on Macao’s tourism industry

and the city’s overall development. Additionally, growing demands for ocean space and coastal resources necessitate a comprehensive strategy for the holistic utilisation and management of ocean resources. UM actively promotes regional oceans research and recruits outstanding researchers globally. With a specific focus on coastal zone health and disaster mitigation and prevention, UM’s efforts aim to contribute to the sustainable development of Macao’s marine environment.

Cutting-edge Scientific Issues and Local Needs: UM's Oceans Research Agenda

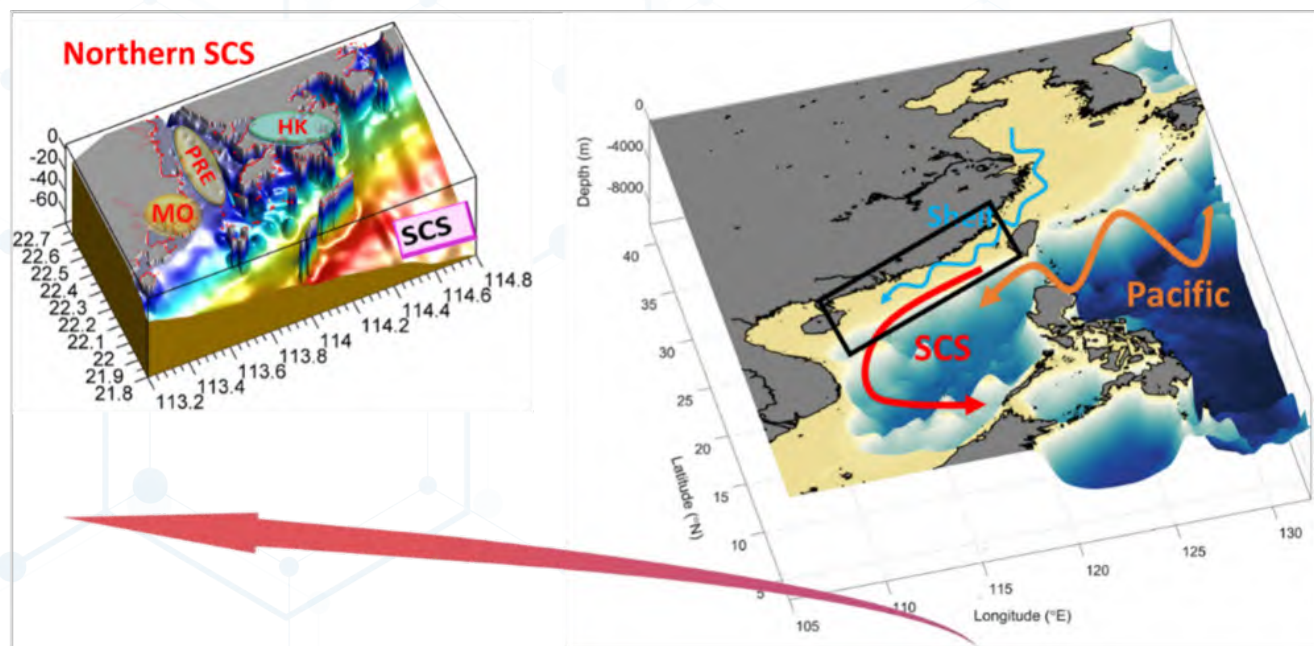
Jie Xu, Associate Professor from the Faculty of Science and Technology, Head of the Department of Ocean Science and Technology, and Interim Director of Centre for Regional Oceans of UM, explains that research directions of the Centre for Regional Oceans are oriented toward both cutting-edge scientific issues and the practical needs of Macao society. The establishment of the Department of Ocean Science and Technology in 2022 was a milestone for the development of ocean research at UM. In the direction of physical ocean, UM has developed

a high-resolution simulation system of the Greater Bay Area estuary shelf which can accurately simulate the multi-scale hydrodynamic processes in the Greater Bay Area, providing a model basis for material transport and marine environment research. In the direction of marine ecology, UM has been studying the ecological hazards and pollution prevention of nitrogen and phosphorus pollutants in the Greater Bay Area. In the direction of disaster prevention and mitigation, UM has developed a platform to simulate the process of typhoons, storm

Feature Stories - Science and Technology Innovation

surges and flooding, to promote remote sensing of near-shore storm surges and provide early warning of marine disasters and assistance in decision-making. In addition, UM has developed marine technology such as

marine observation equipment, marine communication technology, and underwater intelligent unmanned equipment.



大灣區河口-陸架環流

Estuary - Shelf Circulating Current in the Greater Bay Area

Land and Sea Coordination Promoting the Collaborative Development of the Greater Bay Area

Land and sea coordination is a new model for regional development. This model adopts an approach of unified planning and coordinated development to promote economic development and land and sea ecological protection. For example, to study the ecological hazards of nitrogen and phosphorus pollution in the waters surrounding Macao and its prevention and control, we need to start with the sources of nitrogen and phosphorus pollutants. Many of them come from human activities on land such as agricultural production. In this process, a large amount of chemical fertilizers is used, which contain a lot of nitrogen. The unused nitrogen is washed into rivers with rainfall. In addition, municipal wastewater contains large amounts of nitrogen and phosphorus pollutants. Therefore, the nitrogen and phosphorus discharged from human activities become sources of nitrogen and phosphorus pollutants that affect the downstream area, leading to eutrophication of water bodies, algal blooms, red tides, and water hypoxia. Sometimes, it even results in the deaths of a large number

of aquatic animals (fish and shrimp). To solve this problem, it is not only necessary to control pollution in the downstream areas but also to manage the discharge of nitrogen and phosphorus pollutants in the upstream areas. This requires coordination between land and sea and cooperation among the cities within the Greater Bay Area.

The Guangdong-Hong Kong-Macao Greater Bay Area, with its long coastline and sea area accounting for about 30% of the total land area, has a natural connection with oceans. It is an important driver for the “Belt and Road Initiative”, and holds the mission to build a modern marine industry base and explore the construction of a “marine community”. UM has collaborated with a number of universities and research institutions in the Greater Bay Area, including the South China Sea Institute of Oceanography of the Chinese Academy of Sciences, the Hong Kong University of Science and Technology, Sun Yat-sen University, the Guangdong

Laboratory of Southern Ocean Science and Engineering (Zhuhai), and the Southern University of Science and Technology. In addition to collaborative research on regional oceanography, UM is also actively engaged in

joint doctoral programmes with research institutions to provide the Greater Bay Area with more high-end talent resources in the field of marine science.

Building the Centre for Science and Technology Exchange and Cooperation between China and Portuguese-Speaking Countries (CSTCP) through International Collaboration

In September 2022, UM initiated the China-Portuguese Speaking Countries Ocean Research Alliance, attracting 19 influential universities and research institutions in the field of ocean research in China, Portugal, Brazil, Angola and Mozambique to join. The alliance will actively respond to the SAR government's call to build the Centre for Science and Technology Exchange and Cooperation between China and Portuguese-Speaking Countries (CSTCP). This Centre leverages the role of Macao SAR as a bridge between China and Portuguese-speaking countries in promoting the establishment of the alliance to build a community with a shared future for mankind in ocean science. In the future, the alliance will devote itself to enhancing cooperation and communication among

universities and institutes in China and Portuguese-speaking countries in the field of ocean science and technology and ocean environmental protection.

“Last year, UM hosted the first Executive Council Meeting and the first Hong Kong- Macau Ocean Forum, which attracted over 70 members from elite universities and institutions in China and Portuguese-speaking countries. With the lifting of border restrictions this year, we will promote more practical cooperation and in-depth communication between China and Portuguese-speaking countries in the field of ocean research.” Professor Xu states.

Ocean Research Is a Bittersweet Journey

When discussing his experience of ocean expeditions, Professor Xu appears very enthusiastic. He believes that research can be challenging, but if it is the research that he likes, it is worth doing despite the difficulties. He adds, “The first step is to be genuinely interested in ocean research, because working at sea can be very challenging. Unlike working on land, most people get seasick due to the wind and waves, and it is common to experience nausea while working. The time spent at sea is usually from a few weeks to a few months, and it is inevitable that you will feel lonely. Therefore, you need a strong internal drive to persevere.”



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

專題故事 特色人文

Feature Stories
Distinctive Humanities and
Social Sciences

從葡萄牙到澳門：將葡語研究發揚光大

Helping Portuguese Studies to Flourish: From Portugal to Macao

澳門與葡萄牙淵源深遠，這一特色也為澳大注入了非常獨特的多元文化。葡語研究是澳大在人文社科範疇極具特色的研究領域。享負盛名的葡萄牙語言學家João Veloso教授於2022年加入澳大並擔任葡文系主任，期望與同事和學生齊心協力，將葡語研究發揚光大，為世界培養更多葡語人才，讓葡語成為中國與葡語國家溝通的橋樑。

Macao and Portugal have deep historical roots, which gives UM a unique multicultural dimension. Portuguese Studies is a distinctive research area at UM, especially in the humanities and social sciences. Professor João Veloso, a renowned Portuguese linguist, joined UM in 2022 as the Department Head of Portuguese. He looks forward to working with colleagues and students together to help Portuguese studies flourish at UM, training more Portuguese-speaking talents for the world, and making Portuguese a bridge between China and Portuguese-speaking countries.



《我不相信雷的回聲》、《聊齋誌異》和散文集《山外》

I Don't Believe in the Echo of Thunder, Strange Stories from a Chinese Studio, Beyond the Mountain

澳大葡語研究蜚聲國際

澳大葡文系成立於1990年，規模傲居亞洲高校葡語院系之最，並憑藉卓越教學和研究蜚聲國際。澳大葡文系現有由三十多名海內外資深講師、教授及研究人員組成的教學研究團隊，不僅致力於葡語作為第二外語的教學，也為其他的葡語研究領域，例如葡語文學及葡語在不同國家和地區，特別是在亞洲地區的變化做出了貢獻。

近年，葡文系師生共同把中國文學經典《聊齋誌異》和詩歌集《我不相信雷的回聲》翻譯成葡文，並與該系教授姚京明（姚風）的葡文散文集《山外》在2022年於巴西出版，讓葡語系國家的讀者也能暢讀中國文學作品。João Veloso教授說，「當我看到葡文系在中葡翻譯研究做出的成果時，我真的很驚訝，澳大不僅培養了很多中葡翻譯人才，還在中葡/葡中翻譯理論研究做出了貢獻，這也成為我們標誌性的成果之一。」

走向專業化的語言學研究

「三文四語」（三文：中文、葡文、英文；四語：廣東話、普通話、葡語、英語）是澳門獨有的語言景觀，此外，菲律賓語、尼泊爾語和印度尼西亞語等東南亞語言也在這裡被廣泛使用。多語言融合的文化生態吸引了眾多語言學家匯聚澳大，也為語言文化交融和變異提供了一個完美的研究樣本。葡語研究作為澳大最具特色的研究領域之一，在描述語言學、應用語言學、教育語言學、葡語文學研究和中葡/葡中翻譯這5個研究方向特色鮮明，成果突出。

Veloso教授表示，過去的十年間，語言學研究正走向高度專業化，研究範疇也在不斷地拓展和延伸，這種趨勢也為語言學研究帶來新的創造力和活力。

「40年前，葡語研究主要是用傳統的方法研究語言學、文學、歷史和文化等。近年來，隨著語言學的進一步發展，葡語研究正在往更專業的方向走，甚至湧現出一些新興的研究領域。你可以研究葡語的語法、結構、使用條件和歷史，也可以研究由葡語和其他語言衍生的變體，例如由以葡文為基礎衍生的克里奧爾語。」 Veloso教授說。



João Veloso教授
Professor João Veloso

創造邊界，不如構建橋樑

在學科日益專業化、精細化的今天，人類社會面對的問題反而變得更複雜和更具綜合性，這對於研究問題、解決問題亦提出了新挑戰。當前，跨學科研究已成為獲取新知識和拓寬認知的重要方式。語言學與不同學科之間的交流與融合，正發展為研究的新範式。隨著認知科學、腦科學、計算機科學和人工智能技術的發展，語言學的研究方法亦變得更加多樣化。澳大近年著力推動文理交叉融合發展，營造合作與創

新的研究氛圍，為人文與理工學科構建起跨學科交流的橋樑。

Veloso教授說，「我剛來到大學時，就注意到在這裡人文學科與理工學科的邊界並不那麼明顯，我也關注到不同研究領域、不同學科之間的交叉融合，我非常喜歡澳大在不同知識領域之間建立聯繫的氛圍，就像校園裡四處可見的橋一樣。」

深化海外合作 助力中葡平台建設

為配合澳門特別行政區關於建設中國與葡語國家合作橋樑的倡議，澳門大學近年與葡語系國家發起成立「中國澳門特別行政區與葡語國家學術圖書館聯盟」，和內地高校發起成立「澳門特別行政區與內地學術圖書館葡語資源聯盟」，並聯合里斯本大學、北京外國語大學發起「中國葡語教育高校聯盟」。這些聯盟的建立將有助於更好地培養高素質中葡雙語人才，進一步匯聚並分享海內外眾多高校豐富的中文和葡語教學和研究資源，推動各方協同發展，助力澳門搭建中國與葡語國家商貿合作服務平台。

Veloso教授表示，澳大有極好的葡萄牙語學習氛圍，並與其他葡語國家的大學建立了廣泛的合作網絡。「我們還可以建立一個葡萄牙語研究者的共同空間，在現有的基礎上進一步發展。儘管我剛到澳大不久，但我希望能為澳大和世界各地高水平大學更高層次的對話做出貢獻。」



澳門貿易投資促進局與澳門大學合辦“葡·分享”交流會

The Macao Trade and Investment Promotion Institute and UM co-organised a Sharing Session on Doing Business in Portuguese-speaking Countries

Portuguese Studies at UM Achieving an International Reputation

Established in 1990, the Department of Portuguese at UM is the largest higher education institution unit devoted to teaching Portuguese in Asia. With a dynamic group of almost 30 highly experienced teachers, professors, and researchers of different nationalities, it has already achieved an international reputation in both research and teaching. They not only dedicate themselves to teaching Portuguese as a second language but also contribute to different research areas such as Portuguese literature and the study of Portuguese varieties in different regions around Asia.

In recent years, faculty members and students in the Department of Portuguese have worked together to translate the Chinese literary classic *Strange Stories from a Chinese Studio* and the poetry collection *I Don't Believe in*

the Echo of Thunder into Portuguese. The two books have been published in Brazil alongside *Beyond the Mountain* (Portuguese title: *O Além da Montanha*), a Portuguese prose collection by Jingming Yao, Professor in the Department of Portuguese (known by his pseudonym Yao Feng). Professor João Veloso says, "I am really surprised when I see the quality of the work done by the Department of Portuguese in the translation between Portuguese and Chinese. UM has cultivated many Chinese and Portuguese translation talents and contributed to theoretical research on Chinese-Portuguese and Portuguese-Chinese translation. It has become one of our signature achievements."

Towards Linguistics Studies Specialisation

Macao is a unique city with "three major written languages and four major spoken languages" (three primary written languages: Chinese, Portuguese, and English; four primary spoken languages: Cantonese, Putonghua, Portuguese, and English). In addition to these languages, Southeast Asian languages such as Filipino-Tagalog, Nepali and Indonesian-Bahasa and other Nepalese languages, are also widely spoken in Macao. The cultural ecology of multilingualism has attracted many linguists to UM and has provided a perfect research site for linguistic and cultural exchange and variation. As one of the most distinctive research areas at UM, Portuguese Studies has yielded outstanding results in five research directions: descriptive linguistics, applied linguistics, educational linguistics, Portuguese literary studies, and Chinese-Portuguese/Portuguese-Chinese translation.

According to Professor Veloso, linguistic research has been embracing a trend of specialisation with diversified scope in the last decades, bringing creativity and dynamism to the field. "Forty years ago, Portuguese academic research mainly centred on linguistics, literature, history, and culture, adopting traditional methods. In recent years, much like Linguistics in general, Portuguese Studies has become highly specialised at a broader level. As a result, some new fields of study have emerged. In the particular domain of the language, you can study the grammar, the structure, the conditions of usage and the history of the Portuguese language, varieties of Portuguese and even the languages which, until a certain extent at least, have emerged from the contact between Portuguese and other languages, as it is the case of the Portuguese-Based Creoles," remarks Professor Veloso.

Building Bridges instead of Borders

Although academic disciplines are becoming increasingly specialised and refined, the complexity and comprehensiveness of the problems that human beings face have posed new challenges to research. As a result, interdisciplinary research has become an important way for researchers to acquire new knowledge and broaden their horizons. The exchange and integration between linguistics and other disciplines are developing into a new paradigm of research. Furthermore, linguistics research methods have diversified with the growth of cognitive science, brain science, computer science, and artificial intelligence. In recent years, UM has been promoting

interdisciplinary research between humanities and the "core sciences", creating a collaborative and innovative atmosphere aimed at building bridges across faculties and disciplines.

Professor Veloso affirms, "When I first came to UM, I noticed that the boundaries between humanities and the so-called 'core sciences' were not so rigid here. I also paid attention to the integration across research areas. I like the atmosphere that creates connections between different fields, just like the bridges throughout the campus."

Fostering International Collaboration for the Establishment of a China-Portuguese Speaking Countries Platform

In line with the Macao SAR's initiative to build a bridge of cooperation between China and Portuguese-speaking countries, UM has initiated three alliances, namely the Academic Library Alliance between Macao Special Administrative Region and Portuguese-speaking Countries, the Academic Library Alliance for Portuguese Language Resources between Macao Special Administrative Region and Mainland China, and the University Alliance for Portuguese Language Education in China with the University of Lisbon and the Beijing Foreign Studies University. These alliances are committed to cultivating more high-quality bilingual talents and sharing Chinese and Portuguese teaching and research resources of universities in China and abroad for collaborative development. This supports Macao's goal of

building a platform for economic and trade cooperation between China and Portuguese-speaking countries.

UM provides an excellent environment for Portuguese language learning and has established multiple partnerships with universities in Portuguese-speaking countries. "We can even create a shared community for Portuguese language researchers. Even though I only came to UM recently, I hope that I can contribute to a higher level of dialogue between UM and top universities across the world," adds Professor Veloso.



澳大與內地多所大學舉行線上合作協議簽約儀式

Online Agreement Signing Ceremony between UM and a Few Universities in Mainland

澳門研究中心：研究澳門，服務社會

Centre for Macau Studies: Studying Macao, Serving Society

澳門大學澳門研究中心是澳大最早成立的校級研究機構，其前身為1987年建立的東亞大學澳門研究所，1988年澳門政府收購東亞大學後更名為澳門研究中心。30餘年來，澳門研究中心舉辦了逾200場次的研討會、座談會、研究發表會，出版著作逾60種，完成近100個不同主題的研究報告，題材涉及「一國兩制」、公共行政和城市規劃、澳門社會發展、社會福利制度、經濟與勞動力、產業多元、澳門文化歷史、回歸大事記、口述史等等。澳門研究中心始終立足本土，審視過去，關注當下，洞察未來，為澳門社會的繁榮穩定耕耘努力。

UM's Centre for Macau Studies (CMS) is a specialised university-level research institute that was established in 1987 as the Institute of Macau Studies of the University of East Asia (UEA). It was renamed as CMS after the acquisition of UEA by the Macao government in 1988. Over the past 30 years, CMS has organised more than 200 seminars, symposia, and research presentations. It has also published over 60 books and completed nearly 100 research reports on various topics, including "One Country, Two Systems" and issues related to Macao: public administration and urban planning, social development in Macao, social welfare system, economy and labour force, industrial diversification, cultural history of Macao, handover chronicles, and oral history. CMS is deeply rooted in the local community and has a strong focus on examining the past, addressing present concerns, and gaining insights into the future. It has been dedicating its efforts to contribute to Macao's prosperity and stability.



2022年11月，澳門研究中心舉行“2023年財政年度澳門特區施政報告”座談會

In November 2022, CMS Held the Seminar on the Policy Address for the Fiscal Year 2023 of the Macao SAR

源舊流新 與時偕行

1987年，澳門大學澳門研究中心（前身為「東亞大學澳門研究所」，下稱「澳門研究中心」）由時任校長林達光教授主持建立，並於翌年創辦學術研究刊物《澳門研究》，至今已出版論文逾2000篇。澳門研究中心主任林玉鳳教授介紹，「《澳門研究》創刊號中提到，我們是澳門的大學，一定要有一個專門的機構來研究澳門，既要對澳門的過去很熟悉，也要幫助我們洞察澳門未來的發展。」

在不同的歷史時期，澳門研究中心順應澳門的發展而調整目標，其研究重心可分為3個階段：

- 二十世紀八、九十年代，澳門研究中心主要以社會智庫的方式，匯集社會領袖和行業精英，為回歸進程中澳門面對的問題與挑戰出謀劃策，例如澳門公務員本地化、法律本地化問題等。

- 澳門回歸後，從公共行政改革到特區政府的管理，從澳門的文化遺產保育到澳門的歷史城區價值，從發展澳門的文化產業到區域合作，從「一國兩制」的實踐到廿一世紀澳門的競爭力等等，都是中心的重要課題。
- 近年，國家提出「一帶一路」倡議和粵港澳大灣區發展規劃，成立橫琴粵澳深度合作區，澳門進入歷史的新階段。根據澳門大學「立足澳門，融入灣區，面向全國，走向世界」的新時代願景，澳門研究中心重新定位，以成為澳門和大中華地區跨學科研究的先驅中心為目標，致力將澳門研究帶入全球學術的前沿。



2022年11月，澳門研究中心舉行成立35周年暨澳門研究年會2022開幕式

CMS Celebrated 35th Anniversary with the Opening of the Annual Conference of Macao Studies 2022 in November 2022

見微知著 多面佈局

澳門研究中心的研究內容廣泛全面，從澳門社會的過去、現在、未來層層切入，見微知著。研究澳門過去，中心於2022年開始協助組織編纂《澳門志》，當中包括七個分志：《地理分志》、《法政分志》、《總述·大事記》、《社會分志》、《文化分志》、《經濟分志》及《人物分志》。研究澳門當代，中心策劃了澳門當代史研究項目，其首冊《澳門回歸歷程口述史—變革前線》以第一手資料還原中葡談判及澳門多年來的變革點滴，並總結澳門回歸至今的發展經驗，在2020年出版後廣受好評。研究澳門未來，中心搭建了澳門宏觀經

濟模型，提供及時和有用的澳門經濟分析，協助決策者對未來作出合理的規劃。

此外，澳門研究中心與多個澳門協會團體合作進行研究，與澳門明愛研究澳門近貧家庭，關注近貧家庭成員的憂鬱症和自殺問題，呼籲政府和社會對近貧家庭給予更多資源支持。中心還與同善堂合作，研究澳門的慈善史、社會服務史、義學等，並設立獎學金支持這一方向的研究。

腳踏實地 互利共贏

新的歷史時期，隨著粵港澳大灣區的協同發展及琴澳深度融合，澳門研究中心亦透過組織橫琴粵澳深度合作區澳門研究系列講座、開展粵港澳大灣區澳門居民參與狀況的研究等，為澳門的經濟適度多元發展建言獻策。

談及澳門居民如何融入大灣區，林玉鳳教授認為，雙方應務實地各取所需。「什麼叫務實地各取所需？可能有一些人，在澳門已有足夠的發展平台，家庭也在這邊，那他服務澳門就可以了。但有一些人，他可能專業

不對口，或者他想從事的職業在澳門市場不夠，那麼大灣區可以是一個更大的平台。例如粵語話劇演員，在澳門粵語話劇的市場是比較小的，可能排練一個月只能演出幾天。但大灣區各個城市地緣相近、語言相通、文化同源，有更廣闊的市場，那他們就可以去大灣區各個城市巡演。反過來，澳門作為國際交流的平台，亦可以利用自身優勢幫助大灣區的內地城市對接國際市場。」



橫琴粵澳深度合作區澳門研究系列講座第四期

The 4th Session of Guangdong-Macao In-Depth Cooperation Zone in Hengqin—Macao Studies Seminar Series

聚焦本土 放眼國際

無論是做澳門研究，還是服務社會，澳門研究中心始終堅持用國際視野看問題，這既得益於澳門國際化的城市文化，也源於澳門對外開放的歷史。林教授說，「如果去瞭解澳門的歷史，你會發現，開放包容是澳門起家的原因之一。澳門地方小，自然資源少，要發展只能靠人、靠眼光。在歷史上，澳門有很多出

乎意料的发展，比如港口開放、博彩業政策，但澳門人把握住了各個時期的歷史機遇，這源於我們的自信開放包容。我們的跨文化交流能力是很強的，不論是在歐洲還是東南亞，都有歷經幾百年積累的人際往來，我們也始終以國際視野在關注本土發展。這些都是我們引以為傲的東西，要發揚光大。」

Bridging the Past and Future, Keeping Pace with the Times

In 1987, the Centre for Macau Studies (CMS) of the University of Macau, formerly known as the Institute of Macau Studies of the University of East Asia, was established under the leadership of Professor Ta Kuang Lin, the then Rector. In the following year, the academic journal, *Journal of Macau Studies*, was also founded. Professor Lok Fong Lam, Director of CMS, explains, “In the inaugural issue of the Journal, it was emphasised that as a university in Macao, it is essential for us to have a dedicated institution to explore the intricacies of Macao. This is not only to familiarize ourselves with Macao’s history but also to gain insights into its future development.”

The Centre conducts research of Macao with different objectives at different times along with the development of the society. Its research focus can be divided into three stages:

- As early as in the 1980s and 1990s, CMS served as a think tank and collaborated with a number of social elites and industry leaders. It provided advice on the challenges faced in the sovereignty transfer process, such as the localisation of Macao’s civil servants and legislation.

- After the handover of Macao, CMS has conducted in-depth studies on major issues in Macao during various periods. These issues include public administration reform and MSAR governance, cultural heritage protection and the value of the Historic Centre of Macao, cultural industries development and regional cooperation, the implementation of “One Country, Two systems” and Macao’s competitiveness in the 21st century.

- In recent years, with China’s Belt and Road Initiative and the development of Guangdong-Hong Kong-Macao Greater Bay Area, Macao has entered a new stage in its history and is now closely related to national policies. According to UM’s vision to “root itself in Macao, integrate itself into the Greater Bay Area, and relate itself vis-à-vis China and beyond,” CMS has repositioned itself to become a pioneering regional centre for interdisciplinary research of Macao and Greater China. It is committed to bringing Macao studies to the forefront of global academia.

Unveiling Hidden Insights, Making Comprehensive Plans

CMS conducts various research on the past, present, and future of Macao society, uncovering profound insights from subtle details. In 2022, the Centre embarked on the compilation of the *Macao Gazetteers*, consisting of seven sub-volumes: Geography, Law and Government, Summary Chronicle of Events, Society, Culture, Economy, and People. In addition to studying Macao’s past, the Centre also initiated a project dedicated to exploring Macao’s contemporary history. Its first volume, *On the Frontline of Change: An Oral History of Macao in the Pre-Handover Era*, offers first-hand accounts of the Sino-Portuguese negotiations and the transformations that Macao underwent over the years. It provides a comprehensive



澳門研究中心出版物
CMS Publications

Feature Stories - Distinctive Humanities and Social Sciences

overview of Macao's development since the handover and has received widespread acclaim since its publication in 2020. Looking towards the future, the Centre has developed a macroeconomic model that provides timely and insightful analysis of the Macao economy. This model serves as a valuable tool for decision-makers in formulating provident plans.

In addition, CMS has collaborated with many associations in Macao to conduct joint research. It has engaged in a

study with Caritas Macau to study Macao's low-income families, focusing on issues of depression and suicide among these family members. Results of the study suggest that governmental and societal resources should be increased to support these low-income families. The Centre also worked with Tung Sin Tong to study the history of charity, social services, and volunteerism in Macao and founded a scholarship to support research in this direction.



2022年10月，澳門研究中心與同善堂舉辦“華人的社會救濟與慈善傳統：慶祝澳門同善堂成立130周年學術研討會”

In October 2022, CMS and Tung Sin Tong Hold the Commemorative Conference on the 130th Anniversary of Tung Sin Tong

Reaching Win-Win Outcomes with Feet on the Ground

In this new era, in line with the collaborative development of the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) and the integration of Macao and Hengqin, CMS has organised the Guangdong-Macao In-Depth Cooperation Zone in Hengqin—Macao Studies Seminar Series and conducted a study on the participation of Macao residents in the GBA. The aim is to provide guidance for the moderate and diversified economic development of Macao.

When it comes to how Macao residents can integrate into the Greater Bay Area, Professor Lam believes that both sides should leverage each other's needs with their feet on the ground. “What does it mean? Some individuals might already have a well-established platform for career development in Macao, with their families residing here, enabling them to live in and serve for Macao. On the other hand, there are

those who may face limited job opportunities in Macao's labour market. In such cases, the Greater Bay Area can provide a larger platform for them. For example, Cantonese drama actors may have limited performance opportunities in Macao due to the small market. They may only perform a few days after a month of rehearsals. However, the cities within the Greater Bay Area are geographically close, share the same language and culture, and offer a broader market. This allows them to tour and perform in various cities within the region. In return, Macao can utilise its own advantages as an international exchange platform to assist mainland cities in the Greater Bay Area in connecting to the international market,” affirms Professor Lam.

Focusing on the Local Needs while Embracing Global Perspectives

CMS has consistently upheld an international perspective while engaging in Macao studies and serving the community, benefiting from Macao's vibrant international city culture and its history of embracing the world. Professor Lam emphasises, "When examining Macao's history, you will find that its openness has been instrumental in its success. Despite having limited natural resources, Macao has thrived thanks to the ingenuity and insights of its people. Throughout its history, Macao has experienced unexpected developments, such as the opening of ports and the gaming industry. The people

of Macao have seized the opportunities presented by these historical moments, driven by self-confidence, openness, and tolerance. With centuries of exchange with Europe and Southeast Asia, the people of Macao possess strong cross-cultural communication skills and have always prioritized local development with an international perspective. These are the aspects that make Macao proud, and its people are committed to carrying them forward."



林玉鳳教授
Professor Lok Fong Lam

焦點對話

Focus Dialogue

高研院：推動跨界合作，促進協同創新

Institute of Advanced Studies in Humanities and Social Sciences: Boosting Cross-border Cooperation and Collaborative Innovation

於興中現為澳大法學院環球法律學系講座教授、人文社科高等研究院院長。他在美國哈佛大學取得法學碩士和法學博士學位，在康奈爾大學、香港中文大學、哈佛法學院等知名院校累積了30年的教學和研究經驗，曾被委任為康奈爾大學法學院Anthony W. and Lulu C. Wang中國法教授。

Professor Xingzhong Yu currently serves as a Chair Professor of the Department of Global Legal Studies in the Faculty of Law and Director of the Institute of Advanced Studies in Humanities and Social Sciences (IAS) at UM. He obtained his Master of Law and Doctor of Juridical Science from Harvard University in the United States. He has 30 years of teaching and research experience at top universities such as Cornell University, Chinese University of Hong Kong, and Harvard Law School, and he was appointed as the Anthony W. & Lulu C. Wang Professor in Chinese Law at Cornell Law School.

王笛現為澳大歷史系講座教授、人文社科高等研究院副院長。他在美國約翰霍普金斯大學歷史學取得博士學位，曾任美國德克薩斯農工大學歷史系教授，英文學術季刊《中國歷史前沿》（FHC）共同主編、中國留美歷史學會會長等。他曾獲得美國城市史研究學會最佳著作獎、首屆呂梁文學獎、中國會黨史研究會優秀學術著作獎等獎項。他的研究關注中國社會史、城市史、新文化史、日常生活史和微觀史。

Di Wang is Chair Professor in the Department of History and the Associate Director of the Institute of Advanced Studies in Humanities and Social Sciences (IAS) at UM. He holds a PhD in history from Johns Hopkins University in the United States. He served as a Professor in the Department of History at Texas A&M University in the United States, co-editor of the English academic quarterly *Frontiers of History in China*, and president of the Chinese Historians in the United States. He has received awards such as the Best Work Award from the Urban History Association in the United States, the inaugural Lv Liang Literature Award, and the Outstanding Academic Work Award from the Association for the Studies of Chinese Secret Societies. His research interests include Chinese social history, urban history, new cultural history, daily life history, and microhistory.



於興中教授
Professor Xingzhong Yu



王笛教授
Professor Di Wang

問：人文社科高等研究院（下稱「高研院」）成立的背景和定位是什麼？

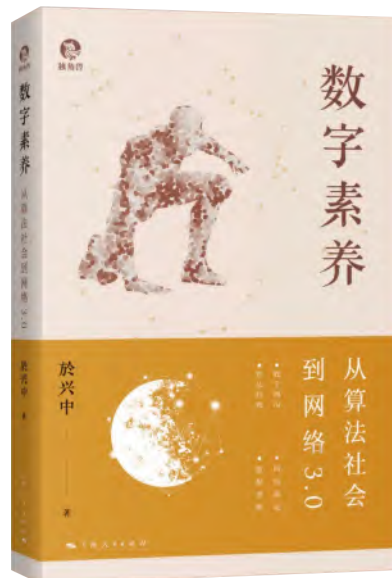
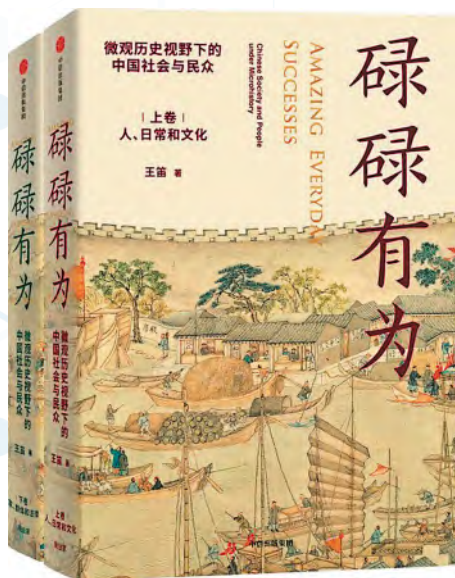
於興中：現在跨學科和跨學院的合作性研究，已經成為一個國際趨勢。以往的研究都是各自為政。近幾十年，人們關注問題的角度發生了變化，各個學科之間交流合作的趨勢也就逐步興起，我想這可能是一個大的背景。具體來講，澳大不同學院之間如何協調，如何互相促進，把不同學科的優勢都發揮出來，並且能夠調動跨學科合作的積極性，這是我們2019年成立高研院的構想。

王笛：除了國際趨勢，也有出於國內的考量。現在國內的一流大學比如北大、清華、復旦都設有高等研究院。澳大成立高研院其實除了整合我們自己內部的資源，也有利於對外的學術交流。高研院實際上就是要創造一個平台，讓人文、歷史、理工有更多的交流與合作。在過去，文科和理科是截然分離的，但是我們現在有意要打破他們之間的壁壘。

問：在推廣人文、社科和科技領域的跨界合作方面，高研院有哪些舉措來實現資源協同？

於興中：我們開展了很多活動，像我們的崇文講座、高仕圓桌論壇、學科對話例會、東望洋論壇等，邀請到各個不同院系的學者參加。前不久，我們舉辦了高仕圓桌會議—ChatGPT 之解讀與思考，邀請了科技學院院長須成忠教授、法學院院長唐曉晴教授和社會科學學院傳播系趙心樹教授等多位不同專業的頂級學者，從不同角度探討了 ChatGPT 所涉及的跨學科議題。

我們不僅從老師、從研究者的角度，也從學生的角度出發去考慮問題。我們現在正在籌辦一個大灣區博士生論壇，由澳大牽頭，圍繞大灣區的經濟建設，組織全國的博士生參與。初步考慮線上線下相結合的模式，設置 4 個分論壇，以知識產權、科技金融、網絡治理、生物科學為主題進行交流探討。



於興中教授、王笛教授著作入選2023年“新華薦書”名單

Professor Xingzhong Yu and Professor Di Wang's Books Made the List of 2023 Xinhua Recommended Books

問：兩位都是跨學科研究的代表，於興中教授是法學大家，同時還在語言學、人工智能、大數據等領域有涉獵；王笛教授的多個著作都融合了歷史學、經濟學、人類學、社會學。可否請兩位教授聊聊跨學科研究的樂趣？

於興中：我覺得這與個人的研究方法和研究角度有關係，就我而言，我不是一個分門別類而是問題導向的學者。所謂不同的學科，其實在很大的意義上來說是不同的方法，從不同角度去研究一個問題，自然而然的就多學科的，比如說研究社會正義的問題，我們可以從政治哲學，從法哲學，也可以從一般的哲學，然後從社會學，甚至人類學的角度進行分析。

我一直在研究社會理論，關於什麼樣的社會是最好的社會，關注社會上各種各樣的問題，經濟問題、社會問題、犯罪問題等等，這是傳統的一些研究方法。但是過去 20 年科技的突飛猛進，你不得不去考慮科技到底是什麼，新的科技究竟如何為我們社會造福，為我們的學科領域服務或者發揮作用，所以我的出發點還是從社會人文的角度來看待科技。



於興中教授(右)與王笛教授(左)在高研院合影
Professor Xingzhong Yu (right) and Professor Di Wang (left) at IAS

王笛：其實樂趣就在於當你努力了很多年，你的成果很快變成書，讓讀者能讀到，讓學術界能看到。就像懷孕了 7 年的孩子終於要出生了，這個心情肯定是很興奮的。當你發現了一種觀點，能夠從歷史的角度發現一些過去別人沒有發現的東西，而且對歷史研究或者對領域之外的學者都有啟發，這都是令人欣慰的事情。

學術研究是一個艱苦的過程，就是日復一日、年復一年深挖同一個課題，閱讀資料，發掘資料，然後把它寫成論文，最後寫成書。說實話，我們做的研究是非常小眾的，做學術研究要耐得住寂寞，冷板凳哪怕是坐 10 年也不奇怪。當然作為一個學者，如果能

把我的成果，讓不同專業的人甚至大眾都能喜歡那又何樂而不為呢。所以我在寫作的同時也在進行調整和探索，跳出學術研究的思維方式，不用很多高深莫測的專業術語，而是用大眾能接受的寫作方式，體會到我想要表達的意思和觀點。這就需要琢磨和思考，甚至要反復地寫。我舉個最簡單的例子，《中國記事》其實我在幾年前就完成了，每一章單獨作為一篇論文發表了，但後來我就想，如果我用非常學術的表達，讀者的範圍會很有限。因此我就花了很長的時間重寫了一遍，這樣一寫的話，我估計大眾也會關注到，學術研究領域以外的人都會感興趣。

問：現在很多青年學者都面臨激烈競爭和職業壓力，可以在哪些方面給青年學者提供更多人文關懷？

於興中：培養人文關懷確實是一件非常有意思的事情。首先要給青年學者表演的機會，比如說我們準備開的大灣區博士生論壇。通過這樣的交流，自然而然地去培養這種人文關懷。其次也可以在青年學者剛入職的時候請老員工給他們提供一對一的指導，同時學院也需要多關注他們的心理和思想狀態。

王笛：現在的青年學者壓力真的很大，其實世界各國都是這樣。壓力太大會影響到他們的研究和正常生活。我覺得作為學校也好，學院也好，對青年老師，一方面要勉勵他們去做更好的研究，不可能躺平的對吧？我和於老師都這麼大年紀了，我們都還很努力，那麼年輕人努力也是正常。但是另一方面確實學校可以做一些事情，比如說首先要讓他們明確地知道，我們期望你們要達到什麼要求，不能模糊。在他們悶頭苦幹的時候去隨時提醒他們，關心他們現在走到哪一步了，下一步應該怎麼走。

Q: What is the background and positioning behind the establishment of the Institute of Advanced Studies in Humanities and Social Sciences (IAS)?

Xingzhong Yu: Cross-discipline and cross-faculty research has become an international trend. In the past, research was conducted separately. In recent decades, people's perspectives in approaching issues have changed, and the trend of exchange and collaboration among different disciplines has emerged accordingly. In specific, our idea of establishing IAS in 2019 was to coordinate different faculties of UM, promote mutual support, leverage the strengths of various disciplines, and foster enthusiasm for interdisciplinary cooperation.

Di Wang: In addition to the international trend, we also took domestic factors into account. Top Chinese universities such as Peking University, Tsinghua University, and Fudan University all established institutes for advanced studies. The establishment of IAS at UM not only integrates our internal resources but also facilitates external academic exchange. In fact, IAS aims to create a platform for enhanced communication and cooperation among humanities, history, science, and technology. While arts and sciences were traditionally segregated in the past, we now intend to break down these barriers.

Q: To promote interdisciplinary cooperation in the fields of humanities, social sciences, and science and technology, what measures has IAS taken to integrate resources?

Xingzhong Yu: We have initiated many activities, such as Lectures on Frontiers in Humanities, Round Table Discussions, Cross-disciplinary Dialogue Meetings, and Guia Lectures. Scholars from different faculties are invited to participate. Recently, we held the Round Table Discussion—Interpretation and Reflection on ChatGPT. We invited top scholars from various disciplines, including Professor Chengzhong Xu, Dean of the Faculty of Science and Technology; Professor Io Cheng Tong, Dean of the Faculty of Law; and Professor Xinshu Zhao from the Department of Communication, Faculty of Social Sciences, to discuss the interdisciplinary issues involved in ChatGPT from different perspectives.

We approach issues from both the standpoint of teachers and researchers, as well as that of students. Currently, we are organising a forum for PhD students in the Greater Bay Area, led by UM, to encourage participation from doctoral candidates across China. The forum aims to facilitate discussions on the economic development of the Greater Bay Area and will be held in a combination of online and offline format. The forum will consist of four parallel sessions, each focusing on distinct topics: intellectual property, financial technology, internet governance, and bioscience, respectively.

Q: Both of you are representatives of interdisciplinary research. Professor Yu, in addition to being a distinguished scholar in law, you also have experience in linguistics, artificial intelligence, and big data. Professor Wang, many of your books integrate history, economics, anthropology, and sociology. Could you share the joy of doing interdisciplinary research?

Xingzhong Yu: I believe it relates to one's research methods and perspectives. For me, I am a problem-oriented scholar rather than one who specialises in one area. The so-called different disciplines, to a large extent, represent different approaches to studying an issue. Therefore, if you study an issue from various perspectives, you may adopt multidisciplinary approach accordingly. For instance, when studying social justice, we can analyse it from perspectives of political philosophy, legal philosophy, general philosophy, sociology, and even anthropology.

I have been studying social theory, exploring what constitutes the ideal society, and focusing on various societal problems such as economic issues, social problems, and crime. These are some of the traditional research methods. However, with the rapid advancement of technology over the past 20 years, it becomes necessary to consider what technology is and how new technology can benefit society and play a role in different disciplines and fields. Thus, my starting point is still examining technology from a social and humanistic perspective.

Di Wang: The joy lies in the fact that after years of dedicated efforts, your results turn into books that are appreciated by readers and fellow academics. It is like nurturing a seedling for years and finally seeing it grow into a strong, fruitful tree. It is truly exciting. When you stumble upon a perspective that enables you to unearth previously undiscovered historical insights, or when your work inspires scholars beyond the realm of historical research, it becomes a gratifying experience.

Academic research is a demanding process that involves delving deeper into the same subject day after day, year after year. It entails studying data, uncovering information, and then translating it into papers and ultimately into a book. To be honest, the research we undertake often revolves around a highly specialised niche. Therefore, we must endure solitude and spend countless hours at a desk even for 10 years. However, as a scholar, if I can make my findings accessible to people from diverse backgrounds, including the general public, why not? So, while writing, I adjust my style to avoid excessive use of professional jargon and convey my thoughts in a manner that the general public can understand. This requires extensive contemplation and even multiple rounds of writing. For example, a few years ago, I completed the content of a book that focused on Chinese history from 1912 to 1919. I have already published each chapter as a journal paper using academic language, but then I realised that it would limit the readership. So, I invested a lot of time in rewriting the material to capture the attention and interest of a broader public audience.

Q: Young scholars now face fierce competition and career pressure. What can we do to provide them with more humanistic support?

Xingzhong Yu: Nurturing a culture of humanistic care is indeed a fascinating endeavor. Firstly, we can provide young scholars with opportunities to showcase their abilities, such as the upcoming forum for PhD students in the Greater Bay Area that we are organising. Through such exchanges, fostering humanistic care can occur organically. Secondly, we can also arrange senior staff members to provide one-on-one guidance to young scholars as they embark on their careers. Additionally, faculties should pay closer attention to their psychological well-being.

Di Wang: Young scholars face great pressure, not only in our country but worldwide. This overwhelming pressure can negatively impact their research and personal lives. Universities and faculties should encourage young scholars to engage in high-quality research, just as experienced professors like Professor Yu and myself continue to work diligently. However, the University also has a vital role in supporting young scholars by clearly defining its expectations and providing reminders and guidance. Showing genuine concern for their achievements and guiding them toward their next steps can alleviate some of the pressures they face.



2022年5月，高研院舉辦第二屆週年國際學術研討會
In May 2022, IAS held the 2nd IAS Annual Conference

跨學科探索行為成癮背後的秘密

Interdisciplinary Studies on Secrets Behind Behavioural Addiction

為配合澳門大學「3+3+3+3」的戰略研究佈局，促進跨學科研究領域交叉融合，大學推出多年度研究資助計劃——協同合作研究資助（MYRG-CRG），旨在為教研人員進行協同合作和跨學科研究提供資助。「遊戲和賭博成癮的神經認知機制」是獲得該項資助的代表性項目之一，項目負責人胡文詩是澳門大學社會科學學院副院長(研究)、認知與腦科學研究中心成員、心理學系教授。她在香港中文大學取得博士學位，目前的研究方向主要集中在行為成癮（例如，賭博障礙、遊戲障礙、網絡成癮、智能手機使用問題和過度消費）以及其他身心健康問題。

In line with UM's "3+3+3+3" strategic research layout, the University has launched the Multi-Year Research Grant-Collaborative Research Grant (MYRG-CRG) to foster interdisciplinary collaboration and knowledge exchange among researchers. One of the notable projects funded by this grant is titled "Neurocognitive Mechanisms of Gaming and Gambling Addiction." The project is led by Anise Man Sze Wu, Associate Dean (Research) of the Faculty of Social Sciences and Professor in the Department of Psychology. She also serves as a member of the Centre for Cognitive and Brain Sciences at the University. Professor Wu, who holds a PhD from the Chinese University of Hong Kong, focuses her research on behavioural addictions. These include gambling disorders, gaming disorders, internet addiction, smartphone use problems, and overconsumption. She also studies various physical and mental health issues related to these addictions.

問：可否請您簡單介紹「遊戲和賭博成癮的神經認知機制」這個項目？

胡文詩：成癮是指人無法控制自己，無法停止做一件可能會傷害自己的事情。一旦成癮，即使努力停止有關行為也很容易故態復萌，因為長期的成癮行為可能使他們的大腦機能甚至大腦結構發生變化，從而相較於非成癮的個體，他們更難控制他們成癮行為。目前已有大量關於毒品和酒精等物質成癮的研究，近年也有越來越多專家關注行為成癮。賭博成癮（又稱「賭博失調」或「病態性賭博」）早已列入正式的疾病分類系統，而遊戲障礙（又稱「遊戲成癮」）則在2019年第72屆世界衛生大會上才列入《國際疾病分類》。遊戲成癮和賭博成癮在臨床診斷中表現出相似的症狀，越來越多的研究也逐漸表明遊戲成癮和賭博成癮是有相關性的。

我們的研究團隊在2021年初與聖公會澳門社會服務處正式合作收集數據，招募有網絡遊戲或博彩習慣的人士和其他人士執行一系列決策性任務，並採用功能磁共振成像（一種通過檢測血液流動來測量腦活動的技術）記錄他們靜息狀態以及執行任務時的大腦活動，此外還對所有的參與者進行訪談和問卷調查，藉此了解不同程度成癮的人士在決策和自我抑制控制

等認知功能上的差異。我們的研究項目其中一大目的是研究成癮行為的神經可塑性。



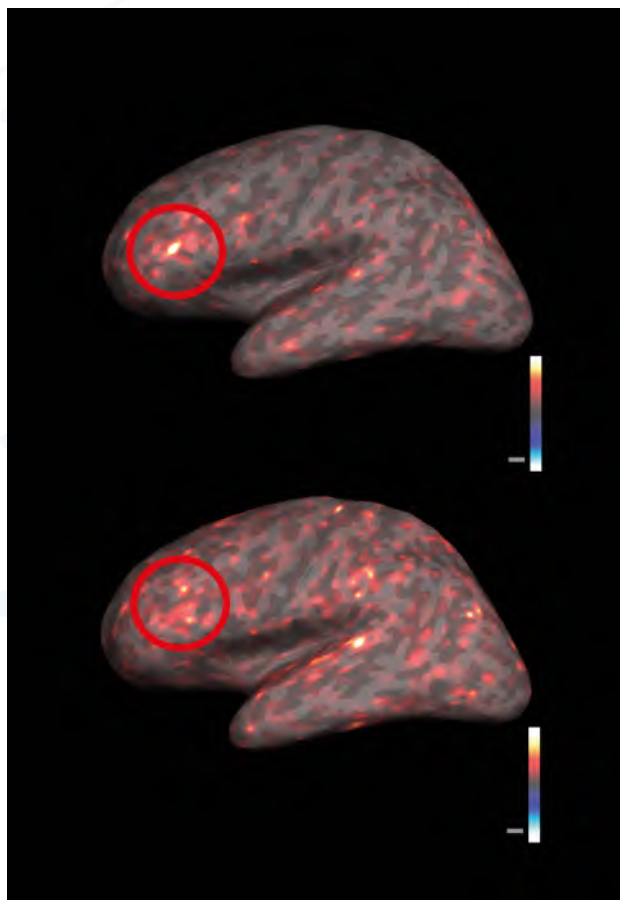
胡文詩教授

Professor Anise Man Sze Wu

問：研究行為成癮，為何要對人的腦部進行掃描呢？

胡文詩：物質成癮和行為成癮均與大腦的獎賞系統息息相關，而多巴胺這種神經傳導物質在其中扮演重要角色。當我們接收到獎賞性的刺激，例如吃了一件甜品或贏了一場遊戲時，中腦會產生多巴胺。多巴胺經神經傳導路徑到達額葉皮層和邊緣系統，這被稱為中腦—皮層—邊緣多巴胺系統，也被稱為獎賞系統。這一過程使我們產生一種滿足感，並對這種感覺形成記憶。獎賞系統讓我們有動力進食、繁殖和執行其它重要任務。當多巴胺不足時，我們會感到沒有動力、難以集中。

我們的研究數據收集過程超過一年半，期間參加者要接受多次掃描和提供資料，使研究人員得以了解遊戲和賭博成癮如何隨時間推移而演變，從而找出有機會用於判斷成癮程度的生物標記。我們在一項關於撲克牌遊戲的前期研究中發現，與一般人士相比，賭博成癮人士在作出有風險的賭注並勝出時，大腦獎賞系統激活程度較低。這或許解釋了為何成癮人士會傾向比其他人尋求更多、更大的刺激，因為可能只有更多、更大的刺激才能讓成癮人士的獎賞系統激活。我們的研究還發現，賭博成癮者等待賭局結果時，他們獎賞系統的部分腦區也得到激活，而在其他人士的相同腦部卻觀察不到這種反應。這點很可能反映成癮者所沉迷的不單是博彩的獎賞，還有下注和等待結果的過程。



功能性磁共振成像掃描顯示研究參加者執行不同風險的決策任務時的腦部活動的差異

The fMRI Scans Show Differences in Brain Activity of Research Participants When They Perform Different Risky Decision-making Tasks

問：在澳門開展這項研究有何優勢和意義？

胡文詩：亞太地區多地近年積極發展博彩業，網絡遊戲和網絡博彩也在全球大行其道，相關的成癮患病率也伴隨提高。澳門作為一個博彩業高度發達的地區，為我們的研究提供了豐富的樣本和數據。我們的研究項目成果不但能惠及澳門社會，還能夠為全球各地的專家和機構提供研究數據。通過這個研究項目，我們也與聖公會澳門社會服務處建立了長期的合作關係。除了招募市民參加研究，雙方也加強了知識交流和合作，尤其是進一步推動了社區教育和干預服務。

通過深入了解和揭示大腦與行為成癮的關係，我們團隊也期望鼓勵有行為成癮的人士了解成癮是基於多種複雜因素，但是這並不代表他們有壞的本質。其中一個看法是行為成癮可被理解為一種涉及腦部活動甚至結構異常的慢性疾病。就像其他身體或精神狀況不健康的人一樣，行為成癮者應該尋求專業治療及協助，改善生活質素。

問：您如何看待澳大推出的多年度研究資助計劃—協同合作研究資助 (MYRG-CRG) ？

胡文詩：澳大近年大力推動跨學科研究，並且從項目和經費層面給予研究人員實質上的鼓勵和資助，對我們研究者來說是很振奮的。澳大在 2017 年成立協同創新研究院，並下設認知與腦科學研究中心，開展極具跨學科特質的項目，並將成果轉化為解決健康和澳門重大社會問題的方案。透過 MYRG-CRG 的資

助，我們匯聚了來自社會科學學院、健康科學學院、工商管理學院以及科技學院的專家以項目的方式通力合作，這些專家們分享了他們在成癮研究的專業知識和技能，推動學科的交叉融合和研究創新，更好地服務澳門社會和國家創新發展。



認知與腦科學中心內的3T功能磁共振成像系統

A 3T Functional Magnetic Resonance Imaging System in the Centre for Cognitive and Brain Sciences

Q: Could you please give a brief overview of your project “Neurocognitive Mechanisms of Gaming and Gambling Addiction” ?

Anise Wu: Addiction is our inability to stop doing something that can harm us. Once people try to stop their addictive behaviours, they may easily get relapsed. As long-term addictive behaviours may result in changes in brain function and even brain structure, this makes it more difficult for addictive people to control addictive behaviours than healthy individuals. While there is a large body of research on substance addiction such as drugs and alcohol, there has been a growing interest in behavioural addiction in recent years. Gaming disorder, also known as gaming addiction, was only recently included in the International Classification of Diseases at the 72nd World Health Assembly in 2019. Gaming and gambling addiction share similar symptoms in clinical diagnoses, and many studies suggest that these two types of addiction are closely linked.

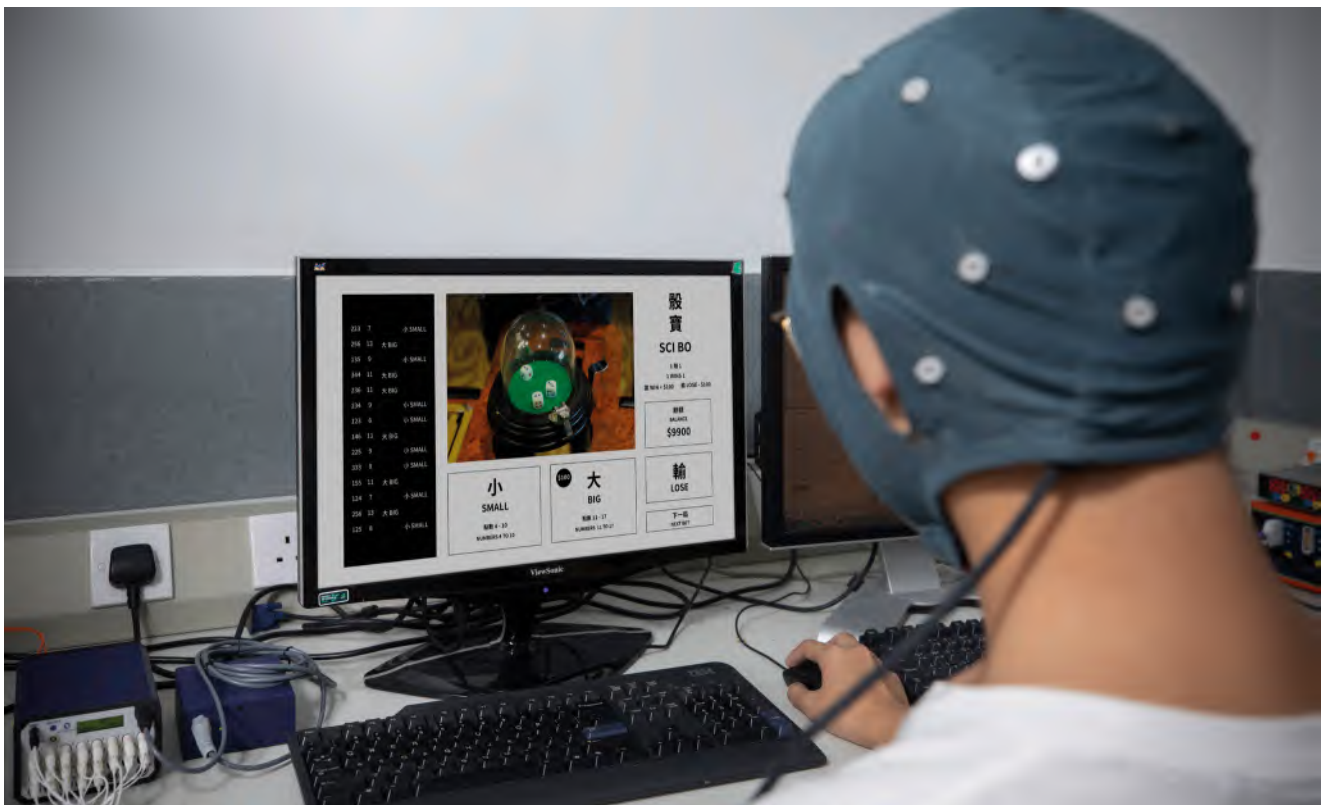
In early 2021, our research team started to collaborate with Sheng Kung Hui Macau Social Services Coordination Office to collect data by recruiting people with online gaming or gambling habits and others without such habits for the project. The brains of the research participants were scanned with a functional magnetic resonance imaging system (fMRI, a technique that measures brain activity by detecting blood flow) to record their brain activity at rest and during the time they performed the decision-making tasks. Interviews and questionnaires were also conducted to understand the differences in cognitive functions such as decision-making and inhibitory control among people with varying levels of addiction. One of the main goals of our research project is to investigate the neuroplasticity of addictive behaviours.

Q: What is the rationale behind using brain scans to study behavioural addictions?

Anise Wu: The brain's reward system is involved in both substance and behavioural addiction, with the neurotransmitter dopamine playing an important role. When stimulated, such as eating dessert or winning a game, an area in the midbrain produces dopamine. This dopamine travels through neural signalling pathways to the frontal cortex and limbic system, forming the midbrain-cortex-limbic dopamine system, also known as the reward system. This process creates a feeling of satisfaction and motivating us to perform vital tasks such as eating and reproducing. A lack of dopamine results in a loss of motivation and concentration.

The data collection process for our study took over a year and a half. During the time, participants have their brains scanned multiple times and provided their information, so that researchers can understand how gaming and

gambling addiction evolves and can identify biomarkers that can potentially be used to determine the level of addiction. In a preliminary study on poker games, we found that compared to healthy individuals, people with gambling addiction showed lower activation levels in the reward system when risky decisions were made and won. This may explain why people with addictions seek more and stronger stimuli than others, because only by doing this can their reward systems be activated. We also found that certain brain areas associated with the reward system were activated in addicted gamblers when they were waiting for the outcome of a bet, a response not observed in the same brain areas of other people. This suggests that addicts crave not only for the rewards of betting but also the process of betting and waiting for a potentially rewarding outcome.



研究人員檢視過往賭局結果等視訊信息是否會導致認知偏差

Researchers Examine Whether People Develop Cognitive Biases due to Visual Information such as the Outcome of Previous Bets

Q: What benefits and importance does conducting this study in Macao bring?

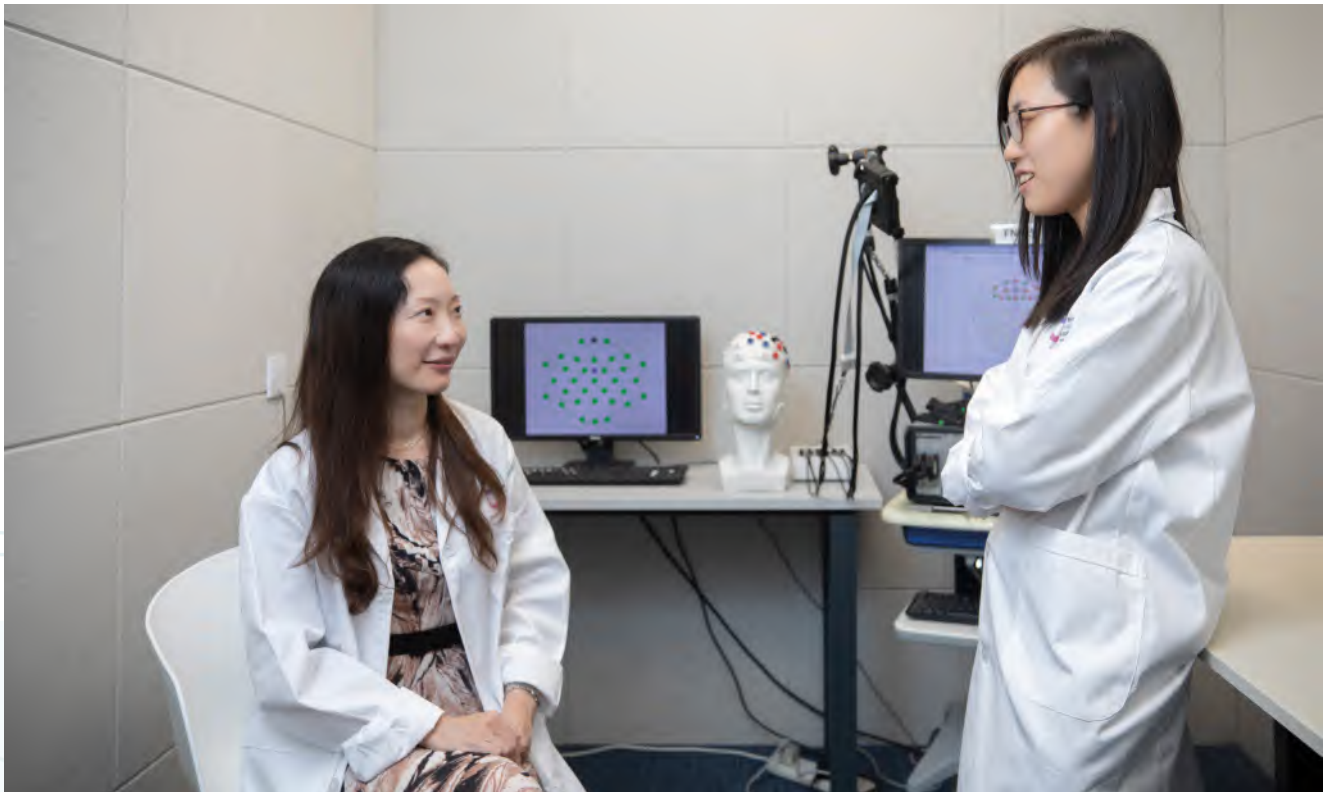
Anise Wu: As the gambling industry continues to grow rapidly across the Asia-Pacific, online gambling and gaming are also becoming more common worldwide, leading to an increase in related addictions. Macao, as a highly developed region for the gaming industry, provides a rich sample and data for our research. The results of this project will benefit not only the local community but also experts and institutions around the world. We have established a long-term partnership with the S.K.H. Macau Social Services Coordination Office to recruit participants, share knowledge, and collaborate on community education programmes and intervention services.

By comprehensively understanding and showing how behavioural addiction changes the brain, we also hope to help those affected recognise that addiction is the result of a variety of complex factors, and it does not represent a bad personality. One point of view is that behavioural addiction is a chronic disease related to abnormality in brain activity or even structure. Just like those with other illnesses, people with behavioural addiction should seek professional treatment and assistance to improve their quality of life.

Q: What is your opinion on the Multi-Year Research Grant–Collaborative Research Grant (MYRG-CRG) launched by the University?

Anise Wu: In recent years, UM has promoted interdisciplinary research, and it is exciting for researchers that UM is providing project and funding support. In 2017, UM established the Institute for Collaborative Innovation, which includes the Centre for Cognitive and Brain Sciences, to conduct interdisciplinary projects and translate the results into solutions for health and major issues in the Macao community. Through MYRG-CRG, we bring together

experts from the Faculty of Social Sciences, the Faculty of Health Sciences, the Faculty of Business Administration, and the Faculty of Science and Technology at UM to share their knowledge and skills on investigating addiction development. This does not only promote cross-discipline collaboration and research innovation, but also better serves the Macao community and national innovation development.



胡文詩教授(左)和研究助理李雯慧

Professor Anise Man Sze Wu (left) and Research Assistant Caren Lei

人才培養

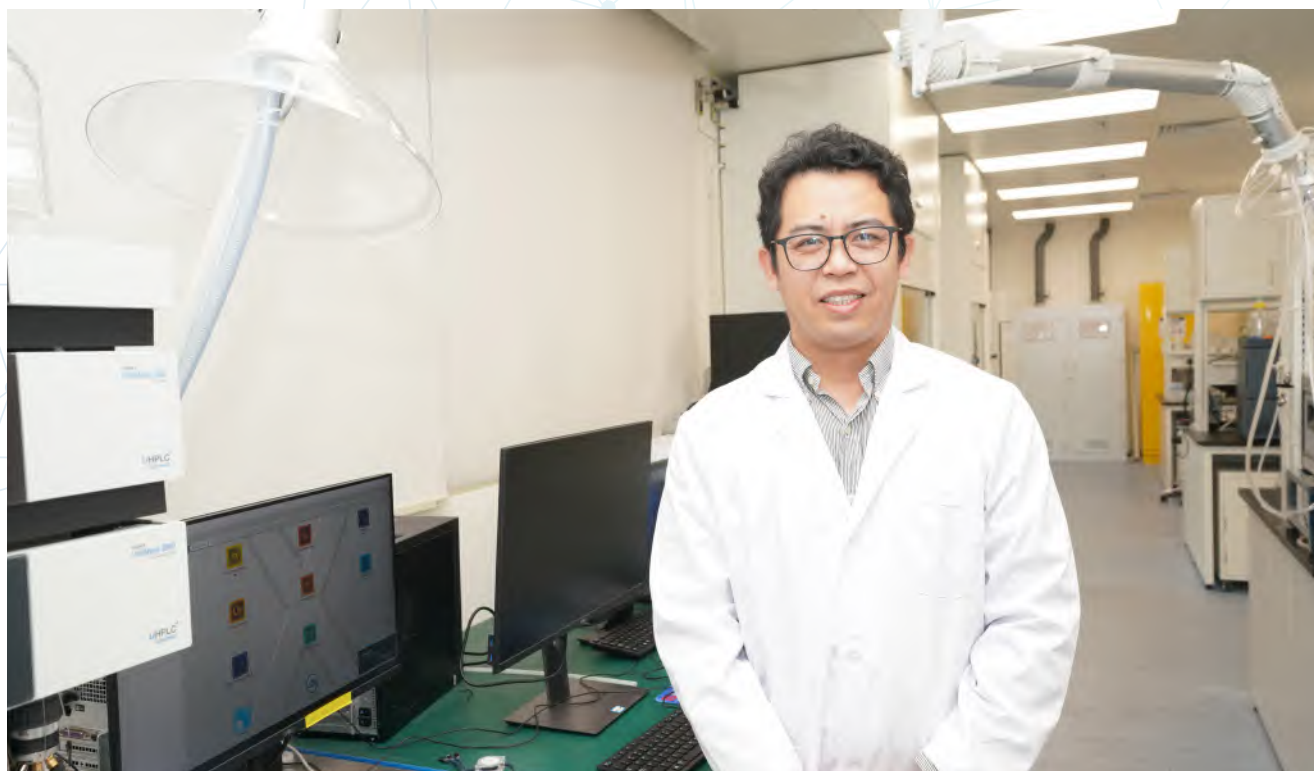
Talent Development

港澳優青郝天偉：變廢為寶，回收遺失的城市資源

NSFC Excellent Young Scientist (Hong Kong and Macao), Tianwei Hao:
Transforming Waste into Treasure, Recycling Lost City Resources

國家自然科學基金委員會自2019年開放「優秀青年科學基金項目（港澳）」給港澳8間大學的年輕學者申請。澳大連續4年共有11名學者入選，展示了澳大在科研創新和青年人才培養取得的成果。科技學院助理教授郝天偉的項目「污水處理與資源化」於2022年入選，該項目提出微生物高價值代謝產物回收與污染物高效去除並進的解決思路，通過開發微生物基因代謝模型和自凝集顆粒污泥成功的將水中污染物轉化為稀缺資源硫酸多糖，可廣泛的應用在工業、農業及食品等領域。

Since 2019, when the National Natural Science Foundation of China (NSFC) opened its funding for young scholars at eight universities in Hong Kong and Macao, UM scholars have consistently been included among the list of recipients. To date, a total of 11 scholars from UM have been awarded this prestigious funding, highlighting the university's remarkable achievements in research innovation and talent development. One of the recipients is Tianwei Hao, Assistant Professor from the Faculty of Science and Technology, whose project titled "Wastewater Treatment and Resource Recovery" was awarded the NSFC funding in 2022. Professor Hao's project proposes a solution for the recovery of valuable microbial metabolites and the efficient removal of pollutants from wastewater. By developing a microbial genetic metabolism model and self-agglutinating granular sludge, Professor Hao's research team has successfully transformed water pollutants into valuable sulfated polysaccharides with broad applications in industrial use, agriculture, and food.



郝天偉教授

Professor Tianwei Hao

回收遺失的城市資源

「在現代城市生活中，遺失的資源50%以上都匯聚到污水中，這就給了我們一個動力和契機，有沒有辦法可以把這些遺失的資源拿回來？」，這是郝天偉教授看到廢水時的真實想法。他秉承著「物盡其用，資源合理分配」的理念，專注於廢水中污染物的定向生物轉化與資源化研究，並取得豐碩成果。

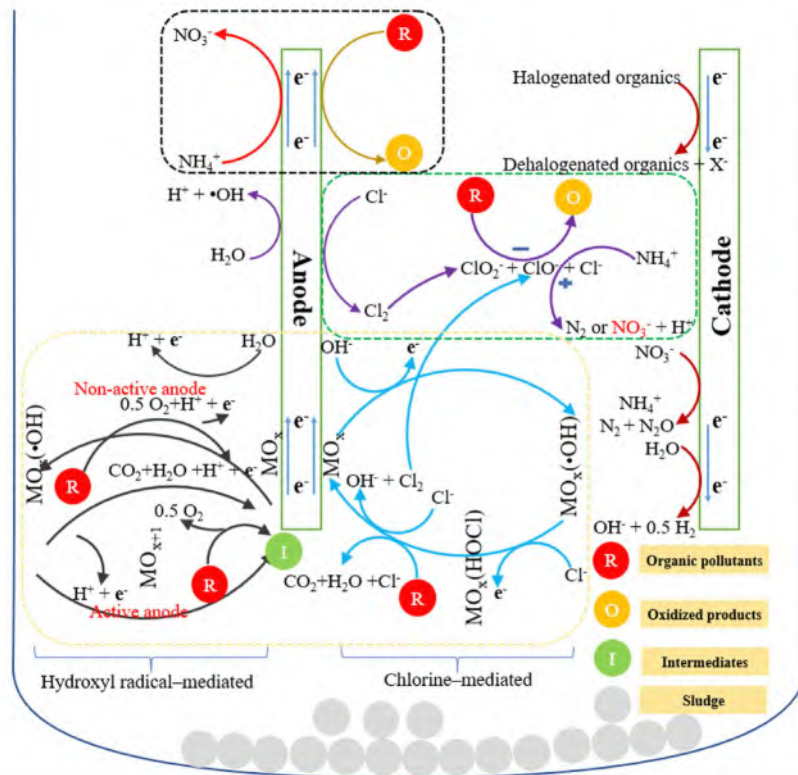
郝教授表示：「我們想要回收有較高市場價值或

者社會效應的東西，以此來彌補前端回收的費用。我們研究的多層級回收方案主要分為三個部分，第一部分是回收一些具有市場應用價值同時準入門檻比較低的物質，比方說藻石酸，可用於自修復水泥。第二部分是回收多糖硫酸，可用於造紙，生產橡膠、飼料和化妝品。第三部分是把剩餘的渣做成電容器，可用於儲放電。」

創新技術獲市場認可

目前郝教授研究團隊開發的三項原創技術都已完成了小試實驗，計劃在今年開展中試實驗。基於前期的研究成果，郝教授表示已與多家企業進行產學研合作，如偉明集團有限公司，華潤環保科技有限公司和瀚藍環境股份有限公司等。「我們有三項技術受到了市場青睞，其中兩項關於污水處理，一項關於垃圾滲濾液處理。第一項是污水厭氧處理技術，採用我們的

技術可以將污水處理的成本降低 60%。厭氧處理的優勢是既可以節約資源和費用，在處理過程中還可以回收由此產生的甲烷。第二項技術是我們在現有的 A2/O 技術的基礎上進行改良，由此形成的污水處理的替代方案可用於污水廠的提標改造；第三項是垃圾滲濾液膜濃縮液處理技術，能夠解決傳統技術流程複雜、耗時長及單一技術無法完全達標排放等問題。」



樹立正確的科研觀

郝教授強調，青年人從事科研工作一定要樹立正確的科研觀。他直言，做科研 90% 的時間可能都是很受打擊的，9% 的時間可能是彷徨不知所措的，也就剩下那 1% 的時間是有認知或理解提高的愉悅感。所以首先一定是自己真的熱愛，不要勉強自己。其次是追求對本領域最新的理解，並推動這個領域向前

走。第三是在有了新的理解的基礎上，一定要注重原創性的東西，不要局限在技術應用上。「有了這三點，做科研就形成了一個良性循環，這是最真實的體會。以前有人問我做科研的目標是什麼，我說是取悅自己。」

Recycling Lost City Resources

In modern urban life, over 50% of valuable resources are lost and end up in wastewater. This inspired Professor Tianwei Hao to ask, "Is there a way to recover these lost resources?" Guided by the principle of "making the best use of everything and allocating resources optimally," he embarked on research focused on targeted biotransformation and resource utilisation of pollutants in wastewater, leading to fruitful achievements.

Professor Hao says, "Our objective is to recycle materials that possess relatively higher market value or social benefits in order to offset the cost of initial recycling.

The multi-level recycling solution we have investigated consists of three parts. The first part involves the recovery of substances with market applications and low entry barriers, such as algolitic acid, which can be utilised for self-repairing cement. The second part focuses on the recovery of sulfated polysaccharides, which find applications in production of paper, rubber, fodder, and cosmetics. The third part entails transforming the remaining residue into capacitors for electricity storage and discharge."

Innovative Technology Gaining Market Recognition

Professor Hao's research team has successfully completed laboratory experiments for three original technologies and plans to conduct pilot experiments this year. Based on the preliminary research results, Professor Hao has established collaborations with several enterprises, including Weiming Group Co. Ltd, China Resources Environmental Protection Technology Co. Ltd, and Grandblue Environment Co., Ltd. Professor Hao explains. "Two focus on wastewater treatment and one on landfill leachate treatment. The first technology is related to anaerobic treatment of wastewater that can significantly reduce treatment cost by 60% by recycling

methane during the process. The advantage of anaerobic treatment lies in its resource and cost saving aspects, and the ability to recycle methane during the treatment process. The second technology is a modification of our existing A2/O technology, offering an alternative solution for upgrading wastewater treatment plants. The third technology is a treatment method for membrane concentrated liquor of landfill leachate that addresses the challenges of complex and time-consuming traditional processes and the limitations of single technologies in meeting discharge standards."

Cultivating a Sound Research Mindset

Professor Hao emphasised the importance of young researchers having a correct perspective on research. He stated that 90% of the time spent in research can be highly frustrating, 9% may be filled with confusion, and only 1% is the joy of advancing understanding and knowledge. Therefore, it is essential to have a genuine passion for research rather than forcing oneself into it. Researchers should also pursue the latest insights in their

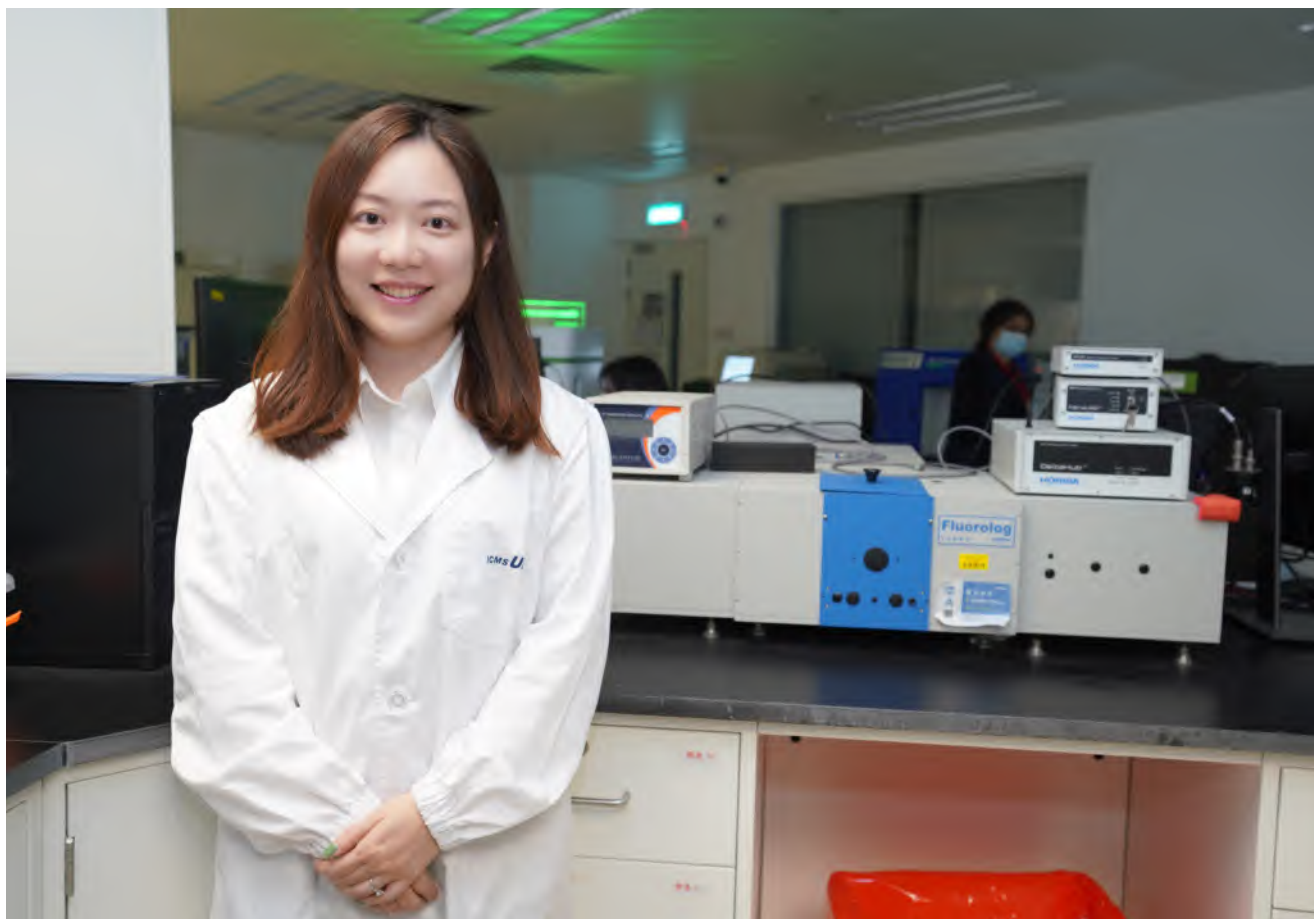
field and contribute to its progress, focusing on originality based on new understanding rather than being restricted to technical applications. "Following these points, one can build a virtuous cycle for research work," Professor Hao remarks. "This is my personal experience. When asked about my goal in doing research, I answered that it was to please myself."

濠江學者鄭慧珊：澳大助力本地青年學者實現科研夢

UM Macao Fellow Wai San Cheang: UM Empowering Local Young Scholars to Fulfill Their Research Dreams

澳大近年推出「澳大濠江學者計劃」，旨在招聘及培養本地年輕學者，同時吸引澳門傑出人才留澳發展。成功申請者除在澳大進行研究外，還可到外地著名大學或機構擔任訪問學者或研究員，進一步提升教研經驗、開拓國際視野及豐富專業知識。自推出以來，吸引了眾多畢業於海內外國際著名大學的傑出澳門青年申請。

In recent years, UM has launched the "UM Macao Fellow Scheme", which aims to nurture young scholars of Macao and encourage qualified local talents to pursue career development in Macao. Besides engaging in research at UM, successful applicants will have the opportunity to work as visiting scholars or researchers at reputable universities or institutions outside Macao. This enriches their teaching and research experience, broadens their horizons, and enhances their professional knowledge. Since its launch, the scheme has attracted many outstanding young Macao graduates from internationally renowned universities in and outside of China.



鄭慧珊教授
Professor Wai San Cheang

讓青年學者的科研路更加順利

博士畢業於香港中文大學的鄭慧珊於2015年入選「澳大濠江學者計劃」。2016年，她作為訪問學者被派往美國加州大學聖地亞哥分校進行為期2年的學術訪問。2019年，她順利成為澳大中華醫藥研究院助理教授。

談及自己作為濠江學者的經歷，鄭慧珊教授顯

得尤為自豪。她表示，澳大濠江學者計劃讓她受益匪淺，「首先是讓我可以回到我出生和熟悉的地方工作，為自己的家鄉做貢獻，並且期間有機會去海外著名高校訪學，讓當時剛畢業不久只有博士後經驗的我收穫很大，身邊的領導同事也在研究方面給予我非常大的幫助，這些都讓我的科研路更加順利。」

自小對生物醫學感興趣

談及為什麼走上中醫藥研究這條道路，鄭慧珊教授表示完全是出於興趣。中學時的她就覺得生物學十分奧妙神奇，那時候主要是看一些相關的書籍和電視節目，引發了她做生物研究的興趣。之後在香港求學時她就選擇了生物醫學相關的專業。「本科期間在實驗室做研究時，我感覺自己真的很喜歡通過實驗去探索一些新事物，比如瞭解為什麼會有疾病，有什麼方法可以去治療這種疾病，於是就選擇了繼續讀博士深造。」

加入澳大後，鄭慧珊教授主要研究血管和代謝功

能障礙中新型的生物治療標靶點，以及中藥和天然產物活性成分對肥胖、糖尿病相關的血管功能障礙的功效和作用機制。「糖尿病和肥胖症在現代人當中很普遍，是一個全球性的問題。中藥和西藥這兩個方向我都喜歡，我家人也是做和中醫藥相關的工作。我們傳統中藥有很多可以利用，有些是藥食兩用的，我最近在做三七、黃連和陳皮的相關研究，探索這些傳統中藥裏面的主要作用成分，比如多酚類和皂苷類藥物成分對糖尿病、肥胖症和心血管疾病的保護作用。」鄭慧珊教授說。

年輕人要多學多想多問

鄭慧珊教授勉勵年輕人做研究要始終保持探索新事物的想法。她建議年輕人在本科和碩士期間可以多接觸自己感興趣的領域和學科，不要局限自己，盡量給自身多一點「裝備」，待找到自己真正的興趣所在，就可以沿著這個方向繼續深造。「一旦確認自己的方向，就要勤奮不放鬆。自身的努力很重要，做研究不

同於中學生階段，不只是上課學習知識，而是要探索新的東西，這就要多想多問，有批判性思維，遇到問題首先要自己想辦法解決。感到迷茫時也可以多和老師聊聊，我在研究生期間就經常和導師交流，他的意見對我幫助很大。」鄭慧珊教授說。

Streamlining the Research Journey of Young Scholars

Wai San Cheang, a PhD graduate from the Chinese University of Hong Kong, joined UM through the UM Macao Fellow Scheme in 2015. As part of the scheme, she embarked on a two-year research stint at the University of California, San Diego in 2016. In 2019, she became an assistant professor in the Institute of Chinese Medical Sciences.

Reflecting on her experience as an UM Macao Fellow, Professor Cheang expresses great pride. She highlights

the benefits she has gained from the scheme, stating, “Firstly, it has allowed me to return to my birthplace and make contribution to my hometown. The opportunity to visit renowned overseas universities was invaluable for me as a recent graduate with post-doctoral experience. The supportive colleagues around me also greatly assisted me in my research endeavours. All these have significantly smoothed my scientific journey.”



中藥質量研究國家重點實驗室（澳門大學）的儀器設備
Equipment at State Key Laboratory of Quality Research in Chinese Medicine (University of Macau)

Interested in Bio-Medicine since Childhood

Talking about her motivation for pursuing Chinese medicine research, Professor Cheang emphasised that it stemmed entirely from interest in the subject. During her time in high school, she developed a fascination with the magic of biology. It was further fuelled by reading relevant books and watching related TV programmes. When she later pursued her studies in Hong Kong, she chose to specialise in biomedicine. Professor Cheang explains, “I felt a genuine enjoyment in exploring new concepts when I did research in the laboratory as an undergraduate,

for example, understanding the underlying causes of diseases and seeking potential treatments. This passion for discovery ultimately led me to pursue a PhD degree.”

After joining UM, Professor Cheang mainly studies novel targeted therapy with potential for vascular and metabolic disorders as well as the efficacy and action mechanism of the active ingredients of Chinese medicine and natural products for vascular dysfunction associated with obesity and diabetes. Professor Cheang explains, “Diabetes and obesity are prevalent global issues in modern society.

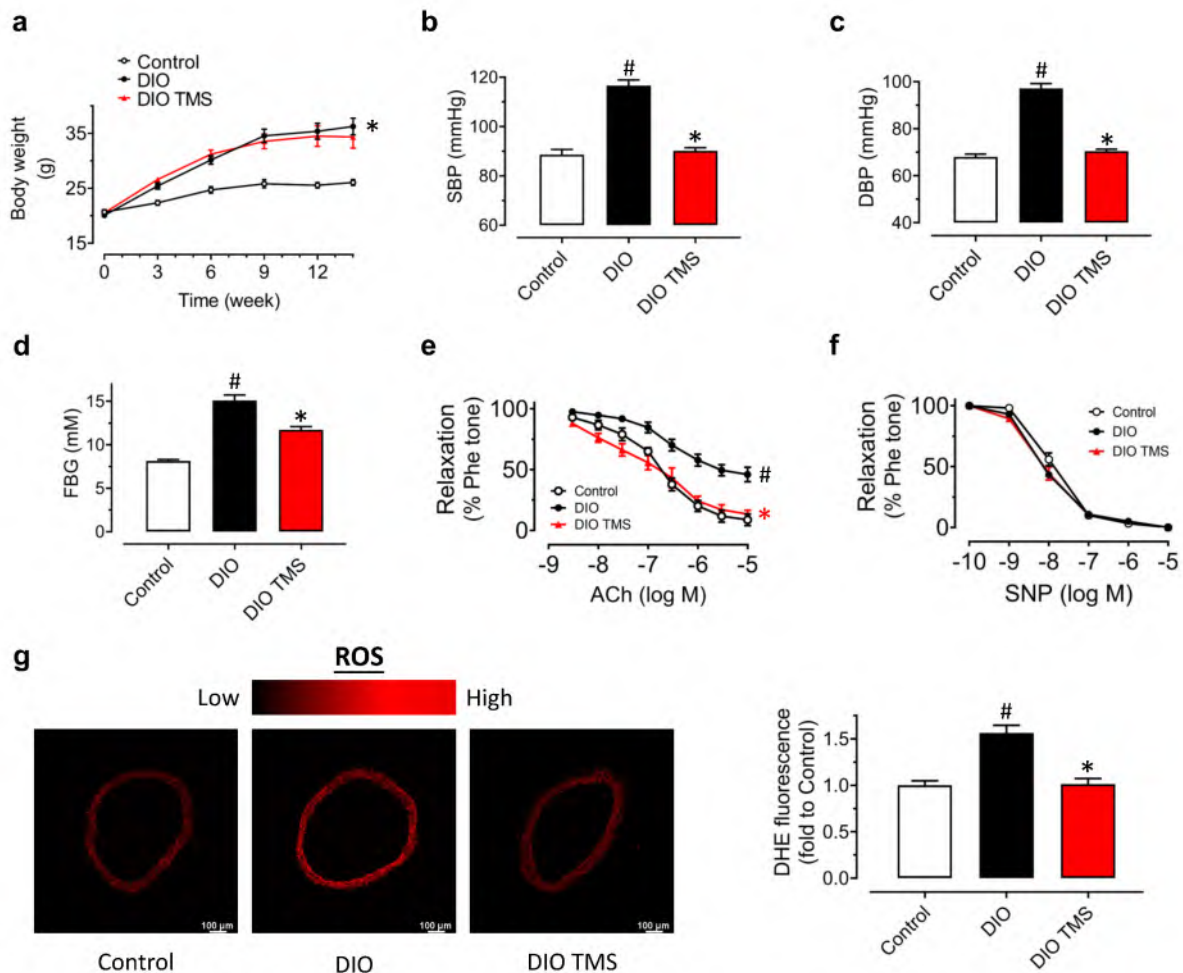
I have a strong interest in both Traditional Chinese Medicine (TCM) and western medicine, and my family members are also involved in TCM-related work. TCM offers numerous possibilities, some of which can be used as both medicine and food. Lately, my research has been

centred around exploring the protective effects of key ingredients from TCM, such as polyphenols and saponins extracted from panax notoginseng, coptis and tangerine peel, on diabetes, obesity, and cardiovascular diseases.”

Encouraging the Youth to Learn, Think, and Question

Professor Cheang encourages young people to maintain an exploratory mindset in research. She suggests that they should actively engage with their fields of interest during undergraduate and master's studies, do not set limitations and acquire diverse knowledge and skills. Once they have identified their true passion, they can pursue it diligently without complacency. Professor Cheang highlighted the significance of personal efforts in

research, stating, “Unlike in high school, you should go beyond classroom learning, actively explore new ideas and develop critical thinking at the stage of research. When faced with challenges, try to find solutions independently and you can also seek guidance from mentors when feeling lost. During my graduate studies, I found great support and guidance from my mentors. They helped a lot.”



此圖揭示了TMS（一種白藜蘆醇的甲氧基化衍生物）對減輕糖尿病和肥胖症內皮功能障礙的治療潛力

This Figure Shows the Therapeutic Potential of TMS (a Methoxylated Derivative of Resveratrol) against Endothelial Dysfunction in Diabetes and Obesity



科研合作

Research Collaboration

2022年科研合作亮點

Research Collaboration Highlights in 2022

澳大積極推動、廣泛開展科研合作，大力拓展與產業界合作的深度與廣度，從而實現推動大學科技成果轉化、助力產業優化升級的目標。2022年，大學與眾多優秀企業開展多種形式的產學研合作，包括共建聯合研發平台、共同申請政府資助的研究項目、開展聯合研發及委託開發等商業合作。在共建聯合研發平台方面，大學與中國南方電網有限責任公司聯合建立「中國南方電網有限責任公司—澳門大學碳中和智慧能源電力聯合實驗室」，旨在取得我國電力能源轉型過程中前沿技術和顛覆性技術的重大原創性突破；在共同申請政府資助的研究項目方面，大學通過聚焦國家戰略與經濟社會發展的重大需求，與眾多企業聯合申請內地及特區政府資助的研究項目，開展多領域的前沿科學聯合研究，2022年有51個項目獲得立項，資助金額超過澳門幣7,200萬元；在委託開發方面，大學分別與位於本澳、北京、珠海、漳州的四間公司開展不同領域的委託開發合作，以此推動產學研深度融合，加快科研成果向現實生產力轉化。

UM actively promotes and extensively engages in research collaboration, fostering deep and expansive cooperation with industries, so as to promote the translation of scientific and technological achievements and accelerate industrial upgrades. In 2022, UM successfully carried out a range of industry-university-research collaborations with many outstanding enterprises. These collaborations took various forms, including the establishment of joint research platforms, joint applications for government-funded research projects, joint research and development (R&D), as well as commissioned R&D projects. One notable example of the joint research platform is the China Southern Power Grid-University of Macau Joint Laboratory of Smart Power and Energy for Carbon Neutrality, established in partnership with China Southern Power Grid Co., Ltd. The Joint Laboratory aims to achieve breakthroughs in cutting-edge and disruptive technologies in the process of power energy transformation in China. Regarding joint applications for government-funded research projects, UM collaborated with enterprises to pursue research in diverse fields of frontier science. These research projects align with national strategies and address significant needs in economic and social development. In 2022, 51 projects received approval, amounting to a funding of over MOP 72 million. UM also engaged in commissioned R&D activities, partnering with four companies located in Macao, Beijing, Zhuhai, and Zhangzhou. These collaborations aim to strengthen the industry-university-research cooperation and accelerate the translation of scientific research results into the market.

2022年新成立的合作聯盟

Newly Established Cooperation Alliances in 2022

粵港澳高校海洋裝備與工程力學聯盟

粵港澳高校海洋裝備與工程力學聯盟以提升粵港澳三地高校在海洋裝備和工程力學學科領域人才培養和科學研究的合作層次和水平為宗旨，致力於匯

集粵港澳精英大學在海洋裝備和工程力學領域的研究力量，促進三地在海洋裝備和工程力學領域的交流協作、資源共建共享。

珠澳高致病性病原微生物研究聯盟

珠澳高致病性病原微生物研究聯盟為大灣區尤其是珠江口西岸城市群傳染病疫情的預警、重大和新發

傳染病或突發公共衛生事件的處理提供重要的實驗室技術支撐，為「健康灣區」建設保駕護航。

電力新能源知識產權運營聯合體

電力新能源知識產權運營聯合體聚合產業上下游有志於促進我國電力新能源產業發展相關單位，共同倡導尊重和保護知識產權，加強創新聯動與產業運

營合作，圍繞電力新能源產業的發展，以知識產權的運用和保護為核心和主要抓手，實現行業技術信息共享、行業發展共治、創新轉化共贏。

Guangdong-Hong Kong-Macao University Alliance for Marine Equipment and Engineering Mechanics

The Guangdong-Hong Kong-Macao University Alliance for Marine Equipment and Engineering Mechanics aims to enhance the level of cooperation in the cultivation of talents and scientific research among universities

in Guangdong, Hong Kong, and Macao in the field. It is committed to bringing together the research strengths of top universities in Guangdong, Hong Kong, and Macao, and to promote the exchange and collaboration, and sharing of resources among the three regions.

The Research Alliance for Highly Pathogenic Microorganisms in Zhuhai and Macao

The Research Alliance for Highly Pathogenic Microorganisms in Zhuhai and Macao provides key laboratory technical support for the early warning of infectious disease outbreaks in the Greater Bay Area, especially in the urban clusters on the west bank of the Zhujiang River. The alliance also helps

with the handling of major and emerging infectious diseases or public health emergencies, in support of the building of a “Healthy Greater Bay Area”.

Power New Energy Consortium for Intellectual Property Rights Operation

The Power New Energy Consortium for Intellectual Property Rights Operation aggregates upstream and downstream units that are interested in promoting the development of China's power new energy industry. The Consortium jointly advocates for respect and protection of intellectual property rights, strengthens cooperation in innovation interact and industry operation, and focuses

on the development of the power new energy industry. The Consortium takes the application and protection of intellectual property rights as the core starting point, and realises industry technology information sharing, industry development and shared governance, and win-win innovation transformation.

2022年新建聯合實驗室

Newly Established Joint Laboratories in 2022

中國南方電網有限責任公司—澳門大學碳中和智慧能源電力聯合實驗室

聯合實驗室主要聚焦於支撐智慧能源電力系統實現碳中和的相關領域研究，具體研究方向包括但不限於支撐能源電力系統碳中和的物聯網、大數

據、人工智能技術；智慧綜合能源系統低碳運行、控制與防護技術；支撐能源電力系統碳中和的智慧新型配用電技術。

澳門大學—芯耀輝科技聯合實驗室

依托模擬與混合信號超大規模集成電路國家重點實驗室（澳門大學）在高速接口電路領域國際領先的科研實力，發揮芯耀輝科技有限公司在該產業和創新實踐中的先導優勢，雙方分別在橫琴和澳門合作共建

“澳門大學—芯耀輝科技聯合實驗室”，由此深化雙方在模擬與混合信號集成電路設計領域的全面合作，將科研成果轉化為生產力，促進產業技術轉型升級。

澳門大學—深圳國際量子研究院量子研究聯合實驗室

圍繞粵港澳大灣區重大戰略研究方向，利用澳門大學應用物理及材料工程研究院的科研成果以及深圳國際量子研究院的量子科學產業平台，由此深化深澳

在量子科學領域的合作，促進產業技術轉型升級，亦助力澳門經濟適度多元發展，與此同時，也探討在量子科學領域開展全方位、多層次的人才培養合作。

福州大學—澳門大學創新藥物合作聯合實驗室

聯合實驗室聚焦抗腫瘤藥物、核酸藥物、納米藥物等領域研究，爭取獲批國家級聯合實驗室，並推動

高新技術發展，加強閩澳科技合作的載體建設，加強生物醫藥領域人才交流。

The China Southern Power Grid-University of Macau Joint Laboratory of Smart Power and Energy for Carbon Neutrality

The Joint Laboratory mainly focuses on the research in the related fields of supporting the smart energy and power system to achieve carbon neutrality. The specific research directions include but are not limited to the Internet of Things, big data, and artificial intelligence technologies to support the carbon neutrality of the

energy and power system; low carbon operation, control, and protection technologies for the smart integrated energy system; and the smart new power distribution technologies that support the carbon neutrality of the energy and power system.

The UM-Akrostar Technology Joint Laboratory

The State Key Laboratory of Analog and Mixed-Signal VLSI at UM and the Akrostar Technology company have jointly established the UM-Akrostar Technology Joint Laboratory in Hengqin and Macao. The Joint Laboratory is based on the international leading research strength of the State Key Laboratory in the field of high-speed interface circuits and leverages the pioneering advantages of Akrostar

Technology in the industrial and innovative practices. The two parties aim to deepen their cooperation in the field of analog and mixed-signal integrated circuit design, turn scientific research results into production, and promote the technological transformation and upgrade of the industry.

The UM-Shenzhen Institution for Quantum Science and Engineering Joint Laboratory of Quantum research

Oriented towards the major strategic research directions within the Guangdong-Hong Kong-Macao Greater Bay Area, the Joint Laboratory capitalises on the research achievements of UM's Institute of Applied Physics and Materials Engineering, along with the industry platform provided by the Shenzhen International Quantum

Academy. This collaboration aims to deepen cooperation between Shenzhen and Macao, promote technological advancements, and facilitate the diversification of Macao's economy. Additionally, the Joint Laboratory explores comprehensive and multi-level cooperation in the realm of talent development.

Fuzhou University and University of Macau Joint Laboratory for Innovative Drug Collaboration

The Joint Laboratory focuses on research in the areas of anti-tumor drugs, nucleic acid drugs, and nanomedicine. It strives to be approved as the national-level joint laboratory and to promote the development of high

technology, strengthen the construction of Fujian-Macao science and technology cooperation, and enhance talent exchange in biomedicine.

珠海澳大科技研究院

Zhuhai UM Science & Technology Research Institute

產學研示範基地

珠海澳大科技研究院（珠研院）是澳門大學與橫琴粵澳深度合作區政府於 2019 年 3 月共建的、澳大在大灣區的首個產學研示範基地。截至 2022 年 12 月底，珠研院共獲得政府資助科研項目超過 130 項，承擔企業委託研究項目超過 80 項，累計合同金額超過 1.3 億元人民幣；申請專利超過 30 項，基於澳大科研成果孵化創新科技公司 6 家。

珠研院積極拓展產學研合作廣度、深度，與艾爾普再生醫學科技（深圳）有限公司、乘木科技（珠海）有限公司、珠海凌煙閣芯片科技有限公司、廣西柳藥集團股份有限公司等多家企業共建院企聯合實驗室，共同開展轉化醫學、數字孿生、生物醫學信號感知等

領域的研究；發揮產學研對接平台功能，打造以「天沐河沙龍」為品牌之創新合作系列分享會，組織舉辦多場企業技術交流、專業技術研討、學生實習對接等活動。

珠研院目前已有超過 100 名在職科研人員，近 250 名澳大學生參與珠研院項目研發實習，已有在站博士後研究員 24 名，逐步形成引才聚才強磁場，為深合區科技創新提供強有力的人才支撐。入站博士後研究員更是先後榮獲國家自然科學基金委員會、中國博士後基金、廣東省基礎與應用基礎研究基金聯合基金等政府資助科研項目，在 SCI、EI、ISSCC 等核心期刊發表多篇高水平論文。



珠研院區位圖
Location Map of ZUMRI

Demonstration Base for Industry-Academia-Research

The Zhuhai UM Science & Technology Research Institute (ZUMRI) is the first industry-academia-research demonstration base of UM in the Greater Bay Area, jointly established by UM and the government of the Guangdong-Macao In-depth Cooperation Zone in Hengqin in March 2019. As of December 2022, ZUMRI had obtained approvals for over 130 government-funded research projects, undertaken more than 80 research projects commissioned by enterprises, and applied for more than 30 patents. The accumulated contract amount for these projects exceeded RMB 130 million. In addition, ZUMRI has incubated six innovative technology companies by leveraging UM's research outcomes.

ZUMRI has actively expanded its industry-academia-research collaboration, and established joint laboratories with numerous enterprises, such as Help Therapeutics (Shenzhen) Co., Ltd, Syncsmart (Zhuhai) Co., Ltd, Zhuhai Lingyange Semi Co., Ltd., and Guangxi Liuyao Group Co., Ltd. These joint efforts have focused on research areas such as translational medicine, digital twin, and biomedical signal perception. To maximize the

potential of its industry-academia-research matching platform, ZUMRI has organized a series of events, including "Tinmuk Salon", technical exchanges among enterprises, professional technical discussion, and student internship matching.

Currently, ZUMRI boasts a team of over 100 researchers, including 24 post-doctoral fellows. Additionally, it has attracted nearly 250 UM students who actively participate in R&D activities and internship at ZUMRI which has nurtured a strong magnetic field for talent recruitment and provided crucial talent support for technological innovation in the region. These post-doctoral fellows have received project grants from the National Natural Science Foundation of China, Postdoctoral Fund of China, and the Joint Fund for Basic and Applied Basic Research of Guangdong Province. Their research outputs are published in renowned journals indexed by SCI, EI, and ISSCC.



珠研院科研平台資質

Qualifications of Research Platforms of ZUMRI



第二期珠海澳大科技研究院「天沐河沙龍」

The 2nd ZUMRI Tinmuk Salon



第二屆微電子工業盟友論壇暨集成電路人才需求對接會

The 2nd Microelectronics Industry Allies Forum cum Integrated Circuit Talent Recruitment Fair



2022年8月，澳門立法會來訪

Legislative Assembly of Macao SAR Visited ZUMRI in August 2022

活動與訪問

Events and Visits

澳大學人研究講壇

UM Scholar Research Forum

澳大學人全新解讀上古中國海貝

UM Scholar Sheds New Light on “Treasured Shells” from Early China

「澳大學人研究講壇」之第四講於2022年2月25日舉行，由人文學院歷史系主任楊斌教授以「印度洋來的“寶貝”：上古中國的海貝」為題發表演說。他用生動通俗的方式介紹了夏商周時期中原地區使用的海貝與其擴張路線，提出了與主流觀念不一樣的解讀。

The fourth lecture of the UM Scholar Research Forum was held on 25 February 2022. Bin Yang, Professor and Head of the Department of History in the Faculty of Arts and Humanities, held a talk titled “‘Treasured Shells’ from the Indian Ocean: Cowries in Early China”. He introduced the seashells used in the Central Plains during the Xia, Shang and Zhou dynasties and their expansion routes in a lively and approachable way, offering an interpretation that is different from the mainstream concept.



楊斌教授
Professor Bin Yang

澳大學人分享城市地下空間研究成果

UM Scholar Shares Research Outputs in Study of Urban Underground Space

「澳大學人研究講壇」之第五講於2022年4月22日舉行，由科技學院土木及環境工程系主任、智慧城市物聯網國家重點實驗室骨幹成員周萬歡教授以「城市地下空間與大數據」為題發表演說。周萬歡從岩土工程專業角度出發，用通俗易懂的方式介紹盾構隧道

和沉管隧道兩種地下空間開發技術的發展，最新的研究和學科交叉技術創新熱點，並且結合工程實例介紹澳大科研小組開展的理論及大數據分析技術研發課題的進展。



周萬歡教授
Professor Wanhuan Zhou

The fifth lecture of the UM Scholar Research Forum was held on 25 April 2022. Wanhuan Zhou, Head of the Department of Civil and Environmental Engineering in the Faculty of Science and Technology, and a key member of the State Key Laboratory of Internet of Things for Smart City, delivered a talk titled “Urban Underground Space and Big Data”. Professor Zhou introduced two underground space development technologies, namely shield tunneling and immersed tunneling, as well as the latest research topics and interdisciplinary innovation hotspots. Using real-world engineering cases as examples, she also discussed her team’s recent research progress in the physical mechanism of tunneling and the applications of big data analysis in this field.

澳大學人分享如何「烹飪」新型光電子材料

UM Scholar Gives Talk on How to “Cook” New Optoelectronic Materials

「澳大學人研究講壇」之第六講於2022年5月24日舉行，由應用物理及材料工程研究院邢貴川教授以「如何在實驗室“烹飪”新型光電子材料？」為題發表演說。邢貴川在講壇上用通俗易懂、深入淺出的方式解釋如何像在家做菜一樣，用低溫溶液法烹飪新型金屬鹵化物鈣鈦礦發光材料及器件，及啟發這些研發背後的物理思考。

The sixth lecture of the UM Scholar Research Forum was held on 24 May 2022. Guichuan Xing, Professor in the Institute of Applied Physics and Materials Engineering, was the speaker. His talk, titled “How to ‘Cook’ New Optoelectronic Materials in the Lab”, discussed the new metal-halide perovskite light-emitting materials, as well as devices that can be “cooked” with a low-temperature solution method and the physical theories behind these research studies.



邢貴川教授
Professor Guichuan Xing

澳大學人分享如何“點沙成芯”

UM Scholar Gives Talk on Power Management Integrated Circuit Design



路延教授
Professor Yan Lu

「澳大學人研究講壇」之第七講於2022年9月26日舉行，由微電子研究院副教授路延以「點沙成芯：能量越大責任越大的電源管理芯片設計」為題發表演說，讓觀眾瞭解一粒沙如何變成影響日常生活方方面面的芯片。

The seventh lecture of the UM Scholar Research Forum was held on 26 September 2022. Yan Lu, Associate Professor of the Institute of Microelectronics, was the speaker of the talk titled “Power Management Integrated Circuit Design for Greater Power and Greater Responsibility”. During the talk, Professor Lu gave an accessible and lively presentation explaining the functions of transistors and semiconductor chips.

澳大學人分享植物多酚抗癌功效

UM Scholar Gives Talk on How to “Cook” New Optoelectronic Materials

「澳大學人研究講壇」之第八講於2022年10月31日舉行，由健康科學學院副教授代雲路以「植物多酚抗癌功效知多少」為題發表演說。是次講壇代雲路介紹了基於多酚分子中廣泛存在的酚羥基可與不同價態的金屬離子進行相互作用，並分享了他的研究團隊利用金屬多酚生物材料在抗癌領域的探索。

The eighth lecture of the UM Scholar Research Forum was held on 31 October 2022. Yunlu Dai, Associate Professor of the Faculty of Health Sciences, gave a talk titled “Plant Polyphenols, More Than Just Simple Natural Antioxidants”. During the talk, Professor Dai discussed the interaction between phenolic hydroxyl groups, which are widely present in polyphenol molecules, and metal ions of different valence. He also shared his research team’s exploration of the use of metal-polyphenolic biomaterials in cancer treatments.



代雲路教授
Professor Yunlu Dai

澳大學人分享企業如何通過知識管理促進創新

UM Scholar Gives Talk on How Enterprises Can Promote Innovation through Knowledge Management



洪福來教授
Professor Jacky Hong

「澳大學人研究講壇」之第九講於2022年11月29日舉行，由工商管理學院管理及市場學系系主任洪福來教授以「企業如何通過知識管理促進創新」為題發表演說。洪教授以當代創新的理論為基礎，討論創新的各種類型和特徵，以及知識管理如何有效地對推動企業實施創新的相關影響。

The ninth lecture of the UM Scholar Research Forum was held on 29 November 2022. Jacky Hong, Head of the Department of Management and Marketing of the Faculty of Business Administration, gave a talk titled “How Can Enterprises Promote Innovation through Knowledge Management”. Drawing on contemporary theories of innovation, Professor Hong discussed the various types and characteristics of innovation and how knowledge management can have an impact on business innovation implementation.

展會活動

Exhibitions

第八屆澳門工展會

The 8th Macau Industrial Products Show

澳大 16 項優秀科研成果在「第 8 屆澳門工展會」亮相，當中多項成果斬獲國際或全國性獎項，並已取得專利，獲得一眾嘉賓和與會者的高度關注及肯定。此外，其中一項成果「消毒機器人」還擔任會場消毒滅菌工作，體現科研創新的應用價值。

A total of 16 outstanding research results from UM were presented at the 8th Macau Industrial Products Show. Many of these results have not only received international or national awards, but also obtained patents. One of the research results, Smart Cleaner, was used to disinfect the venue, demonstrating the value of scientific innovation through its application.



澳大師生向嘉賓介紹研究成果

UM Faculty Members and Students Introduce Research Results to Guests

2021年度科研項目結題展暨學術報告會

The Exhibition of Scientific Research Results and Academic Report of Year 2021

2022 年 10 月 20 日，澳大 68 個科研項目於「2021 年度科研項目結題展暨學術報告會」展出，模擬與混合信號超大規模集成電路國家重點實驗室主任麥沛然獲邀為主講嘉賓，並以「萬物聯網時代一綻放未來芯片設計」為題進行主題演講；科技學院教授徐青松、中藥質量研究國家重點實驗室副教授趙靜、應用物理及材料工程研究院副教授孫國星亦以優秀科研項目代表作作出報告。

On 20 October 2022, a total of 68 research projects from UM were exhibited at the Exhibition of Scientific Research Results and Academic Report of Year 2021. Pui In Mak, Director of the State Key Laboratory of Analog and Mixed-Signal VLSI, delivered a keynote speech at the event. Qingsong Xu, Professor of the Faculty of Science and Technology; Jing Zhao, Associate Professor of the State Key Laboratory of Quality Research in Chinese Medicine, and Guoxing Sun, Associate Professor of the Institute of Applied Physics and Materials Engineering, gave presentations as representatives of outstanding research projects.



2021年度科研項目結題展暨學術報告會

Exhibition of Scientific Research Results and Academic Report of Year 2021

2022科技周暨創科成果展

The Science and Technology Week 2022 cum Exhibition of Achievements in Science and Technology Innovation

在「2022 科技周暨創科成果展」上，澳大有 90 項科研項目及成果展出，獲一眾嘉賓和與會者的高度關注及肯定，並與多家企業進行了有效對接。

UM participated in the Science and Technology Week 2022 cum Exhibition of Achievements in Science and Technology Innovation. A total of 90 research results of UM were displayed at Science and Technology Week. A number of UM research projects and results were showcased at the Exhibition and they were highly recognized. There are enterprises showing interest to these research outputs and expressing collaboration intention.



2022科技周暨創科成果展

The Science and Technology Week 2022 cum Exhibition of Achievements in Science and Technology Innovation

參訪交流

Visits and Exchange



2022年3月1日，社會文化司司長歐陽瑜率團視察澳門大學。

A delegation led by Ao leong U, the Secretary for Social Affairs and Culture, visited UM on 1 March 2022.



2022年5月25日，中國科學院深圳先進技術研究院參訪澳門大學。

A delegation from Shenzhen Institute of Advanced Technology of the Chinese Academy of Sciences visited UM on 25 May 2022.



2022年6月6日，山東省科技廳代表團參訪澳門大學。

A delegation from the Department of Science and Technology of Shandong Province visited UM on 6 June 2022.



2022年8月22日，經濟及科技發展局及科學技術發展基金參訪澳門大學。

Representatives from Economic and Technological Development Bureau and the Science and Technology Development Fund visited UM on 22 August 2022.



2022年9月6日，中聯辦經濟部黃聖彪副部長率團考察澳門大學。

A delegation from the Economic Affairs Department of the Liaison Office of the Central People's Government in the Macao SAR visited UM on 6 September 2022



2022年9月21日，澳門大學全國科普教育基地授牌儀式。

A certificate presentation cum plaque unveiling ceremony for the national science education base at UM was held on 21 September 2022.



2022年9月21日，澳門廠商聯合會參訪澳門大學。

A delegation from the Industrial Association of Macau visited UM on 21 September 2022.



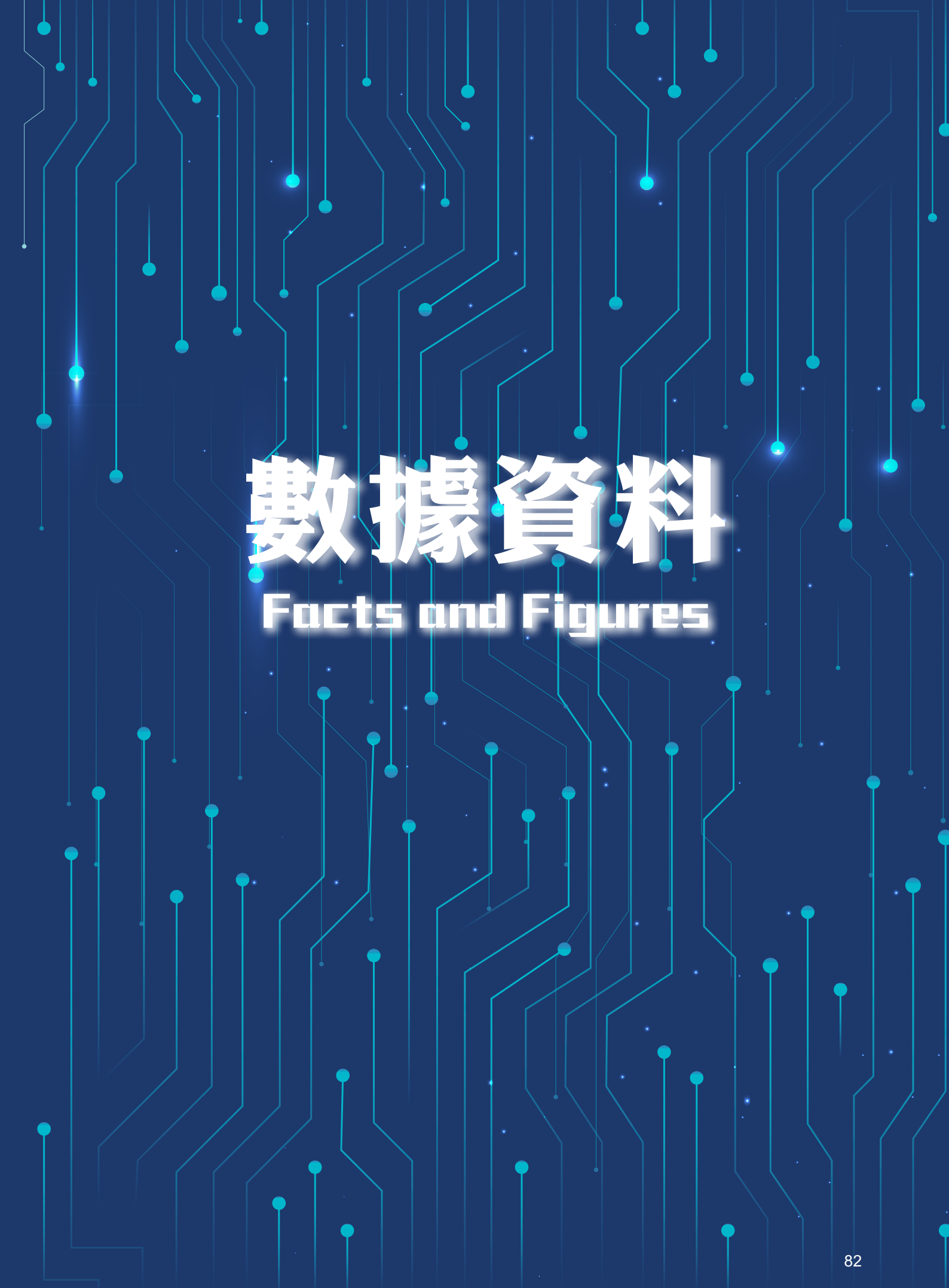
2022年10月28日，澳門立法會參訪澳門大學。

Members of the Legislative Assembly of Macao SAR visited UM on 28 October 2022.



2022年11月16日，國家科技部代表團參訪澳門大學。

A delegation from the Ministry of Science and Technology of the People's Republic of China visited UM on 16 November 2022.



數據資料

Facts and Figures

概況

General Information

創校時間：1981年

Founded in: 1981

2022年泰晤士世界大學國際化發展第5位

University rankings: THE 2022 International Outlook #5

學校排名：2022年泰晤士高等教育世界大學排名

201-250位

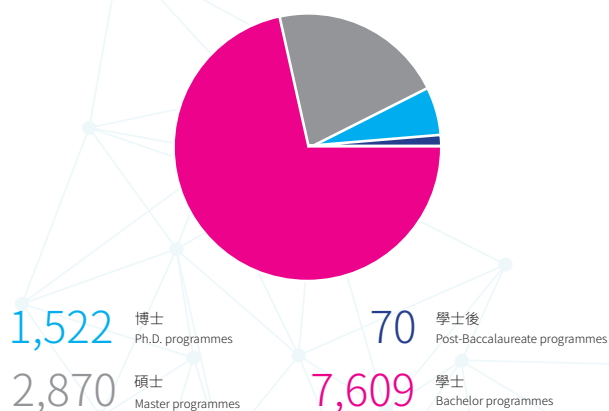
University rankings: THE 2022 #201-250

ESI前1%學科數量：10個

Number of research fields in ESI top 1%: 10

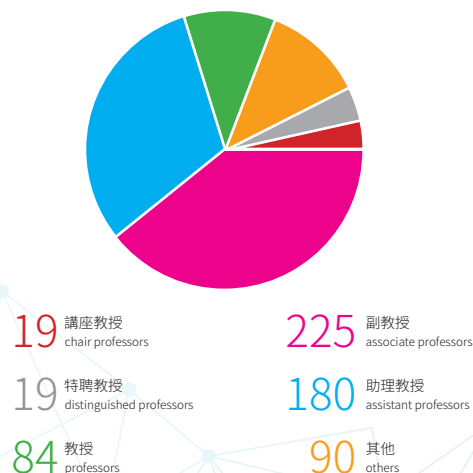
註冊學生數量（2021/2022學年）：

Number of registered students (2021/2022 Academic Year):

總人數
Total 12,071

教學人員數量（截至2022年12月31日）：

Number of faculty members (as of 31 December 2022):

總人數
Total 617

學院及研究院數量：14個

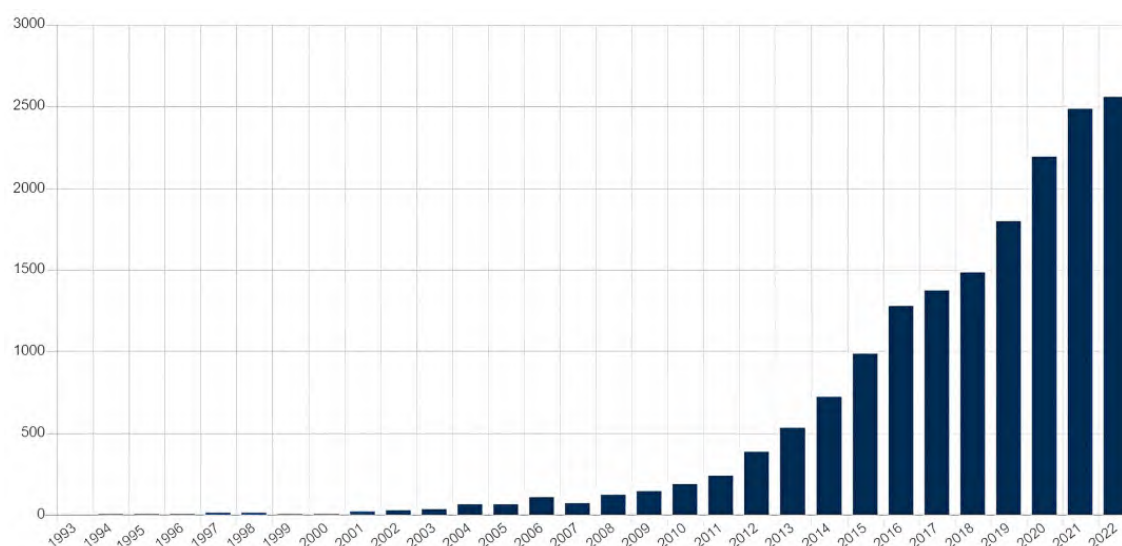
Number of faculties & institutes: 14

住宿式書院數量：10個

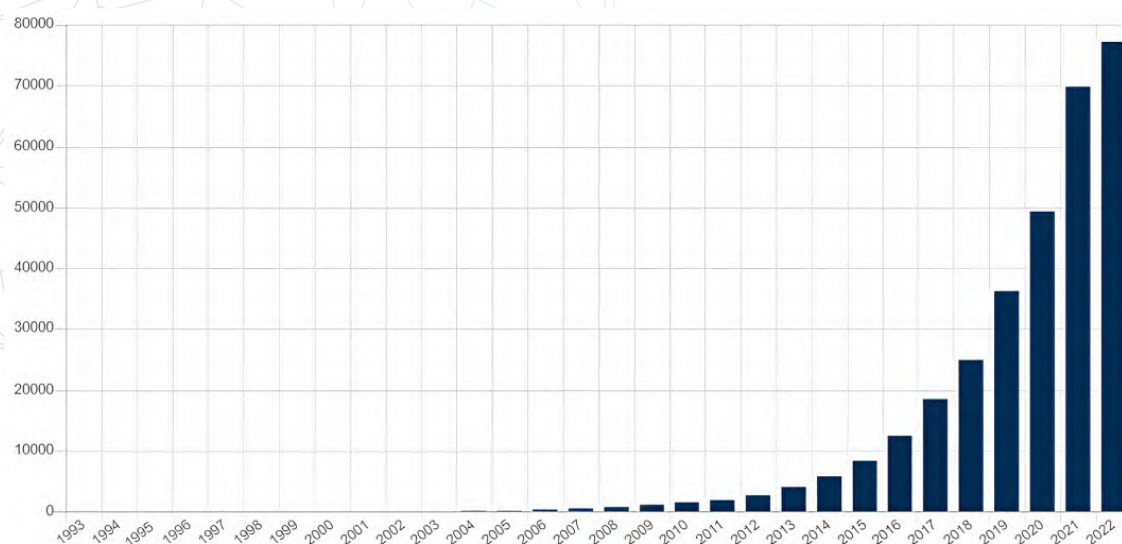
Number of residential colleges: 10

論文發表和被引用次數

Publications and Citations



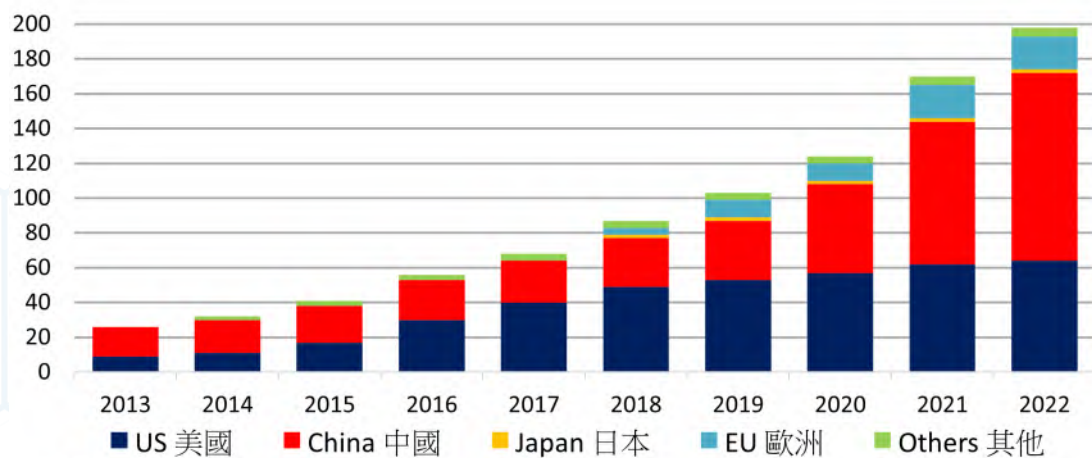
期刊論文發表數量（截至2022年12月31日）
Number of Published Journal Papers (As at 31 December 2022)



期刊論文被引用次數（截至2022年12月31日）
Citation Frequency of Journal Papers (As at 31 December 2022)

專利

Patents



Notes:

1. Includes inactive patents

專利數目 (截至2022年12月31日)
Number of Patents (As at 31 December 2022)

2021/2022學年獲批科研項目

2021/2022 Approved Research Projects

澳門大學研究委員會資助的研究項目總數：243；總金額：澳門元 81,580,000

澳門特別行政區科學技術發展基金資助的研究項目總數：54；總金額：澳門元 87,952,300

澳門特別行政區高等教育基金資助的研究項目總數：23；總金額：澳門元 4,794,900

其他（包括內地、香港資助）項目總數：38；總金額：澳門元 23,838,960

Number of research projects approved by the UM Research Committee: 243; funding amount: MOP 81,580,000

Number of research projects approved by the Science and Technology Development Fund of Macao SAR: 54; funding amount: MOP 87,952,300

Number of research projects approved by the Education Fund of Macao SAR: 23; funding amount: MOP 4,794,900

Number of research projects approved by other funding organizations (including Mainland China and Hong Kong): 38; funding amount: MOP 23,838,960

澳大研究 委員會

UM Research Committee

2022/2023成員

2022/2023 Membership

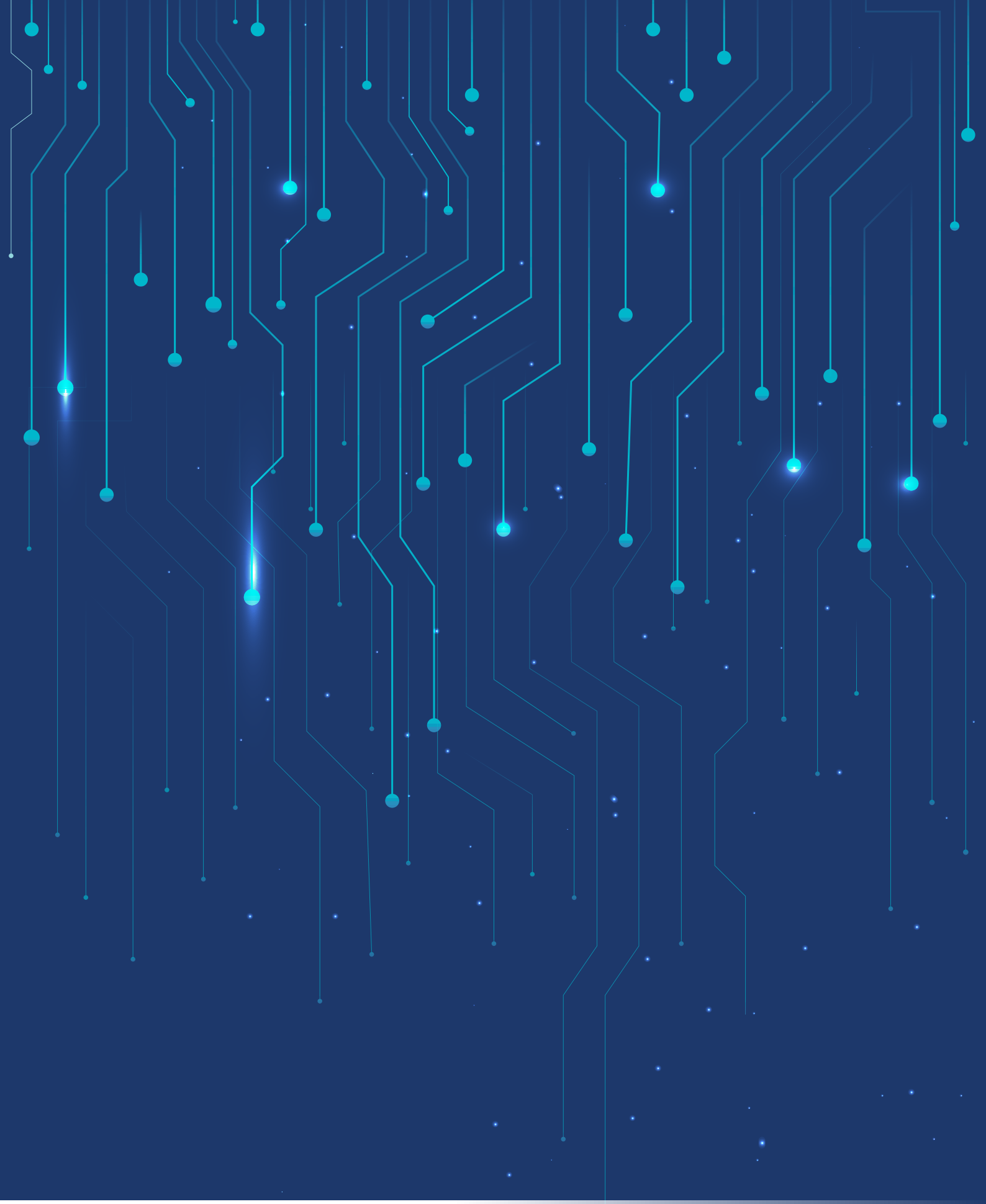
	所屬單位 Affiliated Unit	姓名 Name
主席 Chair	副校長（研究） Vice Rector (Research)	葛偉 Professor Wei GE
秘書 Secretary	研究服務及知識轉移辦公室主任 Director of RSKTO	王春明 Professor Chunming WANG
成員 Member	人文學院 Faculty of Arts and Humanities	李德鳳 Professor Defeng LI Professor Damian John SHAW
	工商管理學院 Faculty of Business Administration	雷智豪 Professor Raymond Chi Ho LOI 苗莉 Professor Li MIAO
	教育學院 Faculty of Education	周明明 Professor Mingming ZHOU 魏冰 Professor Bing WEI
	健康科學學院 Faculty of Health Sciences	徐仁和 Professor Renhe XU 張仲榮 Professor Edwin Chong Wing CHEUNG
	法學院 Faculty of Law	Professor Augusto Teixeira GARCIA Professor Teresa Lancry A.S. ROBALO
	社會科學學院 Faculty of Social Sciences	胡文詩 Professor Anise Man Sze WU 蔡天驥 Professor Tianji CAI
	科技學院 Faculty of Science and Technology	蔡小川 Professor Xiao-Chuan CAI 祝雷 Professor Lei ZHU
	研究生院 Graduate School	王百鍵 Professor Pak Kin WONG

所屬單位 Affiliated Unit	姓名 Name
應用物理及材料工程研究院 Institute of Applied Physics and Materials Engineering	湯子康 Professor Zikang TANG
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協同創新研究院 Institute of Collaborative Innovation	須成忠 Professor Chengzhong XU
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