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University of Macau Annual Report

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以國家重點實驗室為契機 引領兩研究領域未來發展

Seizing the Opportunity Brought by the State Key Labs to Progress Further in Microelectronics and Chinese Medicine



科學研究最大的貢獻是促進人類社會的進步，提升人類的生活質素和促進人類健康水平。作為一所卓越的高等學府，澳門大學(澳大)責無旁貸肩負推動人類社會向前發展的使命。

在微電子和中醫藥這兩大尖端的前沿研究領域，澳大花了不到10年的時間，實現從零開始到跨越式飛躍：數度刷新微電子奧林匹克新世界紀錄，研究成果處世界領先水準；中醫藥則採用世界最先進的技術進行研究，取得多項重大和突破性進展。能夠取得這些令國際學術界眼前一亮的成績，背後都有一班擁有卓越學術背景、長期刻苦鑽研、不斷砥礪創新的世界級優秀師資和研究人員，他們是引領社會進步的導航人和工程師，也為澳大能成為微電子和中醫藥研究重鎮的地位做出了不可估量的傑出貢獻。

2010年12月，是澳大微電子和中醫藥發展史上的重要里程碑，國家科技部正式批准澳大與上海復旦大學、北京大學等分別籌建模擬與混合信號超大規模集成電路國家重點實驗室和中藥質量研究國家重點實驗室，在此契機下，澳大勢將引領這兩大研究領域的未來發展，為推動人類社會的持續發展和進步作出更重要的貢獻。

The greatest contribution of scientific research is that it can potentially advance the progress of human society and enhance people's life quality and welfare. Institutions of higher education have always been powerhouses of scientific research. So as a reputed local university, the University of Macau (UM) no doubt shares this mission.

UM has made progress in leaps and bounds in microelectronics and Chinese medicine within less than a decade, a feat all the more remarkable given that the university started from scratch in these two fields. UM's microelectronics research team has repeatedly broken world records in terms of chip size. The Institute of Chinese Medical Sciences has also achieved numerous major breakthroughs through utilizing state-of-the-art technologies. These impressive achievements have earned UM recognition from the international academic circle, but none of these would have been possible without the unremitting efforts of the outstanding teachers and researchers with excellent academic backgrounds and a commitment to innovative research and realizing their full potential. These people are the driving force of society. They have made immeasurable contributions to UM's current leading status in the fields.

December 2010 represents an important milestone in UM's development in microelectronics and Chinese medicine. The Ministry of Science and Technology of the People's Republic of China officially approved UM's application to establish two state key laboratories in microelectronics and Chinese medicine in collaboration with such mainland universities as Fudan University and Peking University. This decision will certainly bring new opportunities for UM to progress further in the two fields and to make greater contributions to the sustainable development of human society.

澳大設兩國家重點實驗室

UM Gets Approval for Two State Key Labs



2010年11月，澳門大學(澳大)迎來了科研發展歷程中的重要時刻。

在澳門特區政府及澳門科學技術發展基金的支持下，在經歷了漫長的申請及評審過程後，澳大終於成功通過國家科技部的審查，批准建立兩個國家重點實驗室，分別是模擬與混合信號超大規模集成電路國家重點實驗室（The State Key Laboratory of Analog and Mixed-Signal VLSI，下稱AMS-VLSI SK Lab）及中藥質量研究國家重點實驗室（The State Key Laboratory of Quality Research of Chinese Medicine，下稱QRCM SK Lab）。前者是廣東省和澳門地區唯一的微電子國家重點實驗室，後者則是首個中醫藥領域的國家重點實驗室，由澳大與澳門科技大學聯合建設。能夠獲得國家的重視和支持，是澳大致力科研創新的戰略舉措，以及一班優秀的師資團隊長期努力鑽研，掘潛創新的成果見證。

November of 2010 represents an important milestone in the history of research development at the University of Macau (UM).

It was in this month that UM successfully passed the rigorous review of the Ministry of Science and Technology of the People's Republic of China, after a long process of application and evaluation started and supported by the Science and Technology Development Fund (FDCT), from the Macao SAR government, and obtained the approval for two state key laboratories, namely the State Key Laboratory of Analog and Mixed-Signal VLSI (AMS-VLSI SK Lab) and The State Key Laboratory for Quality Research in Chinese Medicine (QRCM SK Lab). The former will be the only state key laboratory in microelectronics in Guangdong province and Macao. The latter, to be jointly established by UM and the Macau University of Science and Technology (MUST), will be the first state key laboratory in the field of Chinese medicine. Obtaining the support of the central government is a strategic move on the part of UM in its attempt to innovate research, and the success in obtaining such support is the result of UM staff's unremitting effort and commitment to realizing their full potential.



科研創新能力大幅提升

自1984年起步的國家重點實驗室建設計劃，是國家科技創新體系的重要組成部分，囊括眾多學科，因此門檻頗高。截至2007年底，全國僅有258個國家重點實驗室。

時至今日，全國與微電子研究有關的國家重點實驗室只有上海復旦大學專用集成電路與系統國家重點實驗室。而全國與藥物相關的國家重點實驗室，也只有中國科學院上海藥物研究所新藥研究國家重點實驗室、北京大學天然藥物及仿生藥物國家重點實驗室、南京大學醫藥生物技術國家重點實驗室，以及中國科學院昆明植物所植物化學與西部植物資源持續利用國家重點實驗室等少數幾所。除個別部省共建的實驗室外，由國家科技部直接批准的以中醫藥為主要研究領域的國家重點實驗室尚沒有先例。廣東省及澳門地區也是首次獲批准建微電子國家重點實驗室。

Becoming a state key laboratory will lead to a substantial improvement of the research innovation ability

The "state key laboratory" programme, which kicked off in 1984, is a key part of the national science and technology innovation system. It covers numerous disciplines and has a high entry bar. At the end of 2007, there were only 258 state key laboratories nationwide.

At present there is only one state key laboratory in China that specializes in microelectronics—the ASIC & System State Key Lab at Fudan University. State key laboratories specializing in medical study are also few, including the State Key Laboratory of Drug Research of the Shanghai Institute of Materia Medica, Chinese Academy of Sciences; the State Key Lab of Natural and Biomimetic Drugs, Peking University; the State Key Laboratory of Pharmaceutical Biotechnology, Nanjing University; and the State Key Laboratory of Phytochemistry and Plant Resources in West China, Kunming Institute of Botany, Chinese Academy of Sciences. Except for a few laboratories jointly established by the Ministry of Science and Technology (MOST) and respective provinces, there have been no MOST-directly-approved state key laboratories with Chinese medicine as the main area of research. A state key laboratory in microelectronics is also the first of its kind in Guangdong province and Macao.

微電子研究處領先水平

10多年前，澳門微電子的研究為零，經過艱苦的創始階段，澳大微電子研究逐漸收穫成果。而1995年的澳大芯片(UMChip)可說是澳大微電子研究的起點，當年作為第一個在國際研討會上公佈的微電子研究成果，大獲好評。當時澳大芯片所採用的技術叫CMOS，最小面積為1.2微米，經過多年發展，現在由澳大的微電子研究團隊設計的芯片已縮小至65奈米(1微米等於1000奈米)。2001年澳大參與創辦了澳門唯一的集成電路設計研發公司——Chipidea微電子(澳門)，令澳大更鼓舞和振奮的是微電子研究的成功，直接促成了該公司在去年受到全球第一大電子設計自動化公司Synopsys青睞併購，成為全球第一模擬與連接性知識產權供應商。至今，澳大在集成電路研究方面已數度刷新微電子奧林匹克(國際固態電路會議，ISSCC)的新世界紀錄，並且提出了最先進的無線及數據轉換解決方法。與當前世界微電子發展水平比較，特別是在中國，澳大可以說是處於領先學術和業界的高水平。

目標成為硅芯片研究中心

AMS-VLSI SK Lab是與上海復旦大學專用集成電路與系統國家重點實驗室合作，在互為補強的前提下，澳大目標是使其成為國家最重要的硅芯片研究中心，並且在運用先進的納米芯片技術基礎下進行模擬及混合信號集成電路的研究，同時通過培訓碩、博士研究生以及博士後研究人員，在澳門建立一個高質量的芯片技術及人力資源平台，包括軟件設計和測試設備的硬體平臺，為澳門在最先進的科技領域大幅提升研發能力作出貢獻。

當AMS-VLSI SK Lab研究團隊第一時間得知申報成功這一好消息後，無比振奮。「澳大僅僅花了15年時間，便將微電子從名不經傳發展至今天站在國際最前沿，證明只要團隊成員一起努力，目標明確，成功是有可能的！」來自葡萄牙，帶領澳大微電子研究發展實現多項突破的專家、澳大副校長馬許願教授在分享這歷史性一天的喜悅時，難掩興奮。此刻，他與其他成員的想法一樣，未來是一個新的挑戰，但也充滿無限探索的可能。

開展電子系統的尖端研究項目

要實現目標，就要不斷嘗試，攀登高峰。AMS-VLSI SK Lab研究團隊現正有序地重點開展各種電子系統的尖端研究項目，包括數據轉換和信號處理、無線通訊、計算物理集成系統、生物醫學工程、電力電子控制器等各種集成電路。對於AMS-VLSI SK Lab一班習慣了日以繼夜埋頭苦幹鑽研學問的研究團隊來說，成功通過國家重點實驗室的審查，肩負的責任更為重大，他們希望最終可將技術成果和專利轉移到產業，為業界帶來實實在在的影響，促進中國在芯片設計領域的自主研發能力。

Rising to the world's forefront of research in microelectronics

More than a decade ago, there was zero research in the field of microelectronics in Macao. After breaking through barriers encountered during the initial stage, UM gradually attained some achievements in this field. The birth of the UMChip in 1995 marks a starting point in UM's microelectronics research, being the first published result in the field presented to an international conference. The minimum size of the UMChip, which adopted a technology called "CMOS", was 1.2 micrometers. Through years of development, the minimum size of a chip designed by UM's microelectronics research team is now 65 nanometers (1 micrometer = 1000 nanometers). In 2001 UM participated in the establishment of Chipidea, which was the only company in Macao that specialized in the design, research and development of integrated circuits. What was more encouraging was that the success in microelectronic research directly contributed to Chipidea being purchased last year by Synopsys, one of the world's largest companies in the electronic design automation industry. That purchase made Chipidea the world's No. 1 supplier of intellectual property on analogue integrated circuits and connectors. So far UM has repeatedly broken world records in terms of chip size and has proposed the hitherto most advanced wireless and data conversion solutions. It is fair to say that UM is now at the forefront of research in microelectronics at both the academic and industrial levels, in particular in China.

The goal: becoming a silicon chip research centre

The AMS-VLSI SK Lab will be jointly established by UM and the ASIC & System State Key Lab at Fudan University. By drawing on the strengths of the partner, UM aims to develop the AMS-VLSI Lab into the most important silicon chip research centre in China. The lab will carry out research in analogue and mixed-signal integrated circuits by utilizing the advanced nano-chip technology, and will at the same time train master's students, doctoral students and postdoctoral researchers. The AMS-VLSI Lab is expected to contribute to a substantial improvement of Macao's R&D capability by serving as a high-quality platform for the development of chip technology, human resources, software design and testing equipment.

The AMS-VLSI SK Lab research team was jubilant at the good news that the application was approved. "It only took UM a mere 15 years to rise from obscurity to the world's forefront in the field of microelectronics, which proves that as long as one team works hard with well-defined goals, success can be made possible!" remarked Prof. Rui Martins with obvious excitement. The Portuguese-born Prof. Martins is UM's Vice Rector (Research) and the leading expert that has led UM's microelectronics team to achieve numerous breakthroughs. Like his team members, he sees the future as full of new challenges but also endless possibilities.

Carrying out cutting-edge research projects on electronic systems

To achieve a goal, one has to try again and again to surmount new challenges. The AMS-VLSI SK Lab research team now systematically carries out cutting-edge projects on various electronic systems, such as data conversion and signal processing, wireless telecommunication, cyber physical integrated systems, biomedical engineering and electric and electronic controllers. The researchers, who have grown accustomed to working hard day and night, should meet greater responsibilities now that the application for establishing a state key laboratory has been approved. They hope that eventually relevant technological achievements and patents can have a tangible impact on the industry and help enhance China's independent R&D ability in the field of chip design.



ICMS的中藥品質評價的系統研究已在海內外產生較大影響
ICMS's research on Chinese medicine quality evaluation system has had some major influence both at home and abroad

中醫藥研究融匯中西科技

同樣地，當澳大中華醫藥研究院(Institute of Chinese Medical Sciences, 下稱ICMS) 接獲國家重點實驗室申請獲批准的消息後，全院上下興高采烈。

院長王一濤教授這天相當忙碌，他不時接到來自各地大學研究夥伴的電話和電郵的祝賀。他興奮地透露，QRCM SK Lab將以中藥品質的評價為研究方向，以中醫藥創新和國際發展為研究目標，以活血化瘀、清熱解毒、扶正固本等類型的中藥方劑為研究物件，以老年相關及衰退性疾病為研究重點，涵蓋化學、分析、藥劑、藥理、藥代、安全性、臨床及資訊等諸多領域。「我們將充分發揮澳門融匯中西文化和科技的特殊優勢，將中藥學與現代前沿科技有機結合，針對中藥現代化和國際化過程中面臨的關鍵問題，實現突破性進展。」王一濤教授對中醫藥未來的發展，充滿期待。

Combining Chinese and western technologies

Sometimes good things come in pairs. In December, researchers of the Institute of Chinese Medical Sciences (ICMS) of UM were elated to learn that their application for establishing a state key laboratory was also approved.

On that day director of ICMS Prof. Wang Yitao was very busy. He received congratulations from research partners from around the world via telephone calls and emails. He disclosed excitedly that the evaluation of the quality of Chinese medicines will be the QRCM Lab's main area of research, and the innovation and internationalization of Chinese medicine will be its main objective. According to Prof. Wang, the subjects of study will include Chinese medicines with various functions, such as medicines that promote blood circulation and remove blood stasis; medicines that reduce internal body heat and remove toxic substances; and medicines that improve the body's immunization system, and the focus will be placed on age-related diseases and degenerative diseases. The research will cover numerous fields such as chemistry, analysis, medicines, pharmacology, pharmacokinetics, safety, clinic study and information. "We will fully tap into Macao's uniquely advantageous position as a place where eastern and western cultures and technologies meet, and we will combine Chinese medical science with cutting-edge modern technologies. We will strive to achieve breakthroughs to address the key problems in the process of modernization and internationalization of Chinese medicines," noted Prof. Wang, full of hope for the future of Chinese medicine.



Advancing the modernization and internationalization of Chinese medicines

The academics and students of ICMS will work together to develop the laboratory into a world-class platform for Guangdong, Hong Kong and Macao to cooperate as well as an international platform for scientific and technological cooperation in Chinese medicine, thereby contributing to the moderate economic diversification of Macao, advancing medical education and scientific and technological progress in Macao, furthering innovation in medical R&D and the development of the biomedical industry in the Pearl River Delta region, serving as a bridge of scientific and technological cooperation between China and Portuguese-speaking countries in the field of traditional medicine, and accelerating the modernization and internationalization of Chinese medicines.

Of course the QRCM SK Lab is not alone in this pursuit. According to the central government's policies, it will cooperate with the State Key Lab of Natural and Biomimetic Drugs, Peking University, in carrying out innovative research in Chinese medicine. In fact, the cooperation between UM and Peking University in the field of Chinese medicine dates back to 2002 when ICMS was just founded. The full cooperation between the two institutions in areas of education, science and technology was officially established through the signing of an agreement on cooperation in the medical field. Every year Peking University recommends four to eight outstanding students to UM for studying in its PhD and master's programmes. Prof. Wang also serves as the director of the International Research Center for Medicinal Administration at Peking University, an institution co-established by the two universities.

推動中醫藥現代化與國際化

ICMS的師生，亦將齊心協力，將實驗室逐步建設成具國際一流水準的粵港澳合作平台和中藥國際科技合作平台，以期服務澳門多元經濟發展，促進澳門醫藥教育和科技文化進步，進而帶動珠三角地區的醫藥創新研發與生物醫藥產業發展，架設中國與葡語系國家的傳統醫藥科技合作橋樑，推動中醫藥現代化與國際化。

當然，QRCM SK Lab並不是孤軍奮戰。根據國家政策，它將與北京大學天然藥物及仿生藥物國家重點實驗室合作開展中藥聯合創新研究。事實上，澳大與北京大學在中醫藥領域的合作，從2002年ICMS創立之初，兩校就簽署在醫藥領域合作協議，開始了教育和科技領域的全面合作，同時北京大學每年都會推薦選送四至八名優秀學生來ICMS攻讀博士和碩士學位，王一濤教授還兼任了兩校共同發起建立的北京大學醫藥管理國際研究中心主任。





冬蟲夏草補益作用成份的研究獲得了國家專利
A research project on the active ingredients of Cordyceps has led to a patent for invention

爭取成為WHO傳統醫學合作中心

王一濤院長自九年前開始領導ICMS之日起，便預見未來將會是一連串艱難的挑戰，但他們卻樂於接受挑戰，而推動中醫藥發展的決心，更是他們不斷戰勝挑戰的動力。「國家重點實驗室並非ICMS的止步之處，而是我們展開漫長征途的其中一個起點！」這位儒雅、和藹的中醫研究專家是一位指揮若定的領軍人物，他心裡明白ICMS能夠取得今天的成績，並非一蹴而就，而是經過長年的積累。在國家的支持下，他們有信心可以為中華醫藥作出更大的貢獻。

下一步，也是ICMS邁向國際平台的關鍵一步，他們將繼續爭取建設成為世界衛生組織(WHO)傳統醫學合作中心，進一步完善和強化自身在國際傳統醫藥科技合作平台的角色。屆時，ICMS的發展，將迎來更燦爛的明天。

新校區帶來機遇和突破

還有不到三年的時間，澳大新校區就會在橫琴半島巍峨聳立，那時候，宏偉的校區內將建有三個開放式研究基地：資訊與電子科研基地（包括微電子實驗室）、醫學醫藥科研基地、能源及環境科研基地。隨著硬體設施的擴展，將能為澳大科研發展創造更好的條件，也為澳門及澳大帶來更多的機遇和突破。 ▮

Striving to become WHO's centre for cooperation in traditional medicine

When Prof. Wang took up office as Director of ICMS nine years ago, he foresaw a future full of challenges. But he and his team members love challenges, and their determination to push forward the development of Chinese medicine is what has motivated them to overcome one challenge after another. "Establishment of a state key laboratory is not the finishing line for us, but rather a new starting point for a long march," said Prof. Wang. This urbane, genial expert on Chinese medicine is a composed leader of ICMS. He is deeply aware that the achievements ICMS has attained do not happen overnight, but rather are the result of many years of effort. He said he believed that with the central government's support, they were sure to make greater contributions to the future development of Chinese medicine.

The next step for ICMS is to strive to become the World Health Organization (WHO)'s centre for cooperation in traditional medicine and also to further consolidate its role as an international platform for scientific and technological cooperation in traditional medicine. For ICMS this is a crucial step to becoming an international platform in this field. When that goal is achieved, ICMS's future will be even brighter.

The new campus brings more opportunities and breakthroughs

In less than three years, the construction of the new UM campus on Hengqin Island will be complete. There will be three open research bases on the new campus: one for Information and Electronics (that will include the Microelectronics Lab), one for Chinese Medical and Pharmaceutical Sciences, and one for Energy and Environment. The increase of such facilities will surely create more favorable conditions for UM to conduct research and will also bring more opportunities and breakthroughs for UM and Macao. ▮

成功非僥倖—— 澳大國家重點實驗室建構之路

Success Is Not Achieved by Sheer Luck— The Road to Obtaining Approval for the Two State Key Labs



微電子研究團隊，十年來獲獎無數。

The microelectronics team has won numerous honours over the past decade

擁有30年歷史的澳門大學(澳大)，相比起許多百年老校，就像個躊躇滿志的年輕人，敢於拼搏、敢於創新。雖然資源有限，卻無阻澳大邁向國際一流大學目標進發的決心。

今天，澳大的微電子和中醫藥研究經過十多年的努力，不僅達到國際水平，最近更通過國家科技部的審查，獲批准成立兩個國家重點實驗室。這兩個項目的成果，全賴團隊上下一心和校方大力支持，建構優勢的學科。回首建立實驗室這一路走來，所付出的辛勞、堅持與汗水，正好印證了「成功非僥倖」這句話。

The University of Macau (UM) has a short history of only 30 years. Compared with many much older universities, it is like a young adult, ambitious and daring to innovate, determined not to let limited resources get in the way of its pursuit to become a world-class university.

Through more than a decade of development, UM's two key research areas, microelectronics and Chinese medicine, have reached international standards. Recently UM's applications to the Ministry of Science and Technology of the People's Republic of China to establish two state key laboratories in each field were approved. This pleasing result is due to the concerted efforts of members of the two teams as well as the university's commitment to developing disciplines with a competitive edge. A review of UM's road to successfully obtaining the approval for the two laboratories would testify to the truth of the saying that, "Success is never achieved by sheer dumb luck."

由零開始 敢於創新 微電子學科研究

Daring to Enter Uncharted Territory— UM's Microelectronics Research Team

在澳首創微電子研究先河

你能想像，現在已經位於國際前沿水平的澳大微電子研究項目，在10年前，別說是個像樣的實驗室，就連做實驗的儀器都沒有，連製作芯片都要遠道送到葡國組裝嗎？而這僅僅是澳大科技學院微電子研究團隊在過去10年裡所遇過困難的冰山一角。

1989年，澳大科技學院開始成立，僅設有電機工程和土木工程兩個專業。可是當時澳門的社會風氣和該行業的發展空間，令科技學院無論是生源和師資都十分匱乏。甚至在成立的第三年，學生們認為該學科在澳門的出路不多，紛紛轉投商學院懷抱。在這個時候，微電子研究和教學相當有經驗的專家——剛從葡萄牙應聘來到澳大的馬許願教授，就為科技學院計劃出多個改革措施和理念，包括推出研究生課程，提高學生水平和發展科研項目等。

以20年前澳門的資源和條件，要發展科研談何容易？相比外地的先進大學，澳大電機工程系學士學位課程的教研和技術水平落後差不多20年，微電子的研究更是完全一片空白。馬許願教授運用自身的專業和經驗，向大四學生傳授現在國際最先進的微電子設計技術，又將電機工程系改為電子及電機工程系並設立碩士和博士課程。一來可以為研究團隊儲備人才，二來亦令學士畢業後可以上升到一個更高的台階或提供更多的出路。多管齊下，生源漸漸穩定，學術水平亦日漸提高。

以「澳大芯」起步

馬許願和一眾師生的努力下，澳大微電子研究取得資助，研究亦一步步發展起來。讓這項研究廣為人知，取得突破性發展的成果，出現在1994年至1995年期間。10位第一批一年級碩士生研究出——「澳大芯」(UMChip)，當時澳大芯片所採用的技術叫CMOS，最小面積為1.2微米。當年團隊設施缺乏，研究時只能使用軟件，芯片要遠道送到葡國里斯本大學組裝。

15年過去了，現時澳大微電子研究已經在國際上享有很高的聲譽，而第五代的「澳大芯」面積現已小至65奈米，成為領先的研究成果。

Pioneering research on microelectronics

Can you imagine that ten years ago, UM's microelectronics research team, which is now at the world's forefront in the field, didn't have a decent laboratory? Did you know that back then after a chip was made, it had to be sent to Portugal for assembly? Actually the lack of local facilities was just one of the many difficulties the team encountered over the past decade.

In 1989 when the Faculty of Science and Technology (FST) was founded, it offered programmes only in Electrical Engineering and Civil Engineering. But the society's prevalent attitude towards—and the career prospects of graduates from—these programmes were not very encouraging, so FST was faced with an acute shortage of both teachers and students. Three years later things went from bad to worse. Many FST students, concerned about a less-than-rosy career outlook in the local market, scrambled to transfer to the Faculty of Business Administration. It is at approximately the same time that Prof. Rui Martins, a Portuguese-born expert in the teaching and research of microelectronics, came on the scene. Noticing this worrisome trend, Prof. Martins proposed numerous reform measures, including the launch of graduate programmes, enhancing student quality, and developing research projects.

Developing research projects, which was one of Prof. Martins' proposals, was actually easier said than done, for two decades ago research resources in Macao were scarce. Compared with advanced universities overseas, UM was nearly 20 years behind in terms of the bachelor programme in electrical engineering, and research in microelectronics was virtually nil. To bridge the gap, Prof. Martins drew on his expertise and experience, and imparted state-of-the-art microelectronics design technologies to year-4 students. He also renamed the bachelor programme Electrical and Electronics Engineering (EEE), and proposed the establishment of master's and PhD programmes. These initiatives aimed to create a pool of researchers and also to offer more choices for bachelor graduates. This multi-pronged strategy worked. Gradually the number of students enrolling for FST increased, and the quality of teaching and research improved as well.

UMChip — a starting point

With the efforts of Prof. Martins, his colleagues and students, FST obtained funding from UM's Research Committee, thereby gaining incremental progress. Between 1994 and 1995 a breakthrough was achieved. The first ten year-1 master's students successfully developed UMChip by using only the software tools donated by the Technical University of Lisbon. UMChip adopted a technology called "CMOS" and had a minimum size of 1.2 micrometers. At the time, the team lacked necessary facilities, so after a chip was made, it had to be sent to Portugal for assembly.

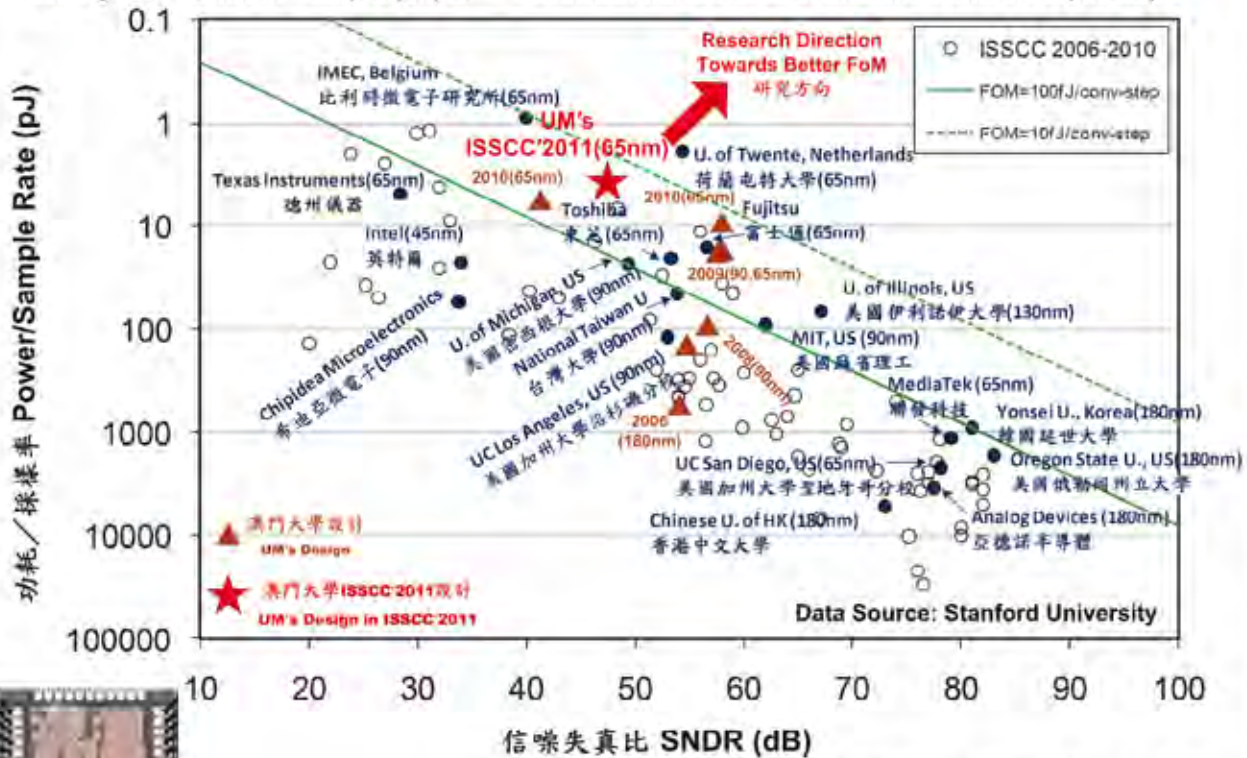
Now, more than 15 years have passed. UM has acquired a significant international reputation in the field of microelectronics. The fifth-generation UMChip developed by UM's microelectronics research team has shrunk in size to as small as 65 nanometers, representing state-of-the-art technology.



澳門大學模數轉換器芯片研究成果之世界紀錄

於“芯片奧林匹克” - 國際固態電路會議 (ISSCC) 上之突破
University of Macau's Analog-to-Digital Converters (ADC) World Record

Setting the Frontier in "Chip Olympic" - International Solid-State Circuits Conference (ISSCC)



$$\text{模數轉換器 質量指標 (FOM)} = (\text{功耗}/\text{採樣率})/\text{信噪失真比}$$

$$\text{Analog-to-Digital Converter ADC Figure of Merit (FOM)} = (\text{Power}/\text{Sample Rate})/(\text{SNDR})$$

國際權威組織認可

澳大的微電子研究得到令人喜出望外的成就，令業界刮目相看，紛紛提出合作意向。2001年，澳大與葡國公司Chipidea簽署了合作協議，該公司在全球各地（如葡國里斯本和波特、波蘭、比利時及後來的澳門和上海）均有設計中心。現時公司被美國一間電路設計模擬工具領域的頂級公司收購，現名為「新思科技」- Chipidea微電子(澳門)有限公司。公司內大部份工程師都是澳大的本科、碩士、博士畢業生，可見澳大的微電子研究對澳門和世界的巨大影響力。

除此之外，澳大微電子研究團隊一直與業界(歐洲、中國、台灣最先進的矽晶圓廠)保持合作和聯繫，不斷汲取奈米電子領域的最新知識、最尖端技術及最先進經驗，力求為學生提供更多就業機會及提升大學在研究領域的知名度。

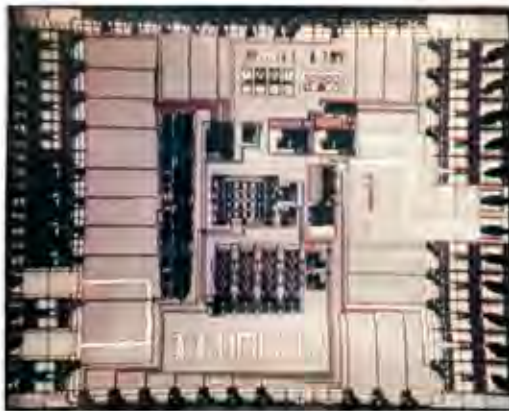
除了與商業機構合作以及論文獲獎，澳大微電子研究團隊的另一個最重要的成就是得到電機電子工程師學會(IEEE)的認可。IEEE是國際科學技術的工業標準，全球共有超過35萬名會員。

Gaining recognition from IEEE

UM's achievements in microelectronics research were beyond many people's expectation. Even industry players began to pay attention to this previously unknown university and sought cooperation with it. In 2001 UM signed a cooperation agreement with a Portuguese company called Chipidea. Chipidea had design centres around the world (such as Lisbon and Oporto in Portugal, Poland, Belgium, and later Macao and Shanghai). In recent years it was purchased by an American company which is one of the world's leading companies in EDA tools. It is now known as Synopsys - Chipidea Microelectronics (Macao), Ltd. Most engineers working in this company are UM's graduates, a reflection of UM's enormous influence on Macao and the world in the field of microelectronics research.

UM's microelectronics research team has maintained cooperation and contact with the industry (namely the most advanced silicon foundries from Europe, China and Taiwan) in order to acquire the latest knowledge, state-of-the-art technologies, and the most advanced experience in the field now known as Nanoelectronics, and also to provide more job opportunities for UM graduates and raise the research profile of the university.

Apart from cooperation with the industry and receiving numerous paper awards, another important achievement of the microelectronics research team is gaining the recognition of the Institute of Electrical and Electronics Engineers (IEEE). IEEE is the world's largest professional association dedicated to the advancement of technology. It sets industrial standards to be followed internationally. Currently IEEE has more than 350,000 members worldwide.



澳大芯(UMChip)的成功研發是澳大微電子研究進程中的起點
The birth of UMChip marks a starting point in UM's research on microelectronics

成為國家重點實驗室

經過多年的努力，澳大微電子研究重要的實驗基地——模擬與混合信號超大規模集成電路實驗室於2003年末正式成立。2005年初，在澳大以及特區政府科學技術發展基金的支持下，微電子研究團隊開始為該項目向美國專利商標局提交了首個專利申請，前後共花了四年的時間通過了嚴格的審批程序。

2010年模擬與混合信號超大規模集成電路實驗室的兩項尖端芯片設計，已獲得國際固態電路會議（ISSCC）接納，有關論文將於2011年2月三藩市舉行的會議上報告。該兩篇論文分別是關於「流動電視接收器前端電路」及「應用於雷達及衛星通訊系統的400兆赫茲超高速模數轉換器(ADC)芯片」；兩項設計均建基於65奈米CMOS的技術，其中第二篇論文更榮獲大會頒發「絲綢之路獎」。這一獎項專門為來自亞洲、澳洲及大洋洲新興國家的博士生而設。ISSCC是微電子領域的頂級會議，該會議每年對世界各地頂尖大學及業界企業進行微電子領域的排名。澳大有兩篇論文被該會議接納，這一成績使得澳大在該會議上世界排名第15位，亞洲第5位，中國內地港澳台地區第2位，及中國內地港澳地區第1位，排名高於香港科技大學、內地清華大學、復旦大學及中國科學院，這些機構各自只有一篇論文被該會議接納。

在2010年11月，澳大成功通過國家科技部的審查，批准建立模擬與混合信號超大規模集成電路國家重點實驗室（The State Key Laboratory of Analog and Mixed-Signal VLSI）成為國家重點實驗室。澳大的這所AMS-VLSI SK Lab是廣東省及澳門地區唯一的微電子國家重點實驗室。

在各種艱苦條件下，澳大的微電子研究仍能屢創佳績，團隊亦希望未來新校園超過3000平方米的實驗基地，澳大微電子研究能繼往開來，創造更多驕人的研究成果。

Becoming a state key laboratory

Through many years of effort, the Analog and Mixed-Signal VLSI Laboratory, now an important research base at UM, was officially founded at the end of 2003. In early 2005, the microelectronics research team submitted the first patent application to the US Patent and Registration Office with the support of UM and the Science and Technology Development Fund of Macao SAR. After a rigorous review process that lasted four years, the first US Patent for research work from UM and Macao was granted in 2009.

In February 2011, two state-of-the-art chips of the Analog and Mixed-Signal VLSI Laboratory (AVLSI Lab) will be presented at the International Solid-State Circuits Conference (ISSCC) in San Francisco. These chips, described in two technical papers, contained a Receiver Front-End for a Full-Band Mobile TV and a 400MS/s Analog-to-Digital Converter for Mobile Applications, both designed with advanced 65nm CMOS technology. One of the papers received the Silk-Road Award for a PhD student, from an emerging country or region, in Asia, Australia and the Pacific. ISSCC is the top-level conference in microelectronics and it marks yearly the rankings of top universities and companies in the world in this specific field. With the two papers in ISSCC 2011, within that conference, UM is ranked No. 15 in the World, No. 5 in Asia, No. 2 in mainland China, Hong Kong, Macao and Taiwan, and No. 1 in mainland China, Hong Kong and Macao, above HKUST, Tsinghua University, Fudan University and the Chinese Academy of Sciences (Beijing), which had only one paper accepted each.

In November 2010, UM successfully passed the rigorous evaluation of the Ministry of Science and Technology of the People's Republic of China and obtained the approval for establishing the State Key Laboratory of Analog and Mixed-Signal VLSI. This will be the first state key laboratory in microelectronics in Guangdong province and Macao.

UM's microelectronics research team has attained impressive achievements despite numerous difficulties. Team members believe that the approval for establishing a state key laboratory and the construction of a 3000-square-meter research space for the lab in the new UM campus Open Research Base will herald a more fruitful future.



澳大微電子研究團隊多年努力拼搏，碩果累累。
The numerous awards are the fruits of many years of efforts of UM's microelectronics research team.

上下求索 勇攀中華醫藥高峰 中華醫藥研究院學科建設

Scaling the Heights of Chinese Medicine — Institute of Chinese Medical Sciences



李紹平教授(中)帶領研究團隊研究冬蟲夏草補益作用成份

A team led by Prof. Li Shaoping (middle) is conducting a lab experiment on the active components of *Cordyceps*

培養高端人才引領成功

ICMS從創立之初就選擇了走「用現代國際前沿的先進技術，研究中華民族最古老的傳統醫藥」這條充滿挑戰之路，然後他們逐步總結出「國際視野、創新理念、學科交融」的治學方略。正是這些精神財富，引導著ICMS八年的奮鬥，並帶來了豐碩的成果。

ICMS招收的第一屆研究生有39名，絕大部份都是海內外著名大學推薦的優秀畢業生。除了幾位研究生享用大學提供的獎學金外，多數全職研究生也獲得澳門大學和中國太極製藥聯合提供的中華醫藥獎學金。

Prerequisite for success: developing high-calibre specialists

From the outset, members of the Institute of Chinese Medical Sciences (ICMS) of UM chose to embark on a challenging road: studying traditional Chinese medicine with state-of-the-art technology. Gradually they developed a strategy that emphasizes "international perspectives", "innovative ideas" and a "cross-disciplinary approach". These principles have guided ICMS members over the past eight years and have yielded numerous results.

The great majority of the first 39 postgraduates recruited by ICMS were outstanding students recommended by renowned universities at home and abroad. Several students received scholarships solely-funded by UM, while most full-time students received scholarships jointly granted by UM and Taiji Group, a pharmaceutical company on mainland China. The scholarships aimed to free the students from financial worries so that they could devote undivided attention to study and research.

2002年10月8日的晚上，經過八個月艱苦籌備，ICMS首屆中藥學專業和醫藥管理專業的碩士研究生正式開課。在致開學辭時，王一濤院長以他一貫溫文爾雅的話氣對學生說：「你們是澳門特區第一批生物醫藥領域研究生，一定要加倍努力，珍惜得來不易的學習機緣，取得好成績，研究所的未來在你們身上！」學生靜靜地聆聽著，內心卻思潮起伏，臉上不禁流露出對未來兩年學習的期盼之色，同時也暗暗下定決心：學好本領，傳承宏揚中華醫藥瑰寶，發展澳門衛生醫藥事業。

在注重國際視野的人才培養模式下，ICMS培養了一批又一批高素質的生物醫藥科技人才和醫藥管理人才；在強調創新的科研工作中，ICMS的研究成果獲得了海內外專家同行的認同；在多學科交融與合作的嘗試中，原本籍籍無名的研究院逐步在國際中醫藥學術界擴大了知名度，有了自己的一席之地。但ICMS還有更高的目標，熬過了創業艱辛的他們，仍在上下求索，希望在中華醫藥學術的高峰上繼續攀登，並為中華醫藥和澳門的發展貢獻力量。

不斷創新前沿科學研究

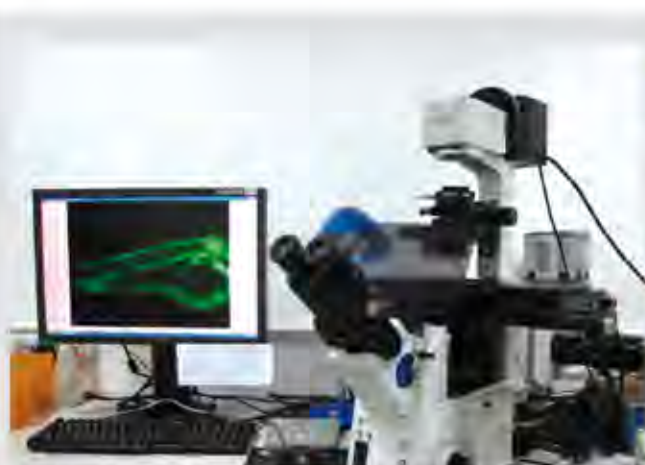
經過多年建設，ICMS已擁有了現代化的實驗條件，組建了植物化學、品質控制、藥理評價、藥物代謝、生物技術、藥物製劑和醫藥資訊等系列實驗室，配備了具有國際前沿水準的大中型生物醫藥儀器設備100多台套，還建立了系統斑馬魚藥物篩選體系和世界上最小的清潔無臭的動物實驗室，率先在澳門開展了中藥和創新藥物臨床前動物藥理實驗研究。

After eight months of difficult preparation, the first master degree programmes in Chinese Medical Science and Medicinal Administration finally opened on the evening of 8 October 2002. In his speech at the opening ceremony, Prof. Wang Yitao, director of ICMS, addressed the students in his usual gentle voice: "You are the first master's students in Macao to specialize in Chinese Medical Science and Medicinal Administration. I hope you will treasure this precious opportunity and study extra hard. The future of ICMS is in your hands." Students listened attentively to Prof. Wang's words, their faces lighting up with excitement in anticipation of the two years' study journey ahead of them. As they listened, they promised themselves that they would study hard in order to perpetuate the knowledge of Chinese medicine and advance the health and medical development of Macao.

The training model that places emphasis on "international perspectives" has enabled ICMS to produce many high-calibre specialists in biomedical technology and medicinal administration. The focus on innovation has resulted in ICMS' research achievements being recognized by experts and peers both at home and abroad. The cross-disciplinary approach has allowed the previously obscure institute to enhance its reputation and gain a foothold in the international scene. Having weathered the initial difficulties, ICMS members still have a long way to go before reaching bigger goals. They hope to scale new heights in their field and make greater contribution to the development of Chinese medicine.

Pioneering research in Chinese medicine and innovative drugs

Through many years of development, ICMS is now equipped with a series of laboratories such as Phytochemistry Lab, Quality Control Lab, Pharmacology Lab, Biotechnology Lab, Pharmaceuticals Lab, and Medical Information Lab, as well as more than 100 pieces of medium- and large-sized state-of-the-art equipment. It has also established a drug screening system using zebrafish, as well as the world's smallest odourless animal laboratory, becoming the first institution in Macao to carry out preclinical animal pharmacology studies for Chinese medicines and innovative drugs.



ICMS配備了具有國際前沿水準的大中型生物醫藥儀器設備100多台套
ICMS is equipped with more than 100 medium- and large-sized biomedical devices



液相色譜質譜聯用儀(LC-MS)是創院時購買的首批啟動儀器，這些先進儀器為學生創造了多篇享譽國際的SCI論文。
Liquid chromatograph-mass spectrometers are the first batch of devices purchased by ICMS after its founding. These advanced devices have helped students to produce numerous internationally-recognized SCI papers.

構建多元合作學科平臺

2004年，當ICMS培養出的第一批碩士畢業生以優異成績通過論文答辯，並獲得評審專家的一致好評後，一個問題浮出水面：他們何去何從？

這班優秀的科研人才都渴望在中醫藥研究領域繼續深入探索，而澳門特區政府對發展中醫藥的扶持、澳大對學科建設的全力支持、先進的設備、一流的師資和團隊合作精神都是難得的平台。對ICMS來說，這批學生亦是可以帮助其不斷發展的寶貴財富。

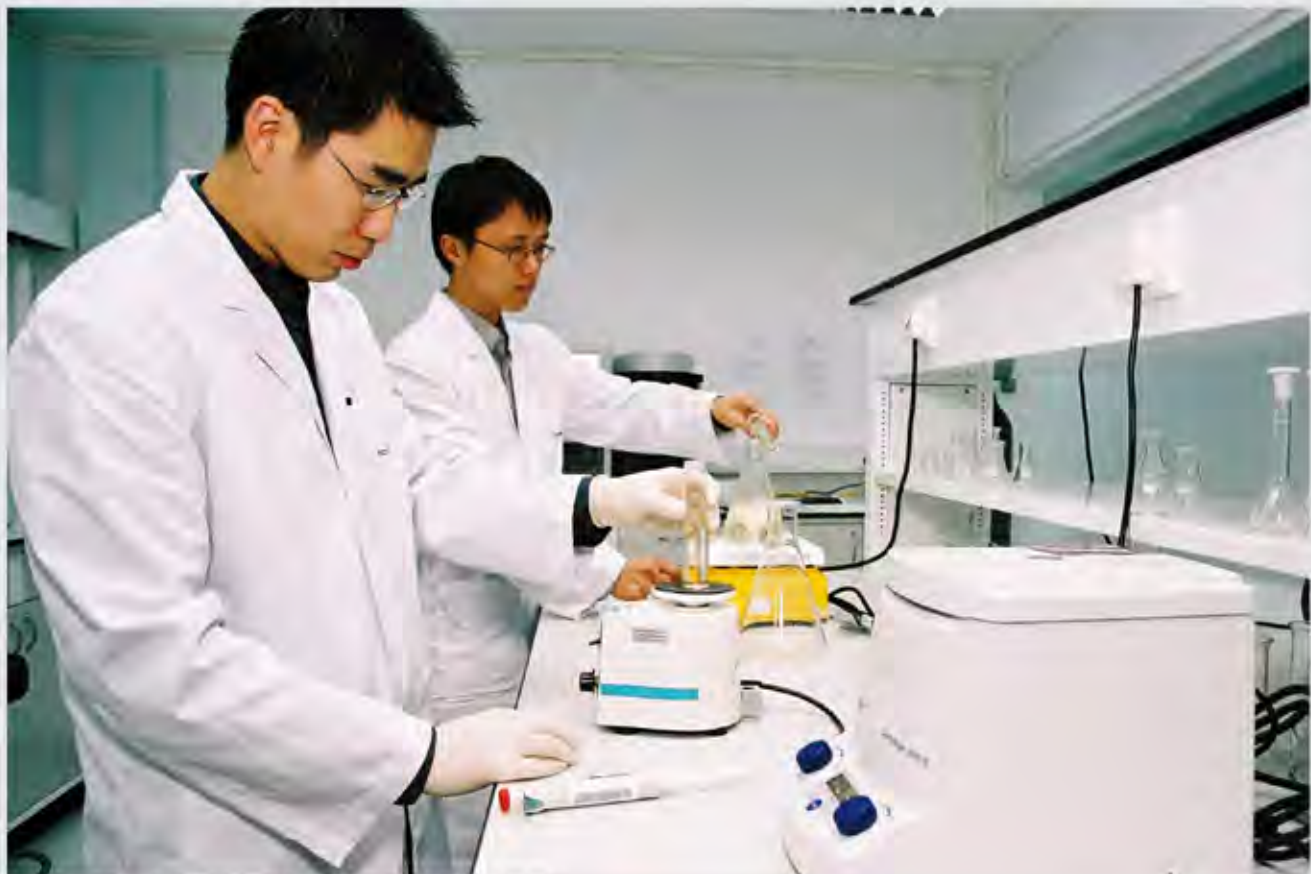
於是，王一濤教授正式向澳大申報開設生物醫藥博士學位。這一行動，立刻獲得了校方和校董會的全力支持。在此後的2006年9月，ICMS更升級為研究院。同時，ICMS的學科建設也在日益完善。目前，研究院設有生物醫藥學、中醫藥學和醫藥管理學三個博碩士專業，明年將新增設生物醫藥本科學士學位課程，ICMS已經形成了多學科的團隊，利用多種技術、方法共同開展中醫藥創新研究的合力，為澳門和海內外培養具有中華醫藥特色的生物醫藥高端人才。

Creating a platform for cross-disciplinary cooperation

In 2004 when the first group of master's graduates of ICMS passed their thesis oral defenses with excellence, they were faced with the question: what next?

They longed to continue their study in Chinese medicine, which was made possible by the support of the local government and UM, the advanced equipment and first-rate academic staff at ICMS, and a team spirit among teachers and students. For ICMS, the continued contribution of these students was also crucial because they could help the institute achieve continuous growth.

So Prof. Wang Yitao applied to establish a PhD programme in Biomedical Sciences. The application received full support from the University Council. With its elevation to a higher rank in September 2006, ICMS stepped up its effort to improve existing programmes and launch new programmes. At present ICMS offers three master's and PhD programmes in Biomedical Sciences, Chinese Medicinal Science, and Medicinal Administration. Next year it will launch a bachelor programme in Biomedical Sciences. ICMS hopes to capitalize on the synergy resulted from the cross-disciplinary cooperation based on an array of techniques and methodologies to nurture high-calibre specialists in biomedical sciences for Macao, China and the world.



ICMS目標是使用現代國際前沿的先進技術研究最古老的中醫藥。
ICMS's goal is to study Chinese medicine with traditional state-of-the-art technology.



ICMS率先在澳門開展中藥和創新藥物臨床前動物藥理實驗研究

ICMS is the first institution in Macao to carry out preclinical animal pharmacology for Chinese medicines and innovative drugs

構建多元合作平臺，與國際著名大學聯合培養和合作科研，是ICMS的特色。ICMS與哈佛大學、耶魯大學、芝加哥大學、劍橋大學、倫敦大學國王學院、日內瓦大學、澳大利亞國立大學、悉尼大學、東京大學、新加坡國立大學、北京大學、清華大學、中山大學、臺灣大學、香港大學、香港科技大學、香港中文大學、中國科學院和中國中醫科學院等數十個國際著名學術機構建立了人才培養聯合計劃、學術科研合作項目或研究人員往來等聯繫。

研究院師生已有100餘人次通過澳門科學技術發展基金、澳大專案和國際學術組織等資助，赴歐洲、美加和亞太地區進行國際學術訪問、聯合開展科學研究、擔任國際會議主席和演講嘉賓，有效提升了博碩士研究生的學術創新思維、研究開發素質和國際發展能力，也顯著提高了研究院的科研水準和國際影響。研究院還接受來自美國、歐洲、日本、新加坡、內地和香港等大學的數十名國際交換學生、研究生、博士後和師資的培訓。

One of the hallmarks of ICMS is its extensive cooperation in training and research with renowned universities from around the world. ICMS's partners include Harvard University, Yale University, The University of Chicago, University of Cambridge, King's College London, University of Geneva, The Australian National University, The University of Sydney, The University of Tokyo, National University of Singapore, Peking University, Tsinghua University, Sun Yat-Sen University, National Taiwan University, The University of Hong Kong, The Hong Kong University of Science and Technology, The Chinese University of Hong Kong, Chinese Academy of Sciences, and China Academy of Chinese Medical Sciences. Such cooperation takes various forms, such as joint training programmes, academic and research projects, and exchange of research personnel.

Teachers and students of ICMS have participated in various international activities (such as academic visits, joint research projects, chairing or speaking at international conferences) in Europe, the United States, and the Asia-Pacific region, more than 100 times. These activities were funded by numerous organizations at the local and international levels, such as The Science and Technology Development Fund of Macao SAR. They have not only effectively improved students' ability to carry out innovative thinking and R&D activities and pursue international development, but have substantially enhanced ICMS's international influence and research quality. ICMS also takes international exchange students at all levels as well as teachers from partner institutions in the United States, Europe, Japan, Singapore, mainland China and Hong Kong.

以卓越攀登科研高峰

Scaling Research Heights with Excellence

每個成功的故事背後都有不為人知的艱辛。澳門大學（澳大）的微電子及中華醫藥研究的亮眼成績，優秀的研究團隊和學術帶頭人，更是學科發展和人才培養的關鍵。

Every success story is filled with obstacles and difficulties. The University of Macau (UM)'s impressive achievements in the fields of microelectronics and Chinese medicine are no exception. In this article, we will examine how the two research teams at UM achieved their success.

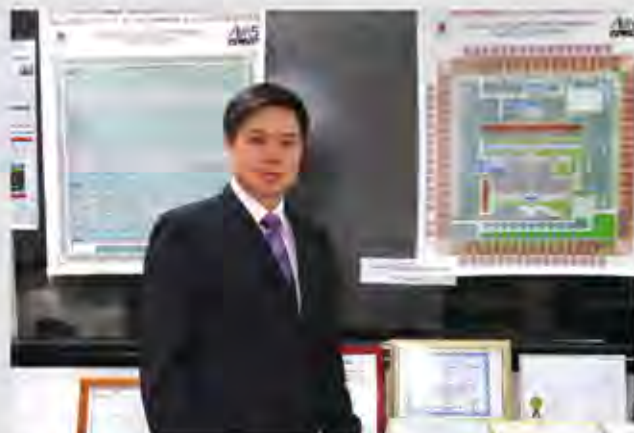
微電子研究團隊

Microelectronics Research Team



實驗室主任馬許願教授全票當選葡萄牙科學院院士，奠定了其在該領域的國際學術地位。

Prof. Rui Martins, principal investigator of the laboratory, has been unanimously elected Corresponding Member of the Portuguese Academy of Sciences, further consolidating his international status in the field.



實驗室副主任余成斌副教授

Prof. U Seng Pan, associate principal investigator of the laboratory

馬許願教授

可以說，沒有馬許願教授，就沒有今日的澳大微電子研究成果。醉心於電子工程研究的他，1980年從葡萄牙里斯本技術大學高級技術學院電機工程及電腦學系獲得電機工程和電腦學學士學位，1985年從同一學院獲得此專業碩士學位，1992年獲得博士學位，2001年獲得教授資格，一直從事專業研究與教育。

自1992年來到澳大科技學院電機及電子工程系任教，馬許願教授便一直為科技學院、為微電子研究開疆闢土。馬許願教授1997年起擔任副校長。澳大修改章程後，經過國際公開招聘，馬許願教授於2008年9月被任命副校長（研究事務）。

Prof. Rui Martins

Without Prof. Rui Martins UM would never have attained such impressive achievements in microelectronics in the past 15 years. Prof. Martins received his bachelor's, master's, and PhD degrees as well as the Habilitation for Full-Professor in electrical engineering and computers from the Department of Electrical and Computer Engineering, at the Instituto Superior Técnico (IST), TU of Lisbon, Portugal, in 1980, 1985, 1992 and 2001, respectively. For his entire life, he has been passionately devoted to the teaching and research of electronic engineering.

Since joining the Department of Electrical and Electronics Engineering, the Faculty of Science and Technology (FST), UM, in 1992, Prof. Martins has pioneered research in microelectronics, uncharted territory for FST. He has served as the vice rector of UM since 1997. In September 2008, through international recruitment following the revision of the *Charter of the University of Macau*, Prof. Martins was appointed Vice Rector (Research) of UM.

馬許願教授於2008年更獲選為美國電機及電子工程師學會(Institute of Electrical and Electronic Engineers, 下稱IEEE)最高榮譽的電機與電子工程師學會會士,也是澳門首位獲得該殊榮的學者。今年10月,他更以全票當選葡萄牙科學院院士,成為亞洲地區唯一一位葡萄牙國內會員。這榮譽等同於中國科學院院士級別,標誌著其學術生涯又邁向另一高峰。

馬許願教授表示:「是次當選,是國際學術界對我學術生涯的認同,而我的學術生涯的大部分都貢獻給了澳大。這個頭銜是我個人的榮譽,也是對澳大學術聲譽不斷提升的肯定。有這樣的成績,全賴澳大師生及工作人員的不懈努力。」

余成斌副教授

余成斌副教授是澳大培養出來的一位優秀青年學者及研究人員,亦是科技學院微電子學科的帶頭人之一及其發展的中堅力量。他於2002年獲得由澳大和葡萄牙里斯本技術大學高級技術學院共同頒發在高速模擬集成電路設計領域的聯合博士學位,現為副教授及模擬與混合信號超大规模集成電路國家重點實驗室的管理人員,IEEE高級會員,IEEE澳門分會工業界協理理事,IEEE澳門電路與系統/通訊(CAS/COMM)學會、國態電路學會創會主席。

2010年10月,在北京釣魚台國賓館舉行的何梁何利基金頒獎大會上,余成斌教授獲頒「科學與技術創新」獎,成為首位獲得此殊榮的澳門學者。

余成斌副教授從事集成電路技術研究,模擬與混合信號集成電路設計,應用於消費性與通信電子的高效信號轉換和濾波,通信基帶、高保真音頻及高清視頻模擬前端等。他在國外主要是IEEE/IET期刊和會議上發表論文近120篇和專著4部(在Springer的專著被中國科出版社選入《國外子信息精品著作》叢書),他目前擁有美國電路專利四項(另多項申請中)和獲論文學術等項20多項。

余成斌副教授亦長期致力於微電子在澳門產業化,2001年,他參與創辦在澳門唯一的尖端科技集成電路研發設計公司—Chipidea微電子(澳門)有限公司並領導研發應用於消費性電子的多媒體模擬矽知識產權(IP)。該公司於2009年5月被美國Synopsys新思科技公司(納斯達克交易代碼:SNPS,全球第一大EDA和排名第一的模擬與連接性IP供應商)所收購而現為旗下的模擬IP研發部。

In 2008 Prof. Martins was elected Fellow of The Institute of Electrical and Electronics Engineers (IEEE), becoming the first scholar from Macao to have ever won this highest honour of IEEE. Recently he was unanimously elected Corresponding Member of the Portuguese Academy of Sciences. He is the only national member (Portuguese) in Asia. This prestigious title is equivalent in rank to Member of the Chinese Academy of Sciences. Prof. Martins' being granted this distinction signals a new height in his academic career.

"That I was elected Corresponding Member of the Portuguese Academy of Sciences reflects international recognition of my academic career in its majority devoted to UM," remarked Prof. Martins. "It is a personal distinction but also reflects the recognition of the academic reputation of UM, which has been improving consistently throughout the years. This achievement would not have been possible without the unremitting efforts of the academic and administrative staff as well as the students of UM."

Prof. U Seng Pan

Prof. U Seng Pan is an outstanding young scholar and researcher produced by UM. He is also the linchpin and one of the leaders of the microelectronics research area in FST, UM. He received a joint PhD degree in the field of high-speed analogue IC design from UM and the Instituto Superior Técnico (IST), Universidade Técnica de Lisboa in 2002. He is currently an associate professor and leads the State Key Laboratory of Analog and Mixed-Signal VLSI (AMS-VLSI Lab). He is also a senior member of IEEE, the Industrial Relationship Officer of IEEE Macau Section, the chairman of IEEE Macau CAS/COMM chapter, and the founding chairman of the IEEE Macau Solid-State Circuits Chapter.

In October 2010, Prof. U received the Prize for Scientific and Technological Innovation 2010 of the Ho Leung Ho Lee Foundation at a prize presentation ceremony held in the Diaoyutai State Guesthouse in Beijing, becoming the first scholar from Macao to have ever won this prestigious honour.

Prof. U's research interests include integrated circuit technologies, design of analogue and mixed-signal integrated circuits, high-efficiency data conversion and filtering and communication baseband and high-fidelity audio and Full HD video analogue front end for consumer and communication electronics. Prof. U has published more than 120 scientific papers and four books in IEEE/IET journals and conferences, and one of the four books was selected in 2007 by the China Science Press for re-publication in "The Overseas Electronics & Information Book Excellence Series". Prof. U holds four US patents (three under processing). He has received more than 20 outstanding paper awards and research prizes.

Prof. U is committed to promoting the industrialization of microelectronic research achievements in Macao. In 2001, he co-founded the Chipidea Microelectronics (Macao), Ltd., the sole innovative-technology IC design company in Macao, and has since led the development of multimedia analogue semiconductor IP. The company was acquired in May 2009 by Synopsys Inc. (NASDAQ: SNPS, the world's leading EDA and analog & connectivity IP provider), and currently it is the R&D centre for multimedia analog IP design.



無線IC主研究組主任麥沛然博士
Dr. Mak Pui In, who leads the Wireless Research Line



數據轉換和信號處理主研究組主任冼世榮博士
Dr. Sin Sai Weng, who leads the Data Conversion and Signal Processing Research Line

麥沛然博士

澳門土生土長的麥沛然博士，在當年還是科技學院一年級學生時，因馬許願教授在課堂上展示研究成果而深受啟發，繼而立志從事微電子研究。在攻讀博士學位期間，麥沛然在導師馬許願教授及余成斌副教授指導下，完成十多篇與微電子有關的研究論文，並在權威刊物IEEE/IEE雜誌及國際性研討會上發表，當中數篇更獲優秀或最佳論文獎，並於2005年獲澳門特區政府頒授功績獎狀。

馬許願教授、余成斌副教授和麥沛然博士三人多次在國際學術期刊上發表論文。2009年5月，三人共同研發的微電子研究項目「用於多制式接收器的階段頻道選取技術」更為澳門和澳大取得首個美國專利，麥沛然博士是該專利研究的第一作者。

去年麥沛然博士獲國際電機電子工程師學會頒發「2009 IEEE MGA GOLD成就獎」。今年6月，麥沛然博士憑其與副校長馬許願教授合著之論文「設計用於移動電視的超寬帶低噪聲放大器」榮獲IEEE電路與系統協會(CASS)頒發2010年最佳期刊傑出青年作者獎。麥博士為本澳首位同時獲邀擔任國際權威刊物《IEEE電路及系統期刊 I—正規論文》與《IEEE電路及系統期刊 II—簡報》副編輯的年輕學者。

冼世榮博士

冼世榮博士於澳大取得電機電子工程學士、碩士及博士學位，現任澳大電機及電子工程系助理教授，同時亦是微電子數據轉換與信號處理(DCSP)研究組主任。他與馬許願與余成斌教授一同帶領二十多位研究員參與關於「數據轉換器芯片」之研究。冼世榮博士出版了一本著作，在國際學術期刊及會議上發表超過 50篇論文，更有幾個專利申請中。他還帶領多項合作項目，合作伙伴包括與意大利帕維亞大學、復旦、清華大學，以及澳大國家重點實驗室之電源管理集成電路研究組。

Dr. Mak Pui In

Dr. Mak Pui In is a native of Macao. Motivated by a research achievement presented by Prof. Martins in class, Dr. Mak made up his mind to study microelectronics while he was still a first-year student of FST. During his doctoral study period, he finished more than ten research papers on microelectronics under the guidance of Prof. Martins and Prof. U Seng Pan, and had the papers published in IEEE/IEE journals and international conferences. Several of them won outstanding paper awards and best paper awards. In 2005 he received an order of merit from the Macao SAR government.

For many years Prof. Martins, Prof. U and Dr. Mak have closely cooperated with one another, and have repeatedly published papers in international academic journals. In May 2009, the project, "Two-Step Channel Selection for Wireless Receiver Front-Ends", jointly developed by the three of them, was granted Macao's first US patent in microelectronics. Dr. Mak is the primary inventor of this technology.

Last year Dr. Mak received the 2009 IEEE MGA GOLD Achievement Award from IEEE. In June 2010, he was granted the Outstanding Young Author Award by IEEE CASS for the paper entitled "Design of an ESD-Protected Ultra-Wideband LNA in Nanoscale CMOS for Full-Band Mobile TV Tuners", which was co-authored by Dr. Mak and Prof. Martins. Dr. Mak is the first scholar from Macao to have been invited to serve as an associate editor for two prestigious IEEE journals, namely *IEEE Transactions on Circuits and Systems Part I – Regular Papers (TCAS-I)* and *IEEE Transactions on Circuits and Systems Part II: Express Briefs (TCAS-II)*.

Dr. Sin Sai Weng

Dr. Sin Sai Weng received his bachelor's, master's and PhD degrees in Electrical and Electronics Engineering from UM. He is currently an assistant professor in FST, UM, and the coordinator of the Data Conversion and Signal Processing (DCSP) Research Line in the AMS-VLSI Lab, UM. He currently leads a research line of more than 20 researchers (together with Prof. Rui Martins and Prof. Ben U) in the field of High-performance Data Converters Integrated Circuits (IC). He has published one book and more than 50 technical journal articles and conference papers in the field, with several patents under processing. He is also leading cooperation projects with the University of Pavia, Italy, Tsinghua University, and the Integrated Power Research Line of State-Key Laboratory.

在2009於台北舉行的IEEE亞洲固態電路會議(被譽為「亞洲芯片奧林匹克」)中,冼世榮博士的論文在近三百篇投稿、四十八篇相同議題的論文中被技術評委列為前五名而被錄取,得到很高的評價。2010年,冼世榮博士一直領導該研究小組取得優異的成績,如其學生論文發表在IEEE《固態電路期刊》(JSSC,被美國專利引用最多以及下載率最高的IEEE期刊)。此外,論文亦在2011美國國際固態電路會議 (ISSCC,被譽為「國際芯片奧林匹克」)接受發表並得到了「絲綢之路」獎。ISSCC極受國際學術界和工業界關注,只有國際知名的大學和業界可以於會議當中展示他們的作品。

冼世榮博士現時是IEEE固態電路協會澳門分會秘書、IEEE電路系統及通訊澳門聯合分會司庫及秘書、IEEE澳門分會執行委員會的學術事務委員,曾任IEEE AVLSI會議技術項目及組織委員會的成員、2008 IEEE 亞太區電路與系統會議特別會議聯合主席及技術項目委員會成員,以及幾部IEEE期刊及會議的評審。

At the fifth IEEE Asian Solid-State Circuits Conference (A-SSCC) 2009 (also known as "Chip Olympic in Asia") held at The Grand Hotel, Taipei Taiwan, Dr. Sin's paper was accepted as one of the top five papers from nearly 300 submissions (48 of which dealt with the same field of research as Dr. Sin's paper) and won high acclaim from conference attendees. In 2010, Dr. Sin led the research group to achieve excellent results. For instance, a student's paper was presented in *IEEE Journal of Solid-State Circuits* (JSSC, the most downloaded and cited IEEE journal in all US Patents), it was also accepted in the 2011 International Solid-State Circuits Conference (ISSCC) and received the "Silk-Road Award". It is worth mentioning that ISSCC is also known as the "International Chip Olympic". It is of great interest to the international academic and industry circles. Only internationally well-known academics and companies in the industry can present their work at this conference.

Dr. Sin is currently the secretary of IEEE Solid-State Circuit Society (SSCS) Macau Chapter, and treasurer/secretary of IEEE Macau CAS/COM Joint Chapter, a member of the Executive Committee – Academic Affair of IEEE Macau, a member of the Technical Program and Organization Committee of the 2004 IEEE AVLSI Workshop, the Special Session Co-Chair and Technical Program Committee Member of 2008 IEEE APCCAS Conference, and a referee of several IEEE transactions and conferences.



在艱苦條件下,澳大微電子研究團隊仍創造卓越佳績
UM's microelectronics research team has attained impressive achievements against all odds

優秀研究團隊

除以上幾位，模擬與混合信號超大規模集成電路國家重點實驗室優秀研究團隊還包括：電源管理集成電路副研究組聯合主任黃民聰教授，他是澳大電機及電子工程系副教授，也是IEEE高級會員。而澳大校長、講座教授趙偉教授則擔任計算物理集成系統獨立副研究組主管；還有生物醫學IC副研究組聯合主任韋孟宇教授，他亦是澳大電機及電子工程系副教授，IEEE高級會員。

學術成績屢獲國際肯定

已站在國際前沿的澳大微電子研究自1995年起便開始鼓勵學生在IEEE舉辦的會議上發表論文，過去十多年先後發表近150篇微電子領域的論文。最新的喜訊是博士生魏和功的論文於2010年10月成功入選引領全球高科技產業的「國際固態電路會議」（ISSCC）。此外，該論文還獲得大會「絲綢之路獎」，這一獎項專門為來自亞洲、澳洲及大洋洲新興國家的博士生而設。微電子研究團隊亦參加許多國際性學術會議，其中包括主持2004年在澳大舉行的第七屆IEEE微電子大規模集成電路國際會議（AVLSIWS 2004），超過一百位專業學術齊集澳大。

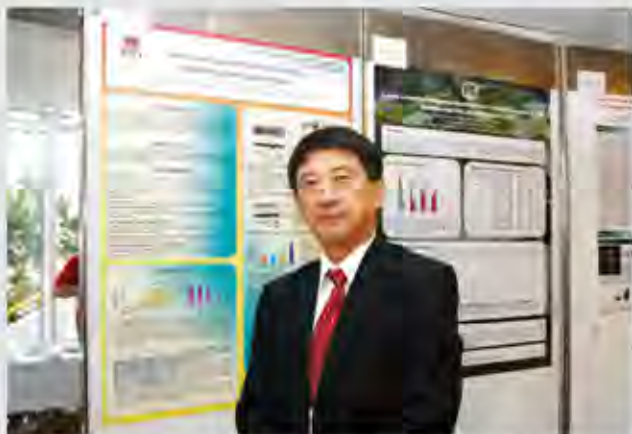
Outstanding research team

In addition to the abovementioned individuals, the research team of the AMS-VLSI SK Lab also includes the following members: Prof. Orion Wong Man Chung, Prof. Wei Zhao, and Prof. Vai Mang I. Prof. Wong is an associate professor at UM in the Department of Electrical and Electronics Engineering and a senior member of IEEE. Prof. Wei Zhao is the rector and a chair professor at UM and the coordinator of the Integrated Cyber-Physical Systems Team. Prof. Vai is an associate professor at UM in the Department of Electrical and Electronics Engineering, a senior member of IEEE, and a co-coordinator of the Biomedical Team.

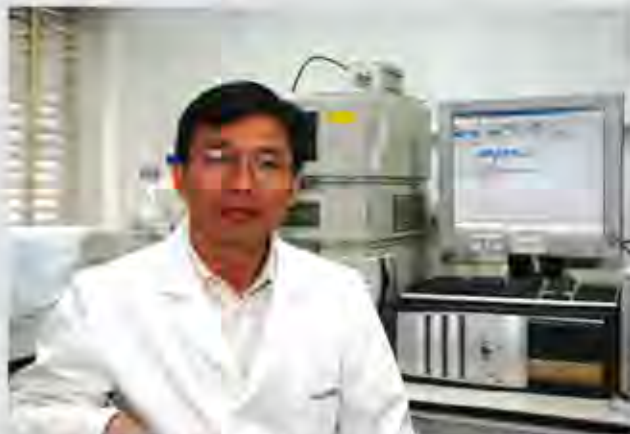
Academic achievements repeatedly gaining international recognition

UM is now approaching international standards in the field of microelectronics. In 1995 FST began to encourage students to publish papers in IEEE-organized conferences. Over the past decade, FST students have published nearly 150 papers on microelectronics. The most recent good news came in October 2010. A paper by Wei Hegong, a PhD student of UM, was accepted by the IEEE International Solid State Circuit Conference (ISSCC), the flagship conference of the Solid-State Circuits Society that serves as a premier forum for presenting advances in solid-state circuits and systems-on-a-chip. It also received the "Silk-Road Award" for a PhD student from an emerging country or region, in the Asia, Australia and the Pacific Region. UM's microelectronics team has also participated in numerous international academic conferences. In 2004 it hosted seventh Institute of Electrical Engineers of Japan (IEEJ) International Analog VLSI (Very Large Scale Integrated Circuits) Workshop 2004 (AVLSIWS 2004), which was attended by more than 100 experts in the field.

中華醫藥研究團隊 ICMS Research Team



王一濤教授是國家第一個973計劃中醫藥項目的兩位首席科學家之一
Prof. Wang Yitao is one of the two chief scientists for the first Chinese medicine project under the "973 Programme", a key research project launched by the Chinese government in March 1997.



李紹平教授是中藥及藥用植物品質控制領域最活躍的學者之一
Prof. Li Shaoping is one of the most active scholars in the field of quality control of Chinese medicine and medicinal plants

王一濤教授

2002年2月，王一濤教授應邀從香港科技大學來到澳大，滿載創業激情的他，肩負起創辦澳大中華醫藥研究院的重任。

出生於醫藥世家的王一濤教授，現任澳大中華醫藥研究院院長、中國中醫科學院首席研究員，兼任北京大學醫藥管理國際研究中心主任。他曾經在多所著名中醫藥學府和生物醫學機構擔任教授和學術負責人，其中包括成都中醫藥大學副校長兼藥學院院長，中國中醫科學院首席研究員、副院長兼中藥研究所所長，以及香港科技大學教授兼中藥研究學科主任，參與了中國第一個中醫藥國家重點學科、第一個中藥學博士後流動站、第一個中藥學國家培養基地的創建，以及參與了中國第一個世界衛生組織傳統醫學（中藥）合作中心建設。

多年辛勤耕耘，王一濤教授已桃李滿天下，指導畢業博士10餘名和碩士80餘名，並已培養博士後10餘名。他的研究領域為中藥品質系統評價、系統藥理學和醫藥管理。他先後主持國家自然基金重點項目、國家973課題和國家科技攻關等重大/重點專案20餘項。1999年被國家科技部聘任為中國首個973中醫藥項目的兩位首席科學家之一。現任國際中醫藥學會秘書長、世界中醫藥學會聯合會常務理事兼副秘書長。先後受聘為國家科技計劃專家委員會、國家科技進步獎勵委員會、國家中醫藥科技進步獎勵委員會、國家新藥開發專家委員會、國家自然科學基金和國家藥品審評委員會的專家。

李紹平教授

在2002年11月，ICMS招聘了第一批助理教授，李紹平教授就是首批招聘的兩名教師之一。李紹平經過八年的教學和科研磨練，已經成為正教授和研究院副院長。當年李教授決定在澳大開始他的研究事業後，馬上帶領碩士生進行他在博士期間已開始的冬蟲夏草補益作用成份的研究，經過長年鑽研，終於在2009年取得了突破性的進展，更獲得了國家專利。與此同時，李紹平教授還致力中藥質量控制研究，多個項目已獲國家自然科學基金、澳門科學技術發展基金和澳大研究基金資助，成為國際上在中藥及藥用植物品質控制領域最活躍的學者之一。李教授目前正研究中醫藥學術前沿領域——中藥與蛋白功能。2011年，他將以訪問學人身份赴英國劍橋大學開展合作研究。

Prof. Wang Yitao

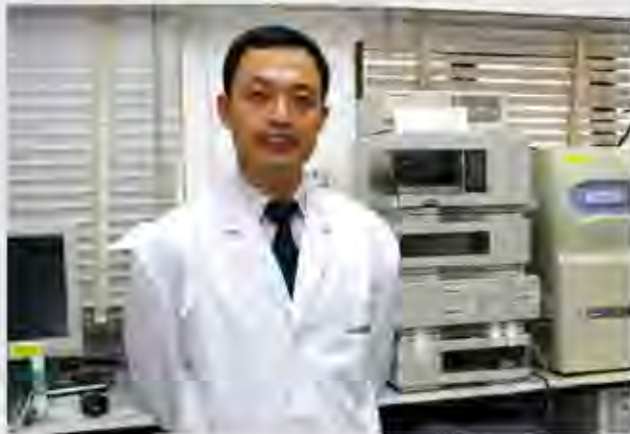
Prof. Wang Yitao previously worked at the Hong Kong University of Science and Technology (HKUST). In February 2002 he accepted UM's offer and joined its Institute of Chinese Medical Sciences (ICMS). Full of entrepreneurial passion, he was entrusted with the mission of establishing research-oriented disciplines for ICMS.

Prof. Wang is from a family that has practiced medicine for generations. He is now the director of ICMS at UM, a chief researcher at the China Academy of Chinese Medical Sciences, and the director of the International Research Center for Medicinal Administration at Peking University. He served as a professor and academic head at numerous higher education institutions of Chinese medicine as well as biomedical institutions, including Chengdu University of Traditional Chinese Medicine (TCM) (where he served as the vice president of the university and the dean of the School of Pharmacy), China Academy of Chinese Medical Sciences (where he was a chief researcher, deputy president of the academy, and the director of the Institute of Chinese Materia Medica), and HKUST (where he served as a professor and director of TCM Programme). He participated in the establishment of China's first state key discipline in Chinese medicine, the first post-doctoral research centre in Chinese medicine, the first state Chinese medicine specialists training centre, and the first cooperation centre of the World Health Organization (WHO) in traditional medicine (Chinese medicine).

Over the years Prof. Wang has trained many graduates, including more than 80 master's graduates, more than ten PhD graduates and more than ten postgraduates. His research interests include quality evaluation system of TCM, systems pharmacology, and medicinal administration. He has led more than 20 projects, including a key project funded by the National Natural Science Foundation of China, a project under the "973 Programme" (The "973 Programme" is a key research programme launched by the Chinese government in March 1997), and a major project under the "National Technology R&D Programme". In 1999 he was appointed by the Ministry of Science and Technology of the People's Republic of China as one of the two chief scientists for the first Chinese medicine project under the "973 Programme". He is now the secretary general of the International Society for Chinese Medicine; and a member of the Executive Council and the deputy secretary general of the Secretariat of the World Federation of Chinese Medicine Societies. He served as a member on various other committees, such as the Expert Committee of the National Science and Technology Programme, the Reward Committee of the State Science and Technology Awards, the State New Drug Development Expert Committee, the National Natural Science Foundation of China, and the National Drug Evaluation Committee.

Prof. Li Shaoping

In November 2002, ICMS recruited its first two assistant professors, and Prof. Li Shaoping was one of them. The rich teaching and research experience gained over the past eight years has earned Prof. Li the position as a full professor and the deputy director of ICMS. After Prof. Li decided to pursue his research career at UM, he lost no time in resuming his research into the active components of *Cordyceps*, which he had begun during his PhD study, with the assistance of his master's students. The efforts of Prof. Li and his students finally led to a breakthrough in 2009, and earned them a patent for invention from the State Intellectual Property Office of the People's Republic of China. Prof. Li's research interests also include the study of the quality control methods for Chinese medicine. Numerous projects headed by him have received funding from the National Natural Science Foundation of China, the Science and Technology Development Fund of Macao SAR and the Research Committee of UM. He is now one of the world's most active scholars in the field of quality control of Chinese medicine and medicinal plants. At the moment he is studying the effects of selected Chinese herbs on the endoplasmic reticulum unfolded protein response, a cutting-edge area of research in the field of Chinese medicine. In 2011 he will go to the University of Cambridge in the United Kingdom as a visiting scholar to carry out a collaborative research project.



胡元佳博士是澳大首位生物醫藥專業醫藥管理方向的博士

Hu Yuanjia, UM's first PhD graduate in biomedical sciences specializing in pharmaceutical management

胡元佳博士

胡元佳博士是ICMS培養的第一屆碩士畢業生，也是第一屆博士。ICMS在國內招生時，他正在中國藥科大學攻讀碩士學位。當年，他考慮到ICMS具有與內地重點大學聯合培養人才的優勢，順利畢業後可獲得內地重點大學和澳大雙碩士學位，便決定轉戰澳大攻讀研究生，師從王一濤教授。一念之間，改變了胡元佳的人生軌跡。第一堂課結束後，胡元佳更無悔自己的選擇：澳大國際化的師資團隊、全英原版教材、自由的學術氛圍、海外深造的機會都令他深深感受到前所未有的震撼。後來他也不負眾望，憑毅力和決心，於2009年以出類拔萃的成績通過博士論文答辯，成為澳大首位生物醫藥專業醫藥管理方向的博士，也是最多論文數量的博士，現在已成為研究院最年輕的助理教授之一。

在讀書期間，他獲得了驕人的學術成績：發表30多篇國際學術論文，其中多篇發表在SSCI的A+級學術期刊和Nature出版社的《Medical Marketing》等期刊上；他還受DIA(美國藥物資訊學會)和INSEAD(歐洲工商管理學院)資助，多次主持和參加國際重要學術會議；他的博士畢業論文獲得來自哈佛大學、澳大利亞國立大學、奧地利研究中心、北京大學和香港理工大學的著名專家組成的評委一致授予優異成績。他還在來自多所著名大學眾多博士的激烈競爭中脫穎而出，榮獲歐亞太平洋大學聯盟博士獎學金赴奧地利研究中心研修。

卓越師資團隊

來自香港大學的生物化學專家李銘源副教授，已成為知名的斑馬魚篩選中藥研究專家；來自北京大學的卞國副教授是海內外頗有影響的醫療政策學者；北大推薦第一位赴香港中文大學深造的鄭穎博士已是在藥劑學領域建樹甚多的優秀學者；來自臺灣大學博士後的鄭力仁博士在健康經濟學領域頗有造詣；畢業於愛丁堡大學的梁少偉助理教授為國際中醫藥學會和我校合作在英國出版的中醫藥英文雜誌貢獻良多；獲得劍橋大學博士學位的澳門學生許貝文助理教授所主講的專業英語課程深受同學喜愛。

Dr. Hu Yuanjia

Dr. Hu Yuanjia is among the first master's graduates and PhD graduates produced by ICMS. When ICMS was recruiting students on mainland China, he was studying for his master's degree at China Pharmaceutical University. He decided to transfer to UM to pursue his master's degree under the guidance of Prof. Wang Yitao, mainly based on the consideration that the cooperation between UM and key mainland universities meant that he could receive a dual master's degree upon graduation. This decision would later prove to be a life-changing one. The first class he took at UM left him feeling surer that he had made the right decision: the excellent teachers from around the world, the all-English text books, the liberating academic atmosphere, and the numerous opportunities for studying abroad thrilled him to the core. He lived up to the high expectations people had of him. In 2009 he successfully passed his PhD thesis oral defense with distinction and became UM's first doctor of Biomedical Sciences specializing in pharmaceutical management. He is also a doctor with the most published papers. Now he is one of the youngest assistant professors at ICMS.

During his doctoral study period Hu did impressively well academically. He published more than 30 papers in international academic journals, including an A+ SSCI academic journal and *Medical Marketing* through the Nature Publishing Group. He attended numerous important international academic conferences, some of which he presided over, with funding from the Drug Information Association (DIA) in the United States and the European Institute of Business Administration (INSEAD). His PhD thesis was unanimously rated as "excellent" by the examination committee which consisted of esteemed experts from Harvard University, Australian National University, and Austrian Research Centers. In August 2008 he stood out from the rest of the candidates recommended by renowned universities from Hong Kong and Macao, and was invited to the Austrian Research Centers for an eight-month study programme under the PhD scholarship granted by Eurasia Pacific Uninet.

Outstanding faculty team

Prof. Simon Lee Ming Yuen from the University of Hong Kong is an expert in biochemistry and in screening of Chinese medicines by using zebrafish. Prof. Bian Ying from Peking University is a scholar of medicare policies with some influence both at home and abroad. Dr. Zheng Ying, the first student recommended by Peking University for further study at the Chinese University of Hong Kong, is well-versed in pharmaceuticals. Dr. Cheng Li Jen, who received his postdoctoral degree from National Taiwan University, has attained impressive achievements in the field of health economics. Dr. Leung Siu Wai, who graduated from the University of Edinburgh in the United Kingdom, played an instrument role in the successful publication in the UK of Chinese medicine magazines in English language through the cooperation between UM and the International Society for Chinese Medicine. Dr. Hoi Pui Man, who received her PhD degree from the University of Cambridge, is very popular with students for her classes in professional English.

研究成果蜚聲國際

ICMS師生已在海內外著名期刊發表學術論文398篇，其中SCI國際性期刊論文佔三分之一以上，國際性英文期刊發表論文的比例還在逐步上升。在美國NOVA出版社、中國科學出版社和人民衛生出版社等海內外著名出版社出版學術專著18部，申請國家發明專利13項，獲得海內外重要科學技術獎勵和優秀論文獎19項，在研保健食品和創新藥物研究10餘項等。ICMS的中藥品質評價的系統研究已在海內外產生較大影響，天然藥物高效快速提取分離技術一直排名該技術的應用推廣和發表SCI學術論文的國際第二至四位。

結語

在中央和澳門特區政府的支持下，澳大橫琴校區破土動工，微電子和中華醫藥兩項澳大傑出的研究項目榮獲難得的發展機遇。模擬與混合信號超大規模集成電路國家重點實驗室得以獲得批准，為研究水平的提升創造了更優越的條件。而中華醫藥研究院亦藉著建立天然藥物及中藥質量研究國家重點實驗室的契機，將在新校園建立開放式中醫藥國際合作研究基地，以彙集海峽兩岸四地和海內外知名學者，共同為發展中華醫藥事業發展作出貢獻。

把握機遇，展望未來，澳大微電子和中華醫藥研究院團隊期望努力建設成為澳門乃至海內外彙聚高端人才培養、整合學術研究資源的國際平台。

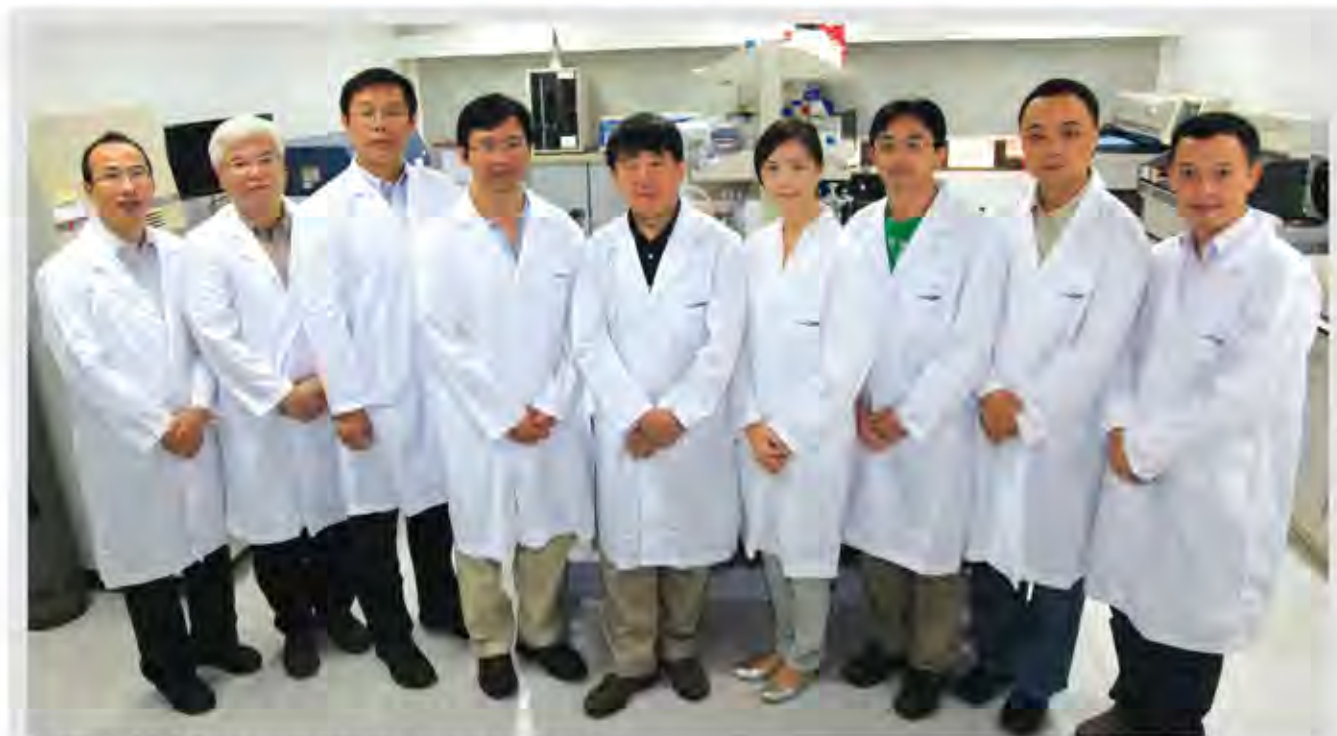
Research achievements gaining international recognition

Academics and students of ICMS have published 398 papers in prestigious academic journals at home and abroad, more than one third of which were published in SCI (Science Citation Index) journals. The ratio of papers published in international English journals is rising steadily. Other achievements include 18 academic monographs published through such renowned publishing houses as the Nova Science Publishers, Inc (United States), Science Press (China), and People's Medical Publishing House (China); 13 patents for invention granted by the State Intellectual Property Office of the People's Republic of China; and 19 major scientific and technological awards and outstanding paper awards. Now more than ten research projects on healthcare foods and innovative drugs are under way. ICMS's research on Chinese medicine quality evaluation system has achieved some major influence both at home and abroad. The high-efficiency accelerated solvent extraction technology of natural medicine has ranked between No. 2 and No. 4 in the world in terms of the application and spread of the technology as well as published SCI papers.

Conclusion

Because of the support of the central government and the Macao SAR government, construction of the new UM campus has begun. Research projects in microelectronics and Chinese medicine also face precious opportunities. The approval of the AMS-VLSI Lab will create more favorable conditions for UM to enhance its research quality. ICMS will seize the opportunity brought by the State Key Laboratory for Quality Research in Chinese Medicine to set up an open Chinese medicine research base on the new campus, in order to provide a platform for scholars from around the globe to cooperate in the field of Chinese medicine.

These new developments of the microelectronics research team and the Chinese medicine research team at UM herald a future full of possibilities. Members of the two teams are hoping to seize the opportunity to consolidate research resources and develop UM into an international platform for training high-calibre specialists in the fields.



優秀的師資團隊是ICMS學科建設和人才培養創出佳績的關鍵

The excellent faculty is the key to ICMS's success in the development of academic programmes and in the nurturing of outstanding graduates

總理來到澳大

Premier Wen Visits UM

「沒想到能與總理零距離接觸，聆聽他的教誨，還可以和總理握手！」相信這是2010年11月14日這天，最多澳大人激動地異口同聲說出的一句心底話。因為在這個特別的日子，澳門大學（澳大）迎來了國家總理溫家寶的到訪，令週日平靜的校園，一下子沸騰起來！

激動、緊張、興奮、快樂……筆墨已經不能形容當大家聽到「總理來了」這個好消息的心情。國家總理的親身到訪，充份地體現了國家對澳大發展的重視與支持。全體澳大師生和職員都為此感到光榮和自豪，「我們一定要讓總理看看澳大學子神采飛揚的精神面貌！」同學們都暗暗對自己許下願望，希望有機會對總理說：「歡迎來到澳大！」

"I never would have dreamed that I'd see Premier Wen in the flesh, much less listen to him talk and shake his hands," people chorused in unison after Chinese Premier Wen Jiabao wrapped up his first-ever visit to the University of Macau (UM) on 14 November 2010. His appearance made the usually quiet weekend campus buzz with excitement.

Excited, nervous, happy...words seem inadequate to describe the feelings of UM staff and students after they heard the good news that Premier Wen would visit UM. They felt immensely proud that one of China's top leaders would visit their university, for they knew that this visit showed that the central government attached great importance to UM's development. Students were hoping to show Premier Wen their vigour and passion. They couldn't wait to say "Welcome to UM!" to him in person.



溫家寶總理參觀澳大，瞭解澳大最新進展
Premier Wen visits UM to learn more about the university's latest developments



溫家寶總理參觀澳大中華醫藥研究院瞭解該院先進的中藥品質控制技術
Premier Wen visits ICMS to learn more about the advanced Chinese medicine quality control technologies

感受平民總理的風範

懷著對澳門高等教育發展和對澳大的殷切期望，溫家寶總理在行政長官崔世安陪同下初次踏足澳大。「平民總理」的風範，大家終於可以第一次親身感受到。毫無架子的他，穿着一件樸素的深藍色外套，精神矍鑠，展露他一貫親切和藹的笑容，跟一湧而上的年輕人一個接一個握手打招呼。

同學們做夢也想不到，平日只能在電視報章上看到的溫總理，是如此平易近人、和藹可親得像自己的爺爺一樣。「總理的手好溫暖！」一位與總理握手後的女同學說。她興奮地說，即使是北京人，一生中可以親眼見到總理並與他握手的機會也不多，何況是土生土長的澳門人。「我對身為澳門人感到自豪！」她笑着說。

認同澳大科研學術成績

澳大近年發展迅速，學術和科研成就突飛猛進。溫總理來到澳大，興致勃勃地聆聽澳大趙偉校長介紹澳大的「新機遇、新進展、新挑戰」。微電子及中醫藥剛獲國家科技部批准籌建兩個國家重點實驗室，多位科技領域的教師亦獲得多項國際學術殊榮，當中包括副校長馬許願教授當選亞洲唯一一位葡萄牙科學院院士、科技學院院長陳俊龍教授成為大中華地區首位現職學者出任IEEE系統人機及智能自動學會主席、由澳大校長趙偉教授任首席科學家引領國家973科研計劃；另外在人文學科領域澳大也取得了卓越的成果，包括在去年已制定了「澳門學」研究與發展規劃，實質性推動「澳門學」的學科發展，將「澳門學」打造成為澳大的學術名片。

溫總理對澳大的科研成就十分認同，特別是「澳門學」研究。這次到澳門，總理引用了澳門第一任海防軍民同知印光任的兩句名詩「好景關情動秋思，故山如畫白雲邊」，形容自己對澳門的深厚感情，雖然初次踏足濠江，卻有重臨故鄉之感。這就不難理解，為何總理對「澳門學」研究這樣關切。溫總理對趙偉校長說，研究澳門歷史文化在中國乃至世界歷史均有重要意義，須認真做好這方面的研究。



溫家寶總理向在場學生揮手
Premier Wen waves to students



溫家寶總理受到澳大學生的熱烈歡迎
Premier Wen is warmly welcomed by UM students

Like a “next-door grandpa”

Accompanied by the chief executive of Macao SAR Chui Sai On, Premier Wen arrived at UM, in the hope that the visit to one tertiary institution could offer him a glimpse of the bigger picture of higher education in Macao. Looking hale and hearty in a simple dark blue jacket, Premier Wen shook hands with swarms of students while beaming his trademark winning smile. His non-condescending manner indeed lived up to his reputation as a “next-door-grandpa” type of premier.

Students didn't expect that a state leader whom they saw only on TV and in newspapers would be as amiable as their own grandfathers. “His hands felt so warm!” exclaimed a girl after shaking hands with Premier Wen. She said that even people living in Beijing have few chances to meet Premier Wen in person and shake his hands, so as a Macao native she felt “extremely honoured” to have done both.

Impressed with UM's academic and research achievements

UM Rector Wei Zhao updated Premier Wen on the academic and research achievements UM has attained in recent years, such as the Ministry of Science and Technology's (MOST) approval of two state key laboratories in Chinese medicine and microelectronics; Vice Rector Prof. Rui Martins' becoming the only corresponding member of the Portuguese Academy of Sciences in Asia; Prof. Philip Chen of the Faculty of Science and Technology's becoming the first active scholar in the Greater China region to have been elected president of the Systems, Man, and Cybernetics Society of the Institute of Electrical and Electronics Engineers; the approval of a research project, headed by UM Rector Wei Zhao in his capacity as the project's chief scientist, by MST, for funding under the “973 Programme”; establishment of a systematic plan for the subject of Macaology with the aim of developing it into an academic “business card” of Macao; and so on.

Premier Wen listened intently, nodding his approval from time to time, particularly concerning UM's attempt to advance the development of Macaology. He concurred that UM is wise to strengthen the study of the history and culture of Macao for it can shed new light on the history of China and the world. Premier Wen's special attachment to Macao is evident in the two lines he quoted, after he set foot in Macao, from a poem by Yin Guangren, a maritime official in Macao in Qing Dynasty—“the pretty autumn sight causes a ripple of homesickness in my heart, the familiar mountains etched against the white clouds, but oh so far”. He said his first visit to Macao actually felt like a homecoming.

與學生討論道德的哲學

年輕人是社會的未來，溫總理也特別關注年輕人的發展。在參觀澳大住宿式書院之一的東亞書院期間，正好遇上東亞書院導師在與學生討論「道德的哲學」課題，溫總理對討論的題目饒有興趣，便停下腳步加入同學的討論中。

當日到場參與討論的張超然同學對當時的情形印象十分深刻：「當時總理面帶微笑進入課室，向我們揮手致意。當走到我旁邊的空位時，突然停下腳步，親切地對我說：『這裡是空位嗎？我能坐這兒嗎？』我點頭，總理就坐到了我右手邊的座位上。我真不敢相信，我和總理之間僅有一個拳頭的距離！可以與國家領導人有如此親近的接觸，真的很幸運。」

另一位東亞書院的同學也說：「總理剛進來時，大家有點兒緊張。溫總理卻和藹地對我們說，『道德話題我最喜歡了，今天真高興與各位同學一起討論。』總理此言一出，氣氛一下子就輕鬆了許多。」

當天，溫總理諄諄教誨澳大學子：「在我心目中，道德的最高標準是同情心，孟子說過『無惻隱之心，非人也』，見到別人有危難時，必須伸出援助之手。公平和正義很重要。亞當斯密說過，有一個富人存在，就有五百個窮人，這是財富分配不公平的情況。而令這個社會穩定發展的，就要靠兩隻無形的手去調節。一隻手是市場機制，另一隻手是社會道德。」

另一位同學也積極發言：「現時澳門也有不公平的現象存在，我們要如何提高社會的公共道德水平？」

溫總理回答說：「孟子說，人有惻隱之心。澳門是以休閒旅遊娛樂博彩為中心的城市，社會更應有公共道德。黑暗和不平等的地方仍然存在，所以法律和道德同樣重要。更需要法律不斷完備，去適應社會發展。如果一個社會的財富被少數人佔有，這個社會就注定會不公平及不穩定。社會發展需要社會的公平和正義。」

討論的尾聲，溫總理鼓勵同學們，要學習知識，要懂得判斷是非，還要樹立學習的目標。這一刻，他不是那個高高在上的領袖，他只是個睿智慈祥的長者，一個告訴年輕人「公平正義比太陽還要有光輝」的智者。溫總理所說的每一句話，將會被澳大的莘莘學子們畢生銘記。



學生熱烈地向溫家實總理提問
Students leap at the chance to ask Premier Wen questions

Discussing “the philosophy of morality” with students

Premier Wen has always showed great concern for the healthy growth of young people for they are the future pillars of society. During his stay at UM, he visited the East Asia College, one of two pilot residential colleges at UM, to interact with students. A group of teachers and students were discussing “the philosophy of morality” when Premier Wen stepped into the room, to the pleasant surprise of everyone present. Interest piqued by the topic, Premier Wen joined the discussion.

“I remember Premier Wen came into the classroom and waved at us with a warm smile on his face,” recalled Kelvin, who participated in the discussion that day. “He stopped at an empty seat next to me and asked ‘Is this seat taken? Can I sit here?’ I nodded furiously, so he took the seat. I couldn’t believe that I was just one fist away from the premier of China. I felt incredibly lucky.”

“We were a little nervous at first,” recalled another student. “But then Premier Wen said kindly, ‘morality is my favorite topic, I’d love to discuss it with you!’ This immediately put us at ease.”

Students remember Premier Wen telling them, “In my opinion, the highest form of morality is compassion. Menfucious once famously said that ‘He who has no compassion does not deserve to be called a human being.’ When we see someone in need, we must lend a helping hand. Equity and justice are very important. Adam Smith once said something to the effect that every rich person exists alongside 500 poor people. This is the result of unfair distribution of wealth. The stability of society depends on two invisible hands. One is market mechanism, and the other is social morality.”

A student leapt at the chance to ask: “Inequities still exist in Macao, so how can we enhance social morality to a higher level?”

Premier Wen answered: “Menfucious once said ‘Compassion is an inherent human trait’. In a city like Macao where the economy is heavily dependent on gambling-centric recreational and tourism industries, it is ever more important to promote public morality. There are still areas of darkness and inequities, that’s why law and morality should be accorded equal emphasis. Laws need to be improved constantly to adapt to changing society. A society where wealth is monopolized by the privileged few is destined to experience inequality-induced instability. Social equity and justice are a prerequisite for societal development.”

Towards the end of the discussion, Premier Wen encouraged the students to study diligently, to learn to tell right from wrong, and to set up clear academic goals. At that moment, he was not an unapproachable state leader, but was like a wise and kind grandpa who maintained that “Equity and justice outshine the sun.” Premier Wen left, but his words would be etched on the students’ memories forever.

大學的靈魂重在風格與精神

溫總理告別澳大學子時，仍不忘寄語學生：「澳大是有前途的，澳門今後的發展，澳門的未來，都寄托在你們身上。大學的靈魂不僅在於物質條件，而在於它的精神，那就是自強不息，艱苦奮鬥的精神，我相信澳大會越辦越好，會形成自己的傳統、風格和精神。自強不息，奮鬥不止的靈魂永在！」溫總理的講話獲得全場如雷掌聲，他的殷殷寄望也轉化成為澳大人奮發的動力。

胡濤錦主席和溫家寶總理到訪澳大，均提出要辦一流大學的目標。溫家寶總理更強調樹立大學精神的重要性，這既是澳大的辦學理念，也大大地鼓舞了澳大人實踐目標的決心。風正帆懸好遠航，澳門大學已踏上了邁向一流大學的航程，正全力爭取早日實現這遠大的目標，培養更多可領導社會發展的優秀人才。

The soul of a university lies in its character and spirit

Waving goodbye, Premier Wen offered his final words of encouragement: "Dear students, UM has a bright future ahead. Macao also has a bright future ahead. That future is in your hands. While material conditions are important, they should never be mistaken as the soul of a university. The soul of any educational institution, in my opinion, is a spirit of continuous pursuit of self-improvement. I have faith that over time UM will grow stronger and will develop its own tradition, character and spirit. Long live the spirit of self-improvement!" The crowd erupted in thunderous applause. The expression on their faces was one of solid determination to try their best to fulfill Premier Wen's high expectations.

Premier Wen is not the first state leader to voice expectation for UM to become a world-class university. President Hu Jintao expressed similar hopes for UM during an earlier visit to UM's new campus. Premier Wen went a step further by stressing the importance of cultivating a spirit of the university. His hopes conform to UM's educational values and greatly reinforce UM members' determination to realize established goals, one of which is to develop UM into a first-rate university and produce more future leaders for society.



討論結束後溫家寶總理主動提出與在場澳大師生合照
Premier Wen offers to take a picture with teachers and students at the end of the discussion

學生感想 Students' Recollections of Premier Wen's Visit



溫總理細心地聆聽學生的討論
Premier Wen listens attentively to students' discussion

有幸坐在總理身旁 Sitting Next to the Premier

張超然

科技學院軟件工程一年級學生
東亞書院學生會主席

Kelvin Cheung

First-year student of the Faculty of Science and Technology majoring in Software Engineering
President of the Student Association of the East Asia College



翻開報紙，看到那慈祥 and 藹的笑容，讓我憶起那讓人興奮的一幕。

剛過去的11月13日和14日，溫總理來澳出席在澳門召開的中葡論壇。而在風塵僕僕的行程中，他仍抽空到澳門各區探訪，瞭解市民的需要和傾聽他們的訴求。溫總理更走進了大學，走進書院，來到我們中間，這讓身為澳大、同時又是書院學生的我，有一次難忘且可貴的經歷。

就在我們討論途中，溫總理走進來了，熱情招呼他就坐並加入討論。很幸運，溫總理就坐在我的旁邊。聆聽他精闢獨到的見解和可貴的經驗，實在使我獲益良多，由衷燃起一份敬佩之情。

我們為溫總理的蒞臨感到喜悅，他不僅藉著來到中葡論壇，鞏固和發揚澳門為中國與葡語系國家之間的橋樑作用，還帶來了祖國對澳門的一份信任和支持。

A look at his genial smile in the newspaper brought me back to that unforgettable day.

Premier Wen came to Macao to attend the third ministerial conference of a forum on economic and trade cooperation between China and Portuguese-speaking countries which was held from 13 November to 14 November. Despite his tight schedule, he managed to squeeze in visits to the homes of local residents to listen to their needs and demands. He also paid a visit to the University of Macau (UM) and had a discussion with us students in the East Asia College. That was truly an unforgettable experience for me.

We were discussing the philosophy of morality when Premier Wen walked in, to the pleasant surprise of everyone present. We rose excitedly to welcome him and invited him to join our discussion. I felt very lucky that Premier Wen sat next to me. As I listened to his insightful views about the topic, a feeling of admiration welled up in my heart.

We were very happy about Premier Wen's visit. He told us that he attended the forum in an attempt to strengthen Macao's role as a bridge between China and Portuguese-speaking countries. His visit shows the central government's support for the development of higher education in Macao.



大學生是社會的未來 University Students Are the Future Pillars of Society

陳子鳳

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Cutebe Chan

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當我告訴家人我就坐在溫總理的旁邊跟他說話時，父親說：「我年過半百了，卻連市長都沒有見過，而你才剛踏入20歲，卻有機會坐在溫總理的身旁與總理交談，這真是我們家族的榮耀啊！」

的確，這種機會也許一生人只有那麼一次啊！其實得知溫總理來澳大時，我興奮得好幾晚不能安睡，但是當他真的坐在我身邊時，原先的興奮反而變成了一種冷靜。

他說的話讓我聯想到了《沉思錄》。這是溫總理最喜歡的書，他說過：「這本書天天放在我床頭，我可能讀了有100遍，天天都在讀。」從書中的塞克斯都，我看到了一種和總理一樣的仁愛氣質。此時的溫總理更像一名耐心的老師在與我們分享他的想法和人生觀，他非常鼓勵我們年輕一代要有自己的想法和判斷力。

溫總理離開的時候說：「大學生是澳門社會的未來。」我作為新時代的一名大學生，大學生是家之學子，國之未來。弊病，正身立己，不斷提高素質文明，樹立良好的精神面貌，是我們每一位同學應該做到的。

When I told my family that I was sitting next to Premier Wen and talked to him, my father said: "I'm already in my fifties, but I haven't even met a mayor. You just hit twenty and already you have sat next to Premier Wen and talked to him. This brings glory to our family!"

Indeed, for ordinary people, meeting Premier Wen in person may be a once-in-a-lifetime opportunity. When I heard that Premier Wen was coming to the university, I was so excited that I couldn't sleep well for several days. But when he actually sat next to me, my excitement gave way to calmness.

His words reminded me of *The Meditations*, which Premier Wen said was his favourite book. He said: "This book occupies a constant place on my nightstand. I probably have read it for 100 times, and I'm still re-reading it every day." I felt that Premier Wen was not so much a state leader as a patient teacher who shared with us his thoughts and outlook on life. He encouraged us young people to think and judge independently.

Before he left, Premier Wen said: "You are the future pillars of society!" Indeed university students are future pillars of the country. It is our duty to cure ills at personal and societal levels, aim for integrity, constantly improve our cultural literacy, and approach life with vigour and passion.



與溫總理在一起 20 Minutes with Premier Wen

雷苑瑩

工商管理學院 工商管理系一年級學生

Katy Lei Yuan Ying

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2010年11月14日，於澳門，於澳大，於我，都是個特別的日子。作為澳大學生，能親睹總理的風采，與國家領導人有面對面交流的機會，何其榮幸！

「平民總理」之稱果然名不虛傳。甫進東亞書院的多功能室，總理就微笑與大家揮手，握手示好；舉手投足間無不散發著親民、務實、簡樸的風采。總理和藹的笑容、親切的問好，立刻融化了之前滿室緊張的氣氛。

室內正進行著以「道德的哲學」為題的工作坊討論，席間，我向總理提問了「法律是否要根據人的道德觀念來制訂」的問題；總理認為，道德在法律上擔當著非常重要的角色，而人在執法過程中，法律會隨著時間的演變而不斷完善。

討論完畢，我們都有機會跟總理握手，興奮之情無法形容。而這一次長達二十分鐘的討論交流，將使我們終生受益。總理，是如此心繫民眾，如此關心澳門社會的年青一代！

14 November 2010 was a red-letter day for Macao, for the University of Macau, and for me. I feel very lucky that I got the chance to meet Premier Wen and talk to him.

Premier Wen did indeed live up to his reputation as a "next-door-grandpa" premier. As soon as he entered the multipurpose room in the East Asia College, he waved hello to us with a smile on his face. He oozed charm. His demeanour was one of amiability, practicality and simplicity. His genial smile and kind greetings immediately put us at ease.

We were having a discussion about the "philosophy of morality" when Premier Wen walked in. He joined our discussion. At one point, I asked him: "Do you think that laws should be amended based on people's moral values?" Premier Wen replied that morality plays a very important role in the development and enforcement of laws, and during the enforcement process, laws will be improved over time.

When the discussion was over, we all got the chance to shake hands with Premier Wen. Our excitement was beyond description. I believe the benefits of the 20-minute discussion with him will last a lifetime. I can feel from my interaction with him that the welfare of his compatriots is always on his mind, that he truly, deeply cares about the young people in Macao.



平民總理和對追求正義的執著 Premier Wen's Persistent Pursuit of Social Equality and Justice

潘莉

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2010年11月14日，對我而言，是一個一生難忘的日子。

就在這一天，我第一次見到了溫家寶總理，雖然整個過程只有20分鐘，在我人生幾十年中，只是短短的「片刻」，對我卻意義非凡，因為我真正見識了這位平民總理的和藹可親，並瞭解到為何他對公平正義有著如此執著的追求。

他曾說過：「我認為，公平正義比太陽還要有光輝。」這是多麼溫暖人心，而國家領導人有這樣的信念，這讓人民對社會的良性發展更有信心。

總理說：「要促進社會的公平，但確實很困難，特別是市場化的情況下，我們如何去發揮市場調節社會的作用，目前還有一定的困難，因此有兩隻手，一隻手是市場，另外有隻手，那就是社會的道德力量。」他循循善誘，讓我們明白了道德對於社會公平的重要作用，我也明白了為何他對公平和正義如此執著。

今天，如此近距離的接觸溫家寶總理，這位國家最重要的領導人之一，卻並感到不太緊張，所以敢於大膽地提問，面對面地交流；而總理和藹可親的眼神，親切溫和的笑容，循循善誘的話語，溫暖有力的雙手，都令我真正認識了什麼是平民總理。■

14 November 2010 is a day I will never forget.

It was the first time I'd met Premier Wen Jiabao in person. The entire meeting lasted a mere 20 minutes—a fleeting moment for a long life, but it was very special for me, for I experienced first-hand how kind and approachable Premier Wen is and also understood why he pursues social equity and justice so unswervingly.

He said: "I think that social equity and justice outshine the sun!" How heart-warming that a state leader has such a faith! It certainly strengthens people's faith in the benign development of society. We couldn't help but tell him these thoughts.

He smiled: "Promoting social equity is important, but it's also very difficult, especially under the market economy. How to maximize the regulatory role of the market is still a challenging task. That's why we need to rely on two invisible hands. One is market mechanism, and the other is social morality." His words helped us understand the important role of morality in promoting social justice as well as why he pursues equity and justice so persistently.

In my own face-to-face experience with Premier Wen, one of the top leaders of China, I didn't feel very nervous, actually I felt relaxed enough to ask him questions. The kind look in his eyes, the gentle smile, his patient and insightful teaching, his warm and firm handshake...his non-condescending demeanour really reminds one of a "next-door-grandpa". ■

乘著音樂 的翅膀 澳大學生 飛進世博

UM Students' Musical Debut at the World Expo 2010

今年夏天，薈萃人類文明成果的上海世博會(下稱：世博)在黃浦江畔激情上演。每個中國人都希望親身到世博會場，感受她帶給我們的榮耀、驕傲、自豪和鼓舞。

要參觀世博不難，從澳門出發也不過三幾小時的航程；但以表演者的身份在世博會場上為來自世界各地的來賓演出，卻是一件難能可貴的事。澳門大學(澳大)的合唱團與管樂團的同學是唯一獲邀參與的澳門高校音樂團體。他們參加了「世界名校大聯歡」活動，與哈佛大學、耶魯大學及牛津大學等13所世界名校一同交流演出。乘着音樂的翅膀，澳大學生飛進世博。

This summer witnessed the opening of the Expo 2010 by the Huangpu River in Shanghai, China. Chinese people felt immensely proud that China was the host of this dazzling international exposition that displayed the achievements of human civilization. Many people wanted to experience first-hand the grandeur of the event.

This is relatively easy to do. After all, it's only three hours' flight from Macao to Shanghai. Performing at the expo for guests from around the world, however, is quite unusual. The University of Macau (UM) Choir and Symphonic Band had the honour of being the only musical groups from Macao to be invited to perform at the "Shanghai World Expo Music Festival", during which UM students had exciting exchanges with students from 13 world-renowned universities including Harvard University, Yale University and the University of Oxford.



在指揮盧沛鈞先生的指導下，澳大合唱團為世博帶來一首首動人的歌曲，盡顯澳門中西交融的特色。

UM Choir's delightful rendering of numerous beautiful songs (including Chinese and western pieces) under the direction of the conductor Mr. Wilson Lo Pui-Kwan gives the audience a taste of the multicultural quality of Macao.

想唱就唱，唱得響亮——澳大合唱團

世界上還有甚麼樂器比歌聲更動人？難怪澳大合唱團的同學們這樣熱愛唱歌，拋開兼職和消遣，每個週末都聚在一起，練發聲、練新歌，享受歌聲共融的和諧感受。

現正就讀澳大公共行政大四的李夢潔是合唱團的團長，正如她所講，每個週末的練習時間，不但是負擔，更是她最放鬆的時刻。

這個合唱團共聚了許多不同專業背景的同學，中文系大二的邱禮賢是合唱團的副團長，他形容：「同一時間同一空間，大家為了同一個目標努力，這是我喜歡合唱團的地方。」

以歌聲感動世博

合唱團由2004年成立至今，由最初的20來人發展到現時60多個成員。多年來他們出席過大大小小無數表演活動：聖誕節在有四百多年歷史的聖母玫瑰堂和「澳門和聲」一起合作表演唱聖詩；還到過馬來西亞檳城參加交流比賽。

今次能代表澳大學生到世博表演，意義非凡。最令團員印象深刻的，是台下觀眾的熱情。李夢潔說：「我們的指揮花了很多心思去編排曲目，力求做到中西結合，當唱到《美麗的草原我的家》的時候，很多觀眾還跟我們一起唱，場面很感人。」

Follow the Voice of Their Hearts and Sing Aloud — UM Choir

Of all the sounds in the world music is perhaps the most beautiful. No wonder members of the UM Choir love singing—so much so that they forgo opportunities for part-time jobs and the pleasure of personal entertainment and instead devote every weekend to practising vocal techniques and new songs. These music lovers derive enormous joy from hearing their individual voices merge into a harmonious piece.

Lemon Li, a year-4 student of the Department of Government and Public Administration at UM, serves as the head of the choir. She said that the weekly practice is not a burden but a chance to relax.

The choir has brought together students of different academic backgrounds. Associate head of the choir Dan Iau, a year-2 student of the Department of Chinese at UM, said: "What I like the most about the choir is that it makes everybody work towards a common goal at the same time, at the same place."

Touch the audience with songs

When established in 2004, UM Choir only had approximately 20 members. Today it has more than 60 members. Over the years the choir has given countless performances, big and small, on different occasions, including a hymn performance in collaboration with Macao Voices in the 400-year-old Igreja de São Domingos at a Christmas, and a competition in Penang, Malaysia.

Representing Macao at the world expo means a lot to UM Choir members. What has left the deepest impression on them is the enthusiastic response from the audience. "Our conductor put a lot of thought in the selection of songs, because we wanted to have a good mix of Chinese and western pieces," said Lemon. "I remember when we sang *The Beautiful Grassland Is My Home*, many people sang along with us. That was really a touching scene."



參加世博會的表演，不但令合唱團成員大開眼界，更令彼此的友誼更進一步。

Performing at the expo has broadened choir members' horizons and has deepened their friendship.



在世博園內來個大合照！

Group photo of the choir members inside the World Expo Garden.



澳大合唱團早前在校內與北京大學合唱團交流表演
Co-performance with Peking University Choir



2009年澳大合唱團到馬來西亞交流
Performing in Malaysia in 2009



澳大合唱團的成員認為每個週末的練習時間，不但不是負擔，而是大家最放鬆的時刻。
Choir members say the weekly practice is not a burden but a chance to relax

以友誼感動人心

感受到台下觀眾的熱情，固然令合唱團同學深受鼓舞，但團員之間的深厚友誼更是令大家感動。在世博的最後一場演出結束後，大家在下榻的酒店大堂唱歌，為即將要畢業退團的成員舉行歡送會，依依不捨的感情令許多女孩子流下感動的眼淚。

新加入合唱團的曾瑋彤也有自己的感動故事：「我因為證件問題而不能與大家一起提早入世博會會場，當指揮問大家，願不願意為了遷就我一個人進場而提早個多小時起床，大家竟然異口同聲地說『好！』，我現在回想起那一刻都有感動想哭的衝動。」

沒有音樂的人生是不完整的

外向的邱禮賢覺得合唱團給他帶來了朋友；內向的曾瑋彤覺得唱歌為自己帶來了快樂、自信和成就感；中學時候已經有參加合唱團的李嘉雯，則認為大學的合唱團比中學合唱團更多姿多彩；剛剛接觸合唱不久的饒麗章說，合唱團是讓大學生接觸音樂的好機會；團長李夢潔認為通過合唱，讓她學會了傾聽別人的歌聲，更是學會面對台下觀眾，對他微笑。

沒有友誼的人生是不完整的，沒有音樂的人生也是不完整的。這些喜歡唱歌的年輕人們，正是要在用自己聲音，想唱就唱，而且要唱得響亮！

Touched by friendship

The contagious enthusiasm of the audience deeply touched UM Choir members. Even more touching is the deep friendship between choir members. After the last round of performance was over, they gathered in the hotel lobby and held a farewell party for those who were going to leave the choir due to imminent graduation. Overcome with emotion, many of them cried.

Sarah Chang, a newcomer in the choir, also shared her "touching moment". "Because the entry certificate I held is slightly different from those of my teammates, I had to queue a long time to enter the venue," recalled Sarah. "When our conductor asked my teammates if they minded getting up 1.5 hours earlier than expected for my sake, they said 'no' en masse. Even now I still feel like crying at the recollection of that moment."

Life is incomplete without music

Choir members unanimously reported having gained a great deal from the choir. The extroverted Dan says the choir has enabled him to meet more friends, while the introverted Sarah feels that singing has brought her joy, confidence and a sense of achievement. Carmen Lee, whose choir experience dates back to her secondary school years, feels that a university choir is even more colourful. Joy Rao, a novice choir singer, remarks that the choir offers a wonderful opportunity for the students to get to know music. Lemon thinks that singing in a choir has taught her to listen to other people's voices and, more importantly, to confidently and smilingly face the audience.

Just as life is incomplete without friendship, life is also incomplete without music. These music-loving young people are following the voices of their hearts to sing aloud. While singing may not necessarily be everyone's passion, "following the voice of the heart" is definitely something we all owe it to ourselves to do.



澳大的管樂團提供了一個讓大學生接觸、延續管樂熱誠的平台。
UM's Symphonic Band provides a platform for students to pursue their passion in music

澳大管樂團 — 專注帶來感動一刻 UM Symphonic Band — Total Absorption Results in the "Goosebumps" Moment

與哈佛大學合唱團同場競技

唸管理及市場學大三的黎乃鏗是澳大管樂團的團長。他沒有想過，這個成立僅短短三年的樂團，會有機會站在世博會場的台上，和哈佛大學合唱團同場表演。

「好開心有機會代表澳門大學生，在國內及世界不同地方的來賓面前表演。當日我們和哈佛大學無伴奏合唱團同一個時段演出，還有其他來自世界各地的大學生團體，可算是見識了一次國際級表演。」他說。

除了哈佛，他們還與北京少年宮藝術團在表演過後互相切磋，火花四射。管樂團副團長何建成說：「少年宮藝術團的老師清唱一段，又有鋼琴好手彈琴唱『My Heart Will Go On』，我們又教他們唱澳門回歸時廣為流傳的主題曲《七子之歌》，整個晚上令人興奮得睡不着覺！」

Performing alongside the Harvard Dins & Tonics

Niken Lai, a year-3 student of the Department of Management and Marketing at UM, is the head of UM's Symphonic Band. It never occurred to him that this three-year-old band would have the chance to perform at the world expo 2010, alongside the Harvard Dins & Tonics.

"Over the years we have had the privilege of performing for guests in different parts of the world representing Macao university students," said Niken. "For the world expo performance, our band, the Harvard Dins & Tonics, and numerous other university musical groups from around the world were assigned the same slot, so we got to enjoy world-class performances."

In addition to the Harvard Dins & Tonics, UM Symphonic Band also had an entertaining exchange with the art group of Beijing Youth Palace after the performance was over. "Teachers from the Beijing Youth Palace sang a piece a cappella, and then an excellent pianist played *My Heart Will Go On* and sang along to the music, and then we taught them to sing *The Song of Seven Sons*, which is a widely circulated song dedicated to Macao's return to the motherland. The entire night we were so excited that we couldn't sleep," recalled Dennis Ho, associate head of the choir.



熱愛管樂的年輕人（左起）：低音號手何建成、長笛手黎乃鏗及薩克斯風手賈駿驤。

Band members (from left): tuba player Dennis Ho, flute player Niken Lai, and saxophone player Sam Jia.

從零開始的音樂平台

澳門管樂協會會長梁健行先生是澳大管樂團的指揮，一直致力推動青少年管樂教育。2007年春天，澳大的領導邀請他為學校組建一支管樂隊伍，於是這個樂團就由零開始，成長為今天各聲部齊集，有近50人的大團體。

團中許多成員自中學甚至是小學已經開始玩管樂。「我升初中加入樂團時吹法國號，隨着年紀的增長，手上的樂器亦越來越大，現在玩的是全樂隊最大的低音號！」何建成說。

除了這些資深樂手，團裡也有像賈駿驤這樣完全沒有經驗的成員。「中學時沒機會加入樂團，到了大學，知道就算完全無經驗都可以參加，還有專業的老師由頭教起。我加入二年，從音樂盲到現時享受到吹薩克斯風的樂趣，真是要感謝樂團這個大家庭！」

梁健行先生見證着這群年輕人的努力和成長：「到了大學，有些同學會為了學業或工作而放低自己的興趣，難得的是團員還這麼熱誠地堅持。樂團由開始時演奏二級半的曲目（管樂難度約分五級），到現時已經可以演奏四級的曲目，整個樂團的實力有很大提升。」

Starting a musical platform from scratch

Mr. Leung Kin Hang, president of the Macau Band Directors Association, is the conductor of UM's Symphonic Band. He is committed to advancing youth education in music. In the spring of 2007 he was invited by UM's top management to establish a musical group for the university, and that's how the UM Symphonic Band was born. Through several years of development, the band has now become a big team of nearly 50 members, complete with various instrumental sections.

Many members of the band began to play woodwind instruments during secondary school or even primary school days. "I joined my first band when I was going on to junior high school. At that time I played French horn," recalled Dennis. "As I grow older, the musical instruments I play also get bigger. Now I play tuba, the biggest musical instrument in the band."

Of course not everyone in the band is a veteran instrument player. There are also complete novices like Sam Jia. "I didn't have the chance to join a musical band during my secondary school days," said Sam. "When I started college, I came to realize that I didn't have to have musical experience to join a band, because there would be professional teachers to teach us anyway. Now I've been in the band for two years, and I've grown from not knowing the first thing about musical instruments to enjoying playing saxophone tremendously. I owe this pleasant change to the help of the band. It's really like a big, warm family."

Mr. Leung is the witness to the effort and growth of these young people. "Some students, after starting college, would understandably drop their interests in favour of study or work, which makes the persistence of the staying members more praiseworthy," noted Mr. Leung. "The skills of the entire band have substantially improved. In the beginning, band members were only up to playing pieces at the level of 2.5 (the highest level of difficulty being 5). Now they can play 4-level pieces with ease."



管樂團還與北京少年宮藝術團互相切磋，指揮梁健行先生更與大夥一起翩翩起舞。
Entertaining interchange between UM's Symphonic Band and the art group of the Beijing Youth Palace. Conductor Mr. Leung Kin Hang is dancing with the art group.



由開始時收生困難，到現時各聲部濟濟一堂，澳大管樂團日漸成熟。

The band is now a big team complete with various instrument sections, in sharp contrast to its initial difficulty recruiting members.

專注帶來的感動一刻

澳大管樂團一行30多人到世博表演，若問到此次行程中有甚麼印象特別深刻？幾位受訪的團員都不約而同地認為：熱情的觀眾和大家用心的表演。「特別是最後一場表演，大家非常專注投入的一刻，樂句就可以到達一個平日不能到達的高度，釋放感情出來，真是會令我們感動到起雞皮疙瘩。」黎乃鏗笑說。

管樂團這次世博行，令他們對樂團更充滿信心和熱誠。希能在未來的日子儲備實力，參與更多海內外的演出，為喜歡管樂的澳大師生們提供一個更廣闊的音樂交流天地，在音樂的世界裡展翅翱翔。█

The “goosebumps” moment

More than 30 band members travelled to the expo for the performance. Asked about what left the deepest impression on them, all those interviewed answered unanimously: the enthusiasm of the audience and the band members' complete absorption during the performance. "Especially during the last round of performance, we were so engrossed that we were oblivious of our surroundings, and as a result, we delivered a better-than-ever performance. I don't know about others, but I myself was so touched by the emotionally charged musical notes that I got goosebumps," laughed Niken.

Their participation in the expo makes the students more confident and passionate about the band's future. They will continue to hone their skills and hope to participate in more performances both at home and abroad. They added that they longed to provide a platform for music-loving teachers and students at UM to enjoy music and perfect their talents. █

汗水創佳績 澳大健兒取得國際體壇殊榮

UM Students Win Bronze Medals at International Meets



徐雪茵(左)和王衡鏘為澳門體育歷史翻開新一頁
Choi Sut lan (left) and Wong Hang Cheong turned a new page in the sports history of Macao

澳門大學（澳大）一直提倡「全人教育」，除了學術成績亦十分重視培養學生良好的體魄和精神面貌。2010年11月，澳大王銜鏘同學和徐雪茵同學分別為澳門體育歷史翻開新一頁，令整個校園為之歡騰。

看博士生王銜鏘平日在機電工程系做實驗時的樣子，你絕對想像不到，眼前這位戴眼鏡的斯文男生，竟是花式單車世界排名第三位的運動猛將！他在11月德國斯圖加特舉行的2010年室內單車世界錦標賽，不僅取得銅牌，還打破亞洲紀錄，是澳門花式單車取得史上首面世錦賽獎牌。還有跳水女將——傳播系二年級學生徐雪茵，外表嬌滴滴，卻在廣州亞運會各國好手中一奪取下三米板的銅牌，名次僅次於兩位中國跳水「夢之隊」成員。這是澳門在亞運會跳水項目的首面獎牌。

這些成績，是兩位同學用鬥志和汗水鑄造而成。他們不但能做到學業成績優異，更投入大量時間和努力於體育鍛煉，其拼搏精神令澳大人為之鼓舞。

兩位澳大運動健將為澳門體壇創造了歷史性的驕人成績，令澳大人感到無比驕傲和興奮。體育不僅是單純的鍛煉，它和其他很多活動一樣，是對人類潛能的極限、耐力和毅力的考驗，體育更是澳大實踐全人教育的一個重要部分。澳大今後將繼續協助學生在全人方面的進步和成長，通過住宿式書院制度，為學生的運動訓練和學習等各項活動提供支持，培養出能為澳門、國家及全世界服務的優秀人才。 ■

The University of Macau (UM) has always championed the idea of "whole-person education". It places equal emphasis on students' academic performance as well as their physical development and moral education. In November 2010, two UM students, Wong Hang Cheong and Choi Sut lan, turned a new page in the sports history of Macao and made all UM members jump for joy.

If you see Wong Hang Cheong conducting experiments in the Department of Electromechanical Engineering, you would have a hard time imagining from his refined demeanor that this bespectacled PhD student is now the world's third-ranking athlete in artistic cycling. At the UCI Indoor Cycling World Championships 2010 held in Stuttgart, Germany, last month, he won Macao's first-ever bronze medal in artistic cycling with an Asia-record-breaking score. However, he is not the only one who has made history. Choi Sut lan, a petite, second-year female student of the Department of Communication at UM, won the bronze medal in three-metre springboard diving (women's singles) with an impressive performance at the Asian Games 2010 held in Guangzhou, ranking next to He Zi and Shi Tingmao, both of whom are members of China's National Diving Team. This is the first time in two decades that a Macao athlete has won a medal in diving at the Asian Games.

These bronze medals aren't really made of copper. They are made of sweat and persistence. Wong and Choi have devoted a lot of time and effort in their training without compromising their academic performance. Their excellence in both study and sports sets an inspiring example to other students.

All UM members are immensely proud of, and excited about, the historic medals obtained by the two students. Athletics is not merely physical exercise. Like many other activities, sports test individual potential, limits, patience and persistence. Physical education is also an important part of whole-person education at UM. In the future, UM will continue to promote well-rounded development of students through sports training and study. UM will also implement a residential college system to facilitate whole-person education. All these efforts will be aimed at nurturing outstanding graduates who can serve Macao, China and the world. ■

澳大973計劃專案 —推動「物聯網」革命 開創新資訊紀元

UM a Part of the Third Revolution in the World Information Industry— A “973 Project” on the Internet of Things

物聯網時代降臨

還記得許多描述未來世界的科幻電影的情節嗎？街上的廣告，只要你盯著看，就會叫你的名字，能說出他們有哪些新產品，而且那還是你喜歡的類型！路上的車流井然有序，完全被交通監控系統所掌控，只要車流量過大，系統就會開始分流後面的車流，以避免塞車狀況。另外，你也可以輕易的透過消費記錄，讓電腦計算你最近購買食物中所攝取的卡路里及營養成分，並得到一份建議的晚餐菜單……

以上的電影情節，現在已經漸漸出現在我們的日常生活中。中國海爾在2010年發佈了世上首台的「物聯網冰箱」。這款新冰箱不僅可以儲存食物，也可顯示冰箱食物的保鮮期、食物特徵、產地等資訊，同時還和超市系統相連，讓消費者足不出戶，就可知道超市貨架上的商品資訊，並根據用家放入及取出冰箱內食物的習慣，制定合理的膳食方案，給消費者的生活帶來全新的享受與體驗。

把生活物件與人類緊密聯繫，使高科技更具人性化，而推動這種革命性的技術，就是透過感應器、網際網路、雲端運算來實現管理、監控和識別等功能。

全球各國高度關注

IBM前首席執行官郭士納曾提出一個重要的觀點，認為計算模式每隔15年發生一次變革。人們把這一判斷稱為「十五年週期定律」。1965年前後發生的變革以大型計算機為標誌，1980年前後以個人電腦的普及為標誌，而1995年前後則發生了互聯網革命。每一次這樣的技術變革都引起企業間、產業間甚至國家間競爭格局的重大動盪和變化。

The Dawn of the IOT Era

Mr. Y, while walking on the street, comes across a giant screen blaring commercials. The minute he casts a casual glance at the screen, the machine kindly addresses him and rattles off the names of the latest products of a company, all of which tickle Mr. Y's fancy. One minute the vehicles on the road are running smoothly, the next minute the traffic is bumper-to-bumper. Sensing the increasing traffic volume, a monitoring system automatically redirects incoming vehicles, thus alleviating the traffic congestion. Ms. X inputs some recent shopping data into her computer. In the blink of an eye, the machine displays a list of the total calories and nutrients in the food she consumes and proposes a healthier menu accordingly.

These might seem like familiar scenes from science fiction films. However, today events like these have become reality. With the advent of the IOT (Internet of Things) era, some of these scenes have already become common happenings in our everyday lives. Haier, the world's fourth largest consumer appliance manufacturer, launched the world's first IOT-based refrigerator in 2010. Besides fulfilling the basic function of storing foods, this refrigerator database can also display relevant information about the foods, such as the shelf life, characteristics, and place of origin. The refrigerator can also be networked to a supermarket system, thus enabling consumers to have all of the available information about the merchandise at their fingertips. What's more, the refrigerator can identify patterns in the individual's eating behaviours based on the food stored and removed, and propose healthier diet choices accordingly. All these new features give consumers a brand-new experience in terms of interaction with inanimate objects.

Such interconnection between people and everyday objects makes technology more user-friendly, and the driving force of this revolutionary transformation is a technology known as the "Internet of Things" (IOT). IOT is a red-hot topic nowadays. It can realize the management, monitoring and identification of objects through sensors, networks and cloud computing.

A Focus of Worldwide Interest

Louis V. Gerstner, the former chief executive officer of IBM, once made a famous statement to the effect that computing mode undergoes a revolutionary transformation every 15 years. This statement has come to be known as "the 15-year-cycle law". The technological revolutions that took place around 1965, 1980 and 1995 found their manifestations in the introduction of mainframes, the popularization of personal computers, and the Internet revolution, respectively. Each of these technological revolutions resulted in major changes in the patterns of competition between businesses, industries, and even countries.

物聯網 Internet of Things



電腦、互聯網和高科技電子通訊設備，已經全面實現了人與電腦、人與人之間的緊密聯係方式。而物聯網(Internet of Things, IOT)一詞，最早由國際電信聯盟(International Telecommunication Union, ITU)於2005年所發布的報告 "The Internet of Things" 中提出。除了人與人之間可透過網路相互聯繫、人可透過網路取得物件的資訊外，物件與物件之間的訊息亦可以互通。換而言之，物聯網代表著未來資訊技術在運算與溝通上的演進趨勢，而這樣的演進過程中將會需要各式各樣領域的技術及科技創新來帶動，小至咖啡機與電腦的聯繫，大至衛星與電腦的聯繫，其影響範圍相當廣泛。

對於這個嶄新的概念，全球高度關注。2006年，美國國家科學基金會(NSF)為此立項、撥款和啟動研究，而以「科教興國」為理念的我國，亦於同年把物聯網列入國家中長期科學和技術發展規劃綱要之中。2009年總理溫家寶提出「感知中國」的領先概念，全面加快開發「物聯網」的進程。同年，高新科技產業發達的日本，提出「i-Japan」戰略。到了2010年，國家主席胡錦濤於中國科學院院士大會上提出了「加快發展物聯網技術」的意見。同時，在《中共中央關於制定國民經濟和社會發展第十二個五年規劃的建議》中，科技、資訊產業和信息化三大專項規劃中，物聯網都成為關鍵字。令「物聯網」的重要性和關注度，上昇至一個前所未有的高度。

Computers, the Internet and high-tech telecommunication devices have fully realized close communication between people and computers, as well as communication among people. The term "Internet of Things (IOT)" made its first appearance in a report issued by the International Telecommunication Union in 2005. According to the report, networks not only connect people to others and facilitate their ability to obtain information about objects, but may also realize communication between the objects themselves. In other words, IOT represents the future trend of information technology in terms of computing and communication. Of course such a radical advance will inevitably entail technological innovation in various spheres. When technologies are ready, IOT will likely have a sweeping influence on the world. By then, almost anything one can conceive of will be potentially connected to a computer, from state-of-the-art satellites to a mundane coffee machine.

IOT is a worldwide focus of interest. In 2006, the National Science Foundation of the United States officially launched research in this field. In the same year, China, following the strategy of "reinvigorating the country through scientific and technological development", identified "IOT" as a component of the mid- and long-term plan for scientific and technological development. In 2009 Chinese Premier Wen Jiabao put forward the idea of "sensing China" and explicitly encouraged the development of "IOT" technology. In the same year, Japan, whose high-and-new-tech industries are highly developed, devised a strategy known as "i-Japan." In 2010 Chinese President Hu Jintao instructed attendees of the 15th conference of the Chinese Academy of Sciences and the 10th conference of the Chinese Academy of Engineering to "accelerate the development of IOT". Meanwhile, in the *Central Government's Suggestions on Devising the 12th 5-Year Plan for the Economic and Societal Development of China*, "IOT" was identified as a key component. These developments have increased the profile of IOT to an unprecedented degree.

數物不相擬—實例

An example of the devastating consequences of the lack of information fidelity and faithful execution

2003年美加大停電 The Northeast Blackout of 2003



- 電網相位數據測量滯後，傳輸不及時
- 數字模型和物理狀態偏差過大，映像不一致
- 引發決策失誤，導致連鎖故障，電網崩潰，社會癱瘓

The inaccurate and delayed transmission of data resulted in the serious deviation of the dynamic parameters of the off-line models of the system, which in turn led to erroneous judgments and eventually network breakdown, paralyzing the northeastern United States and eastern Canada.

澳大牽頭973物聯網專案

就在這一個關鍵時刻，澳門大學(澳大)在物聯網的研究和改革上，邁出了舉足輕重的一步。

2010年3月，在澳大校長、講座教授趙偉教授的帶領下，以澳大教授為主，30多位來自於中國科學院、清華大學、同濟大學、華東師範大學及澳大的教授組織團隊，向國家科技部973計劃提交了題為「物聯網基礎理論及設計方法研究」的項目申請。經過多番嚴格篩選，項目申請已被國家科技部正式確認立項，撥款資助。

國家973計劃又稱國家重點基礎研究發展計劃，因在1997年3月提出而得名。973計劃的戰略目標是解決國家發展中的重大科學問題、為國家長期發展提供科學支撐、佔領重點學科領域的國際競爭制高點。973計劃每年根據需要確定重點與方向。在2010年，國家將物聯網與新能源、綠色製造等並列為五大新興戰略產業。許多專家認為，物聯網極可能會是繼電腦、互聯網產業之後的第三次資訊產業浪潮，是下一個萬億級的技術產業，對促進生產力發展和提高生活水準將起著重要的作用。

A UM-headed 973 Project

It is at this very crucial juncture that the University of Macau (UM) decided to launch research in this field.

In March 2010, a team led by Prof. Wei Zhao, the rector and a chair professor at UM, submitted an application to the Ministry of Science and Technology of the People's Republic of China for funding under the "973 Programme" category for the project, "The Study of the Fundamental Theories and Design Methodologies on the Internet of Things". The majority of the 30 team members are from UM, with the rest coming from the Chinese Academy of Sciences, Tsinghua University, Tongji University, and East China Normal University. Through several rounds of rigorous evaluation, the application was approved.

The "973 Programme" is otherwise known as the "National Key Fundamental Research Development Programme". It was launched by the Chinese government in March 1997, hence the name "973". The strategic objective of this programme is to address major scientific issues encountered in the economic and societal development of China, thereby providing technological support for the country's long-term development and gaining a head start in fierce international competition. The programme identifies annually the key areas for development based on the actual needs of the country. In 2010, the Chinese government identified IOT, New Energy, and Green Manufacturing as three of the five emerging industries with strategic importance. Many experts hold that IOT is likely to bring about a third revolution for the information industry—following the popularization of personal computers and the Internet revolution. They predict that IOT will be the next trillion-dollar industry and will play a significant role in improving productivity and people's standard of living.

極具優勢的973團隊

澳大在此項物聯網專案的研究上，有著許多不可取代的優勢。首先澳大校長，專案的首席科學家趙偉是物聯網領域的國際知名專家。在就任美國科學基金會電腦暨網路系統分部主任期間，他主持啟動了美國首個物聯網方面的研究計畫，並為首批專案立項撥款。

此外，以澳大教授為主力的973團隊由30多位國際知名專家學者組成，吸納了海內外不同領域的頂尖科研人才，研究領域覆蓋了傳感網路、即時系統、通信系統、軟體系統、電力系統，研究團隊包括了院士一人、講座教授三人、IEEE/AAAS會士五人、國家傑出青年三人，代表了當前物聯網領域的最高研究水準。

物聯網面臨的問題

物聯網發展潛力巨大，但基於現時仍處於開發階段，現仍面對着不可靠、不可控、不安全等重大問題。這些問題嚴重地影響物聯網的普及和使用。經過趙偉教授帶領的科學家團隊反覆論證，專案小組首次提出導致這些問題的根本是物聯網的資訊保真性和執行忠實性沒有得到有效保障。

讓我們來看兩個例子。2003年8月14日美國東北部以及加拿大東部出現大範圍停電，在加拿大超過1000萬人口和美國超過4000萬人口受到影響，停電造成多人死亡以及城市地鐵、機場、電訊等公共設施基本癱瘓，經濟損失高達40到60億美元。經調查，造成該事故的關鍵原因之一，就是電網系統資訊獲取傳輸出現重大問題。由於電網相位資料感知不準確、不及時，導致系統離線模型動態參數過現過大偏差，進而引發決策失誤和網路崩潰。也就是說，是電網系統狀態資訊保真出現問題。

另一例子為最近豐田汽車由於車和控制系統的問題，導致多人死亡並在世界範圍大規模召回，已造成高達數十億美元的損失。雖然最終的調查結果尚未公佈，但不論是車感知系統出現問題還是車控制系統出現問題，問題癥結還是數位系統未能準確及時獲取物理系統的狀態變化，或是控制操作未能按預期忠實執行。豐田汽車車門事件的核心也是與資訊保真和執行忠實相關的問題。

綜合來說，物聯網資訊保真性和執行性忠實問題是制約物聯網進一步發展的瓶頸科學問題，也是必須要解決的科學挑戰。

A Team with Unparalleled Advantages

UM enjoys some unparalleled advantages in carrying out IOT research. First and foremost, Prof. Wei Zhao, rector of UM and chief scientist of this project, is a world-renowned expert in the field of IOT. During his tenure as the director of the Division of Computer and Network Systems at the National Science Foundation of the United States, he initiated the first IOT research programme in the US and was in charge of approving funds for the first projects.

Besides Prof. Wei Zhao, the team consists of more than 30 other world-renowned experts, including one academician, three chair professors, five members of The Institute of Electrical and Electronics Engineers (IEEE) and The American Association for the Advancement of Science (AAAS), and three winners of the National Outstanding Young Scientist Award. These experts specialize in various fields, such as sensor network, real-time system, telecommunication system, software system, electric power system, and so on. The composition of the team represents the highest IOT research level in China.

Current Problems Concerning IOT

While IOT possesses enormous potential, some major problems need to be addressed before IOT can be widely popularized. These include the lack of a high degree of reliability, controllability and safety, due to the fact that technological standardization in most areas is still in its infancy. The team led by Prof. Wei Zhao conducted painstaking research into these problems and was the first to reach the conclusion that the root cause of these problems is the lack of guarantee of information fidelity and faithful execution.

Let us look at two examples. The first example is the "Northeast Blackout of 2003". On 14 August 2003, a massive blackout occurred throughout the northeastern United States and eastern Canada, affecting more than 50 million people. The power cut left numerous people dead and paralysed the infrastructure of the affected areas, such as subways, airports and telecommunication systems. The resultant economic loss amounted to between USD four billion and six billion. Investigation revealed that one of the key causes of this incident was the major malfunction of the power grid system in obtaining and transmitting information. The inaccurate and delayed transmission of data resulted in the serious deviation of the dynamic parameters of the off-line models of the system, which in turn led to erroneous judgments and eventually network breakdown. In other words, the incident was in effect caused by a lack of information fidelity.

Another example is Toyota's recent recall incident in which the world's largest automaker launched a safety recall worldwide after the problems in the brake and control system of certain models of its vehicles caused numerous deaths. So far the financial losses arising from the incident have amounted to several billion US dollars. The findings of the investigation have yet to be released. So whether the problem lies in the brake sensing system or the brake control system remains unknown. But basically there are only two possibilities: either the digital system failed to accurately and promptly sense the change of the state of the physical system, or the control system failed to faithfully execute instructions as expected. Whatever the possibility, at the core of Toyota's recall incident is still the lack of information fidelity and faithful execution.

To sum up, the lack of information fidelity and faithful execution are two bottlenecks that hinder the further development of IOT—and also the scientific challenges that must be overcome.



立項研究物聯網改革

「物聯網基礎理論及設計方法研究」的項目研究團隊，正是在973計劃項目申請書中提出了一套系統地解決這些問題的方案。針對物聯網系統資訊保真性和執行忠實性兩大科學問題，圍繞軟體系統和網路系統兩條主線，從基礎理論、設計方法、支撐技術三個層面開展研究工作。

在基礎理論層面上，其提出新型網路解析和軟體物化理論，分別從網路和軟體方面為解決資訊保真性和執行忠實性問題提供理論支撐。在設計方法層面上，提出自——協網路體系結構和感——執軟體體系結構，為解決資訊保真性和執行忠實性問題提供具體設計方法保障。

兩條主線和三個層面的工作相互配合，合力為解決物聯網發展中的關鍵科學問題提供全面支持。

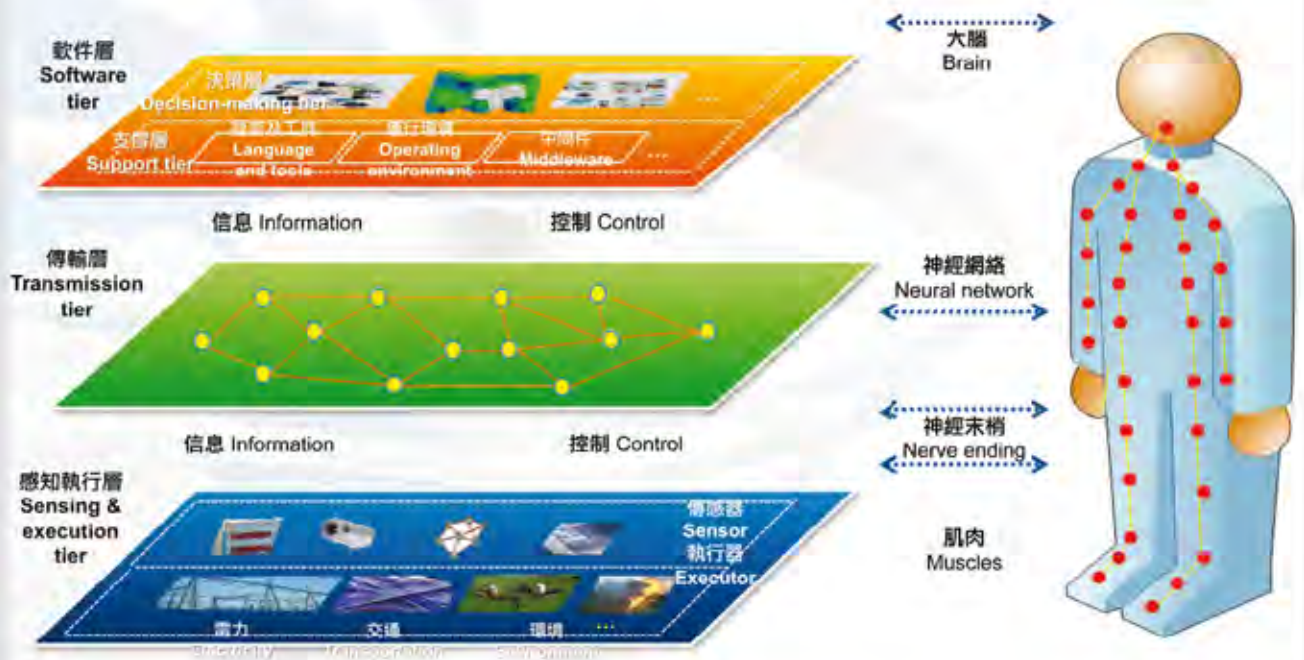
Proposed Solutions

In the application, the UM team proposed a series of solutions for the problems of information fidelity and faithful execution. The team approaches the problems from two angles (software system and network system) and three levels (fundamental theories, design methodologies, and supporting technologies).

In terms of fundamental theories, the team proposed a novel theory about the interpretation of networks and the materialization of software, providing a theoretical basis for tackling the problems. In terms of design methodologies, the team proposed the automatics & coordination network structure and the sensing & execution structure, providing concrete design methods for ensuring information fidelity and faithful execution.

Such a two-angle-and-three-level-based approach promises to overcome the key technological hurdles in the development of IOT.

物聯網的分層結構 Tiered Structure of IOT



突破物聯網發展瓶頸

以澳大牽頭的973物聯網專案，其研究目標是立足國民經濟和社會發展對物聯網技術的重大需求，針對影響物聯網發展的基礎理論研究瓶頸制約，研究物聯網系統資訊的保真性和執行忠實性兩大科學問題，構建物聯網的基礎理論體系，發展物聯網新型體系結構，突破物聯網設計和實施的關鍵技術，提供物聯網支撐技術平臺。團隊提出的這一套解決方案得到了參與評審的專家及領域學者的認同和贊賞。其申請在歷經國家科技部組織的三輪嚴格評審和一周全國公示後，最終脫穎而出得以立項，獲得資助。

對澳大而言，能參與此項當前物聯網領域的最高研究水準研究，不但可以提高澳大的科技研究水平，更能夠為區域、祖國甚至全人類社會的經濟、文化、科技乃至文明作出重大的貢獻。

Objective of the Project

The objective of the project, "The Study of the Fundamental Theories and Design Methodologies on the Internet of Things", is to overcome the two technological bottlenecks that hinder the development of IOT and establish a system of fundamental theories and a new system structure for IOT, thereby realizing breakthroughs in the design and implementation of IOT technology for the benefit of the economic and societal development of China. The solutions proposed by the team won high acclaim from the evaluation panel and scholars in the field. Through three rounds of rigorous evaluation by the Ministry of Science and Technology and a subsequent one-week nationwide announcement period during which time no objections were raised, the project was finally approved as a project under the "973 Programme".

This project, by far the highest-level IOT project in China, will not only go a long way towards enhancing UM's research capability, but also offers a chance for UM to leave a mark on Macao, China and even the entire human society in economic, cultural, scientific, technological, and cultural arenas. |

大學為甚麼要籌款？

Why Is Fundraising of Crucial Importance to Universities?

撰文：金木 Text by: Kam Mook

歐美的一流大學無論在教學、研究和人才培養等方面都取得了舉世讚嘆的卓越成果。它們成功的背後，都離不開捐贈基金雄厚的財力支持，使大學可不受財政的羈絆高薪招攬全球頂級教授，以巨額獎學金吸引優秀學子，以及進行大膽和創新的前瞻研究。捐贈基金就好比大學的驅動機，為大學的持續發展提供永不停息的動力，驅使大學實踐更遠大的教育抱負。如今，當香港、新加坡和台灣等鄰近地區都已有大學進入世界一流大學行列之際，澳門的大學應如何提升國際競爭力，爭取早日晉身一流大學之列？

參照世界一流大學的做法，成立捐贈基金，藉籌款拓展資源，以支持大學的長遠發展，這不僅是世界高等教育發展的大勢，也是澳門高校正邁出澳門，與世界一流大學接軌的重要標誌。

Top universities in Europe and the United States have attained universally-acclaimed achievements in various areas such as teaching, research, and nurturing of outstanding graduates. Their success has been inextricably linked with the strong financial support of their respective foundations. Their foundations have freed them from financial constraints and have enabled them far greater flexibility in offering attractive salaries and scholarships to recruit top-notch professors and students internationally, and in carrying out bold, innovative and cutting-edge research. A university foundation is like a perpetual engine that unflinchingly powers a university's pursuit of bigger goals geared towards sustainable development. The fact that many universities in neighboring regions such as Hong Kong, Singapore and Taiwan have joined the ranks of world-class universities poses a serious question to Macao: how can local universities increase their international competitiveness and catch up with their neighboring counterparts in the shortest time possible?

Establishing foundations to obtain more financial resources to support the universities' sustainable development is a common practice of many world-renowned universities. Not only has it become an inexorable trend for tertiary institutions worldwide, but it is also an important indicator of the degree of internationalization of any university.



一 基金會，一流大學的驅動機

大學捐贈基金源於歐美，有著悠久的歷史，在其發展中更佔了舉足輕重的地位。例如歐美的大學，捐贈更成為大學最重要的經費來源。美國歷史最悠久的哈佛大學就以其第一位捐贈人約翰·哈佛(John Harvard)命名；耶魯大學在1890年成立了全美第一個校友基金會，專門接收校友、個人、基金會或企業的捐贈。在歐洲英國，舉世知名的牛津大學和劍橋大學也擁有源遠悠長的捐贈傳統。

育才聲譽帶動捐贈

歐美大學的基金會一開始時資金並不充裕，但往往能隨著大學的聲譽日隆，培養的學生越頂尖，捐贈率也越來越高。耶魯大學捐贈基金在1822年創立時戶口不足三萬美元，2009年底該基金已累積至約226億美元。美國各大學每年所獲得的捐贈金額與其大學排名也有著緊密的聯繫。連續多年獲得最多捐款的首幾所美國大學依次序分別是哈佛大學、耶魯大學、斯坦福大學、普林斯頓大學和德克薩斯州大學體系。這些大學恰巧全是公認的頂尖大學。最負盛名的哈佛大學去年的捐款總金額高達256億美元，已成為世界上接受捐款最多的大學。

美國一流大學當中，德克薩斯農工大學就是憑創立捐贈基金躍升為一流大學的成功例子，它對澳門高校極有參考和鼓舞作用。該校創立於1876年，在1980年成立捐贈基金之前，只是一所以教學型為主的大學。1980年代，該校管理層決心將學校轉型為一流大學，並為大學制訂了二十年發展規劃，同時創立了捐贈基金，成功透過社會和校友籌募到巨額捐款，協助大學持續穩步上揚。到了2000年時，大學已成功晉身美國最佳一百所大學之列，這時基金的總額也超越了五億美元。目前，這家大學已躍升為世界百大名校之一，其基金會總額也逾50億美元。

辦學水平節節攀升

基金會就好比一座推動大學發展的驅動機，能為大學的持續發展提供永不停息的動力，使其教學與研究保持國際競爭優勢。大學可運用基金會的資金招攬世界級講座教授，發展創新教學與研究，資助不同教學部門發展卓越專案，設立各類獎學金及獎勵計劃，以吸引全球尖子入讀以及購置一流研究設備等，從各個層面整體提升大學的教研質素。大學與基金會的發展是相輔相成的，大學辦得越好，社會認同度高，捐贈率自然上升，反過來，大學也因為有了基金的財力支持，辦學水平也會節節攀升。

I. University foundations: perpetual engines of the growth of top universities

Establishing university foundations is a time-honoured practice that has its origins in Europe and the United States. University foundations have historically played a vital role in the development of top European and US universities. Indeed donations have become one of the most important sources of income for universities in these regions. Harvard, the oldest university in the US, was named after its first donor John Harvard. In 1890, Yale established the first alumni foundation in the US to collect donations from individuals (alumni and non-alumni alike), other foundations, and businesses. World-renowned European universities such as Oxford and Cambridge in the UK also have long traditions of attracting donations through university foundations.

Enhanced reputation brings more donations

Foundations of European and US universities were not deep-pocketed to begin with. The alumni giving rate (AGR) tends to grow with the improvement of the universities' reputation and the quality of their graduates. Take Yale University, for example. When Yale first established its foundation in 1822, it only possessed a miserly balance of less than USD 30,000. By the end of 2009, however, the foundation had accumulated a whopping USD 22.6 billion. Actually AGR is not the only index that is closely linked to a university's reputation, which is often reflected in its ranking. Also closely related to a university's reputation and ranking is the total annual amount of donations (annual total) it receives. It is no coincidence that Oxford, Yale, Stanford, Princeton, and the University of Texas System, whose annual totals have ranked among the top for many consecutive years, are also universally acknowledged top universities in the world. Harvard, the cream of the crop, received total donations of USD 25.6 billion last year, making it the world's richest university donation-wise.

The renowned Texas A&M University in the US, which has ascended the rank of a world-class university precisely because of its foundation, offers an inspiring example of how a university foundation can help the university progress in leaps and bounds. Texas A&M University was founded in 1876. Before it established its foundation in 1980, it was a teaching-oriented institution. In the 1980s, the management of Texas A&M University, determined to transform the university into a first-rate institution, formulated a 20-year development plan and established a university foundation. The enormous donations from its alumni and society raised through the foundation helped the university to grow steadily. By 2000, Texas A&M University was ranked among the top 100 universities in the US, and the foundation had accumulated funds of over USD 500 million. Now, Texas A&M University is ranked among the top 100 universities in the world, and the foundation is in possession of more than USD five billion.

Increased donations in turn enhance a university's quality and competitiveness

A university foundation is like a perpetual engine that eternally powers the university's growth and ensures that the university maintains its international competitiveness in teaching and research. Donations raised through such foundations can be used to internationally recruit renowned chair professors, develop innovative teaching and research projects, sponsor academic departments to carry out projects, and set up scholarships and incentive programmes to attract top students and procure state-of-the-art research equipment, thereby enhancing the overall teaching and research quality of the university at various levels. The growth of a university and the growth of its foundation feed on each other. The greater a university's quality and reputation, the higher the society's recognition and the alumni giving rate. Similarly, the more financial resources a university can obtain through its foundation, the easier and faster the university can improve its quality and reputation.

二 拓資源，邁向世界一流大學

澳門大學是澳門第一所公立大學，自1981年建校以來，便朝著國際化大學的目標邁進。經過近30年的成長，明年將屆而立之年，也代表其將進入施展更宏大抱負和實踐教育使命的重大階段。在此前夕，澳大關鍵性地籌組了被視為世界一流大學指標的捐贈基金，進一步推動社會賢達、校友、教職員和學生捐贈大學，同時貫透過持續的捐贈行為凝聚社會向心力和熱心教育的捐獻文化，使社會與澳大聯手促成更多具前瞻性和飛躍式的學術發展。

澳大具有優良傳統

澳大一直都有捐贈的傳統，卻未能在本地社會和校友裡形成氣候以至捐獻文化。在1990年代，大學先後獲得何賢、王寬誠和何鴻燊等一批社會賢達的慷慨捐贈，一時傳為佳話。至2006年，校友劉少榮為報效母校培育之恩，捐贈了港幣一百萬元，為校友捐款樹立良好的典範。為了提升澳門特區高等教育的國際競爭力，為本地培養優秀的頂尖人才，高瞻遠矚的前任特首何厚錕於是一力促成澳大發展基金會的成立，並發動社會人士踴躍捐贈，冀憑社會的財力將澳大發展成為一所國際化和現代化的世界一流大學。

在特區政府的鼎力支持下，澳大創立了發展基金會，為大學的長遠發展尋找到更大的驅動力。另一方面，新校園帶來的天時、地利、人和的發展契機，也為基金會進一步明確了將來的籌款定位和方向——所有募款都是為了扶助澳大實現一流大學的目標，為本地區培養出類拔萃的優秀人才！一石激起千層浪，澳大在半年內已籌得近三億澳門幣，在如此短時間內籌募如此大筆捐款，在其他國家或香港的大學也很難做到。籌款的成功不單反映了社會人士熱心支持教育事業的態度，也反映了他們對澳大30年來建立的卓越成果的認同。

II. Obtain more financial resources to reach the goal of becoming a world-class university

The University of Macau (UM) is the first public university in Macao. Since its inception in 1981, UM has been committed to the goal of becoming a world-class university. Next year marks the 30th anniversary of UM, a milestone that heralds a new era where the university is to pursue bigger goals and better fulfill its educational missions. To gear up for the 30th anniversary and also to progress more quickly towards its goals, UM established a development foundation late last year, based on the faith that university foundations have played an irreplaceable role in the growth of top universities around the world. One primary purpose of establishing UMDF is to encourage the alumni, staff, and community to work in unison to help UM grow through donations. Another important purpose is to foster a culture of giving to higher education in society.

Promote a fine tradition of giving to education

While UM has received numerous donations from individuals and institutions alike over the years, a culture of giving to education has yet to be further promoted among its alumni and the local community. In the 1990s, UM successively received generous donations from a number of eminent personages such as Mr. Ho Yin, Mr. K.C. Wong, and Dr. Stanley Ho, which for a time became the talk of the town. In 2006, UM alumnus Dr. Anthony Lau Siu-wing donated HKD 1 million as a token of appreciation of what he had learned from the alma mater, setting a good example to other alumni. Apart from alumni contributions, UM also has the good fortune to have the support of the Macao SAR government. The visionary former Chief Executive of Macao SAR Mr. Edmund Ho, bent on increasing Macao's international competitiveness in higher education and on developing UM into a modern, world-class university that produces future pillars of society, played an instrumental role in bringing about the birth of UMDF. During the initial stage he went out of his way to help secure donations from multiple sources.

With the unreserved support of the Macao SAR government, UM successfully established UMDF. The approval and implementation of the new UM campus have brought about unprecedented opportunities for UM and have also made the objectives of UMDF's future fundraising activities crystal clear: all donations will be utilized for the purpose of developing UM into a first-rate university so that UM can nurture more excellent graduates to serve the local community. UMDF got off to a good start, with numerous community leaders collectively making donations of more than MOP ten million on the day of its establishment. This caused a positive ripple effect across the entire community. Within only six months of its inception, UMDF raised donations of close to MOP 300 million, which is no mean feat even for Hong Kong and overseas universities with considerably more fundraising experience. The enthusiastic response of the donors is a reflection of their recognition of the impressive achievements UM has attained over the past three decades.



拓展需要社會支持

或有人會質疑，澳大作為公立大學，有政府的公帑支持，為何仍要成立基金會？根據資料顯示，從1992年至2005年，美國大學的私立大學的基金增長規模大概在二點九倍左右，但是公立大學的基金規模增長卻在四點二倍。這結果看出美國公立大學對財政來源的態度轉變。世界一流的大學（無論公立或私立大學），都證明政府的資助僅可以支持大學的恆常支出，至於一些前瞻性的大方案，必須依賴社會資源的強力支持，無庸置疑，捐贈已成為促成一流大學的重要關鍵。

三 捐贈率，一流大學排名的指標

捐贈是一套長遠的規劃，基金會除接受大額捐贈外，還需珍視來自各方的小額捐贈，推動校友和市民參與。捐贈不分大小，大家都在努力為教育事業增添一磚一瓦。在捐款的過程裡，大學積累的不僅是金錢，而是一份信任、認同、希望和聯繫，捐贈文化也在日積月累，一點一滴中慢慢地開枝散葉。

為教育事業添磚瓦

美國斯坦福大學就十分注重培養在校生以及年輕校友的捐贈傳統，考慮到校友的經濟收入，學校往往會設立等額捐贈計劃予以鼓勵。比如2002年的畢業捐贈號召每個畢業生為斯坦福基金捐贈至少20美元，每筆20美元以上的捐贈將得到校友Peter Bing雙倍金額的配對以及家長顧問委員會的等額配對。香港大學最吸引捐贈者的籌款項目，是「芥菜籽行動」，校友、教職員工都可以選擇捐款的數目和捐贈的對象。至今香港大學獲得的捐款額最高為港幣十億元，少至港幣一元也有。美國大學的排行榜，也以「校友年度捐款率」而不是「捐贈額」作為大學評價的一項重要指標，雖僅佔百分之五，卻體現了校友對大學的信任和歸屬感。2009年，世界一流大學的校友平均捐贈率已超過百分之四十，可見一流大學的校友捐款率也絕對是一流的。

Institutional advancement needs society's support

One may question the necessity for UM, a government-funded university, to establish a private foundation. But in fact all top universities worldwide, whether public or private, have come to understand that government funding can only cover routine day-to-day expenditures, and that major, cutting-edge projects must rely on the support of society. Indeed, statistics show that from 1992 to 2005, the endowments of private universities in the US increased some 2.9 times, compared with a 4.2-fold increase for public universities. These figures suggest that public universities in the US have long since realized the importance of exploring other financing avenues apart from government funding. There is no denying the fact that for any university that aspires to join the exclusive "world-class club", successful fundraising is the key.

III. Alumni giving rate, an important indicator of a university's ranking

Fundraising is a long-term project. Apart from major gifts, university foundations should also value small gifts from various channels and encourage the participation of alumni and the local community. In pursuing a brighter future for higher education, every donation, whether big or small, is like a brick indispensable to the construction of a tall building. The process of fundraising is not just one of accumulating financial resources, but also, more importantly, one of building trust, recognition, hope and emotional bonds. Every seemingly insignificant donation is a nourishing drop of water that will, over time, help bring into bloom a culture of giving to education.

Little drops of water make an ocean

Take the example of Stanford University in the US. Stanford attaches great importance to fostering a tradition of donation among its current students and young alumni. It also has a match-fund programme to encourage donations from alumni of moderate financial means. For instance, in 2002, it called on every graduating student to donate at least USD 20 to the university. At the same time it announced that for every donation that equalled or exceeded USD 20, the university president Peter Bing would contribute a double-amount matching fund and the parents' advisory board would contribute an equal-amount matching fund. Take another example—The University of Hong Kong (HKU), HKU's "Mustard Seed Action" that appeals to many prospective donors gives its alumni and staff the freedom to choose the amount of donation they wish to make as well as the object towards which they wish to apply their donations. Over the years, HKU has received donations of varying amounts, from as small as HKD 1 to as large as HKD 1 billion. In fact university ranking lists in the United States also use "annual alumni giving rate" instead of "annual totals" as an important index in deciding university rankings. Although annual donations from alumni account for only 5% of the total annual donations received by a university, they reflect the alumni's sense of belonging and confidence in the future of their alma mater. In 2009, the average alumni giving rate of the world's top universities exceeded 40%, showing that the higher a university's ranking, the higher its alumni giving rate.



緊守學術自由原則

澳大可參照一流大學的籌款經驗，在發動社會賢達和領袖大額捐獻的同時，鼓勵校友以小額捐贈起步，逐漸養成校友回饋大學的傳統，待其有更大經濟能力後，必然向母校作大筆的捐贈。校友生活在社會各個階層，若持之以恆，必可帶動整個社會的捐款文化，逐漸形成社會支援教育事業的優良傳統和奉獻文化。但如何維持基金會的運作，才不會白白浪費捐贈者的一番善心？這就需要有一套嚴謹的基金管理制度和有一班熟悉大學發展的專業籌款隊伍，把大學的卓越貢獻和使命讓校友和社會瞭解，爭取認同，讓他們深深感受到大學的成功就是自己的成功，資助教育事業更是光榮的使命。在接受捐贈時，大學還須牢固緊守學術自由的原則，保證所有捐款以合理和妥善的方式運用。

澳大明年將邁向30周年，聽聞校方已在策劃一系列慶祝活動，當中重點項目是展開30年週年紀念年度籌款計劃，成效如何，仍是未知之數。但從過去半年澳大籌款的成績可預見，澳大一定可以在籌款的金額上更上層樓。澳大正處飛躍的階段，要實現願景，要施展策略，要發展成為一所深受本地和世界認同的一流大學，就必須邁出與一流大學接軌的步伐，謀求更加充沛的資金支持，促成大學實現教學、學術和研究的目標，爭創一流。以澳大多年累積的教學和研究實力，加上基金會的財力支持，相信要實現世界一流大學的願景絕對不會是夢想。■

Never compromise the principle of “academic freedom”

UM can borrow the fundraising experience of world-class universities. In addition to soliciting major donations from community leaders, it should also encourage its alumni to start with small donations and thereby foster a fine tradition of giving back to the alma mater. This way, when alumni are in a stronger financial position, they will be likely to make larger donations. Over time, a culture of donation can be fostered throughout the whole community since alumni come from different walks of life. Having said that, we come to another important question: how should UMDF be effectively managed so as to make sure that the good intentions with which donors make their donations will not be compromised? The answer is through a set of rigorous management systems and a team of professional fundraising staff who are familiar with the university's operations and who can communicate the university's achievements and missions to the alumni and society and help them understand that the university's success is their success and that giving to higher education is a noble cause. While carrying out fundraising activities, UM must ensure that donations are not obtained at the price of compromising academic freedom. It must also ensure that all donations are used in a reasonable and appropriate manner.

Next year will mark the 30th anniversary of UM. I have heard that UM is already in the process of planning a series of celebratory activities, and one of the most important activities is the “fundraising for the 30th anniversary” campaign. Whether this campaign can achieve its intended results remains to be seen, but based on the university's impressive fundraising results over the past six months, it is reasonable to predict that it will likely do even better in its future fundraising endeavours. At the moment UM is developing at a fast pace and is poised to enter a brand new era. In order to realize its academic and research objectives and become a locally and internationally recognized first-rate university, it is essential that the university follow international standards and practices adopted by the world's top universities and strive to obtain more financial resources. I believe that with the support of UMDF, UM can surely build on its existing strength in teaching and research and turn the dream of becoming a world-class university into a reality. ■

戰略研究 再掀高潮

—評郝雨凡教授關於 「外交大戰略」的兩篇文章

A Review of Prof. Hao Yufan's Article on China's Grand Strategy

撰文：任樂山 Text by Ren Leshan



2010年9月17日，《環球時報》登載了澳門大學（澳大）郝雨凡教授的文章《用大戰略打破中國外交被動》。郝教授認為，今天的中國已經前所未有地處於世界舞臺的中央，然而，中國缺乏相應的大戰略去面對複雜的國際局勢，扮演世界級的角色。缺乏大戰略指導的政策，會使總體外交在不知不覺中陷入被動的、窮於應付個別事件的局面。因此，盡快建立一套系統的、自治的、基於全域考慮和通盤謀劃的國家大戰略，使中國的各方面利益更好地與外交利益銜接，迫在眉睫。

Prof. Hao Yufan, dean of the Faculty of Social Sciences and Humanities at the University of Macau (UM), published an article entitled "China Should End Its Diplomatic Passivity Through Devising and Implementing a Grand Strategy" in *Global Times* on 17 September 2010. In Prof. Hao's opinion, for the first time in its history China has ascended centre stage in the international scene, but at the same time it lacks a *Grand Strategy* to support this role amid the complex international situation. Policies devised in the absence of a *Grand Strategy* will, noted Prof. Hao, unwittingly render China in a passive diplomatic position where energy is misplaced in coping with individual incidents as they arise. Therefore, concluded Prof. Hao, it is imperative that China devise a tailor-made, systematic and holistic *Grand Strategy* so that China's national interests in various arenas can better align with its diplomatic interests.

郝教授是國際著名的中美關係研究學者，先後獲得美國約翰霍普金斯大學國際關係碩士和博士學位，在加入渥太華成為社會科學及人文學院院長前，曾擔任美國科蓋特大學政治學教授15年。郝教授多年從事國際關係、外交政策、中美關係、決策學及腐敗理論等比較政治研究，曾發表多部學術著作，並有眾多學術文章在國際學術刊物中發表。郝教授的文章發表後引發了海內外的廣泛關注，不但在谷歌和百度搜索引擎中網頁量激增，而且各大網站如新華網、人民網、文匯網、半月談、中國評論紛紛轉載，強國論壇、華聲論壇、華商論壇、中華網論壇等網絡論壇也展開熱議。有人形容其文「振聾發矇」、「一針見血」、「發人深省」、「字字發乎心、句句發乎真」。一個月後，《香港商報》又刊登了對郝教授的專訪《郝雨凡：定位世界第二，構建中國外交大戰略》。在專訪中，郝教授進一步提出中國的外交大戰略包含兩個層次，即，在亞洲範圍內，要思考如何從過去維持地區穩定轉向獲取地區領導權；在世界範圍內，則要明確坐穩世界老二的定位。

十年前，也就是世紀之交時，這一問題曾一度成為熱點。當時，中國政權正處在從第三代領導人向第四代領導人交接的前夜，而美國處在從克林頓到小布什的過渡時期。在這一背景下，蘭德公司的中國問題專家斯溫 (Michael D. Swaine) 和泰利斯 (Ashley J. Tellis) 於2000年初出版了《理解中國的大戰略》(*Interpreting China's Grand Strategy*)，是美國第一部系統全面討論中國大戰略的專著。同年9月，斯溫又發表了文章《中國有一個國際大戰略嗎？》(*Does China Have a Grand Strategy?*)，他們認為，儘管中國的領導人從來沒有以一種全面的方式清楚地表達其大戰略，但中國似乎也像其他國家一樣一直在尋求一種國際大戰略。在這一問題上，一些中國學者們也發表了自己的看法。有人認為，中國應當選擇「搭車」和「超越」作為中國的世紀性戰略。也有人認為，採用「夥伴者」戰略是中國的理性選擇。更有人認為，中國還沒有形成完整的戰略體系。然而在過去十年裡，我們聽到更多的是，將「和平發展(崛起)」和「和諧世界」當作對中國外交大戰略的宣揚和解釋。

Prof. Hao is a world-renowned scholar in the area of Sino-US relations. He received his master's degree and PhD degree in International Relations from Johns Hopkins University in the United States, in 1984 and 1989 respectively. Before joining UM, Prof. Hao worked in the US for 16 years in numerous positions, including MacArthur Fellow at the Center for International Affairs, Harvard University, and Professor of Political Science and Robert Hó Chair at Colgate University. He is a veteran expert in such areas as international relations, Sino-US relations, Chinese foreign relations, and regional development. He has published a dozen books and numerous articles that have carried considerable academic influence. His recent article on China's *Grand Strategy* is no exception, attracting widespread attention both at home and abroad. Key in the words "Prof. Hao" and "Grand Strategy" in the search bar at Baidu or Google, and numerous search results will turn up. The article was reproduced on various websites, sparking heated discussions at online forums. People used such words as "a deafening wake-up call", "hit the nail on the head", "thought-provoking", "every word is from the bottom of his heart", to describe the article. One month later, *Hong Kong Commercial Daily* published an exclusive interview with Prof. Hao entitled *Hao Yufan: China Should Aim for Second Place in the World and Devise a Grand Strategy for Diplomatic Affairs*. In that article Prof. Hao was quoted as saying that China should devise a *Grand Strategy* at two levels—the Asian level and the international level. At the Asian level, noted Prof. Hao, China should seek to transform from a stabilizing role to a leading role, while at the international level, China should aim for second place.

Interest in this topic actually dates back a decade. At the turn of the 21st century, China was on the eve of the handover of power from the Jiang Zemin administration to the Hu Jintao administration, while the United States was going through a transitional period from the Clinton administration to the George W. Bush administration. It is against this background that Michael D. Swaine and Ashley J. Tellis, two China experts from the RAND Corporation, published in early 2000 a book *Interpreting China's Grand Strategy*, which is the first monograph in the United States to deal with this issue in a systematic manner. In September 2000, Swaine published another article *Does China Have a Grand Strategy?* in which he held that while Chinese leaders had never fully and explicitly expressed China's *Grand Strategy*, it seemed that China, like any other country, never ceased its pursuit of a *Grand Strategy*. Some Chinese scholars have also expressed their views on this issue. Some hold that China should adopt "hitchhiking" and "overtaking" as its *Grand Strategy*; some note that building partnerships with other countries is a rational strategy on the part of China; while others believe that China has yet to devise a complete strategic system. The predominant view over the past decade, however, has been that "peaceful rising" and "promoting a harmonious world" are China's *Grand Strategy*.

郝教授則在文章中明確提出，「和平發展（崛起）」和「和諧世界」不是外交大戰略。其實，「和平發展（崛起）」與鄧小平時代的「韬光養晦，有所作為」一樣，經常被外國人解讀為中國對「中國威脅論」的辯護，中國既要「韬光養晦」，又要「有所作為」。再加上中國的外交戰略從沒有清晰地向外界表露，外國人便不免生出很多狐疑，對中國的不信任更進一層，他們認為中國當前的「韬光養晦」和「和平發展（崛起）」是為了爭取時間，為以後大有作為做準備。「和諧世界」與中國古代的「協和萬邦」和毛澤東時代的「和平共處」一樣，是中國人的外交理想。在國際社會上存在着霍布斯式的鬥爭文化和洛克式的競爭文化，以及在西方國家內部存在着康德式的同盟文化的時候，希望一個可以覆蓋全世界的和諧文化更像是一廂情願的理想。何況在國際紛爭和利益角逐之中，這一理想缺乏操作性，更無法衡量其成敗。

那麼，十年後的今天，當我們再次聚焦這一問題時，中國是否已經有了比較明確的大戰略呢？尤其當考慮到金融危機席捲全球以來，世界局勢正在發生一系列深刻變化，中國也處於經濟轉型和社會轉軌的關鍵時期，徹底思考戰略定位以適應不斷趨向世界舞臺中央的地位變化，似乎已經刻不容緩。在這一背景下，郝教授的文章有其鮮明的時效性，引起廣泛關注也就不足為奇了。

在一定程度上，郝教授所指的「大戰略」與法國學者博弗爾(André Beaufre)的觀點有類似之處。博弗爾在其《戰略緒論》(Introduction à la Stratégie)中提出了「總體戰略」(Stratégie Totale)的概念，認為戰略分為三個層次：最高層次是總體戰略層次；第二層次是全面戰略層次，指的是在軍事、政治、經濟、外交等某一領域中的全面戰略；第三層次是實施層次，即作戰戰略層面。也就是說，郝教授所指的「大戰略」，是一國與外部世界交往領域的全面戰略，是「基於手段和目標之間經過深思熟慮的全面行動規劃」，包括「清晰的戰略目標和為達到戰略目標具體可行的步驟、方法和策略」。更為重要的是，郝教授提出大戰略應該具有可操作性和可檢驗性，「它應該基於現實主義的考量，顧及到外部世界的複雜多變性和別國的不同利益，以及實力在國際關係中的作用。在弘揚一種價值觀的同時，大戰略不能只在描述一種空泛的美好理想。它必須能夠真實地在維護國家的根本利益。」

In his article Prof. Hao maintained that neither "peaceful development (rising)" nor "promoting a harmonious world" is a *Grand Strategy*. As a matter of fact, noted Prof. Hao, "peaceful development (rising)", like "Keep a low profile and do something", instructed by the late Chinese leader Deng Xiaoping, is often interpreted by foreigners as a defense against the "China Threat" theory, for after all how can one "keep a low profile" and "do something" at the same time? Deepening foreigners' distrust of China, added Prof. Hao, is the fact that China has never clearly expressed its diplomatic strategies to the outside world, which makes foreigners suspect that China is "keeping a low profile" and seeking "peaceful development (rising)" only to bide its time in order to do something huge in the future. "Promoting a harmonious world", like "harmonious coexistence with other nations" advocated by Confucian scholars in the ancient times and "peaceful co-existence" championed by Chairman Mao, is a diplomatic ideal of the Chinese people. But realistically, this is a world where some still believe that man's life is a "war of all against all," as postulated by the English philosopher Thomas Hobbes in his book *Leviathan*; or every person in an anarchistic state of nature would possess the "executive power" to enforce his own rights against the aggressive actions of others, as suggested by the English political philosopher John Locke; or that states should form a "union", a "league", or a "coalition", as advocated by the German philosopher Immanuel Kant. So hoping that contemporary life will be a "culture of harmony" embraced by all nations on earth, enticing as it may sound, is perhaps just wishful thinking due to its unfeasibility and immeasurability.

A decade has passed. Does China have a relatively clear *Grand Strategy* now? This question seems to have taken on a new sense of urgency, especially in the light of a series of profound changes in the international landscape as a result of the global financial crisis. China is now going through a crucial transitional period at both economic and societal levels, which makes it all the more important for China to devise a *Grand Strategy* in order to adapt to its increasingly central international status. Given this context, it is not surprising that Prof. Hao's article, with its timeliness and pertinence, has attracted widespread attention.

To some degree, the "Grand Strategy" mentioned in Prof. Hao's article bears some similarities to the view of the French scholar André Beaufre. In his book *Introduction à la Stratégie*, André Beaufre put forward the concept "Total Strategy" (Stratégie Totale). André Beaufre held that strategies exist at three levels: namely "Total Strategy" (the highest-level strategy), "Overall Strategy" (the second-level strategy, which refers to the strategies that pertain to specific areas of a country's national interests, such as military, political, economic and diplomatic areas), and "Operational Strategy" (the third-level strategy). The "Grand Strategy" mentioned in Prof. Hao's article is actually equivalent to André Beaufre's "Overall Strategy", which is defined as "a well-thought-out action plan designed to achieve a goal" and which consists of "clear strategic goals and concrete, feasible steps; methodologies and tactics geared towards the achievement of that goal". Not only did Prof. Hao propose that China should devise a *Grand Strategy*, he also stressed that a *Grand Strategy* should be feasible in terms of implementation and measurable in terms of its effectiveness. "It (the *Grand Strategy*) should be based on realistic considerations and should take into account the complexity and volatility of the outside world, the interests of other nations, and the role of a country's power in the international relations. In promoting a set of values, a *Grand Strategy* should not just present in vague terms some grand ideal, it should be able to safeguard the fundamental interests of a country in tangible ways", noted Prof. Hao in his article.





的確，由於中國外交缺乏大戰略，加深了國際社會對中國意圖的猜疑，而這些來自外界的猜疑往往不利於中國在國際上維護自身的利益。大戰略的制定需要源源不斷的來自學界的智力支持，然而，中國在這方面與西方發達國家的差距還很大。有研究表明，全世界約70個國家擁有不下300多家「戰略研究中心」，但中國的戰略研究相對較弱，不僅沒有成梯隊的高端人才，也沒有產出具有相當質量的研究成果。對比其他國家尤其是美國的當代學者，比如提出「歷史終結」的福山 (Fukuyama)、提出「文明衝突」的亨廷頓 (Huntington)，提出「軟實力」的約瑟夫·奈 (Joseph Nye)，中國更缺乏具有全球意識、宏大視野、戰略思維、長遠思路的戰略思想家。

除了缺乏大戰略制定的智力支持以外，在實際行動上，中國政府的各個部門之間似乎也缺乏一致的認識和協調機制。郝教授在文章中提到，要「使得中國的安全、經濟、政治、科技、能源、教育、文化等利益更好地與外交利益相銜接」。但是中國對待不同的利益，似乎是眉毛鬍子一把抓，不能分出輕重緩急。眾所周知，各個部門都有自己的工作重點，也都在強調自身部門的重要性。比如，經濟部門側重於發展國民經濟，外交部門傾向於擴大國際參與，安全部門強調國家安全，軍事部門力圖加強軍事防禦。基於不同的部門利益，出現了不同的口號，譬如「把國家的領土完整和主權統一放在第一位」、「穩定壓倒一切」、「科技是第一生產力」、「教育是基礎」……這些口號看上去都有道理，但是，如果不同的利益都是核心利益就可能產生矛盾，有限的資源的合理分配就會產生問題。而如何協調不同方面的利益，應該成為中國外交大戰略研究的重要內容。

曾對西方戰略思想和中國戰略思想都做過梳理的鈕先種先生認為，在過去三千年中，東西方戰略思想的興衰趨勢恰好相反。中國先盛後衰，自先秦的開創期和秦漢的成熟期後，就進入了中古時代的衰頹期和元明清三代的蛻變期。西方則先衰後盛，並先經過古代的萌芽期就進入了中古時代的停滯期，但經過啟蒙時代的復興期後，又進入了近現代的全盛期。當前，中國的國力在增長，戰略研究也應當發展。盼望郝雨凡教授和澳門大學的研究團隊能夠對中國外交與戰略思想的研究有所推動。 ▮

Indeed, the lack of a *Grand Strategy* has fueled the international community's speculations about China's intentions, and such speculations tend to run counter to China's efforts to safeguard its national interests. The formulation of a *Grand Strategy* requires continuous intellectual input. Unfortunately, China still lags far behind developed countries in the West in this respect. Studies show that there are more than 300 centres for strategy studies in approximately 70 countries around the world, while China has neither a pool of high-calibre experts in this field nor scholarly works of much consequence. Compared with the United States which has produced numerous famous contemporary scholars, such as Francis Fukuyama, the author of *The End of History*, Samuel Phillips Huntington, the author of *The Clash of Civilization*, and Joseph Nye, who postulated the concept, "Soft Power," China seems to lack strategic thinkers with international perspective, a broad vision, and a long-term approach.

In addition to the lack of intellectual support for the development of a *Grand Strategy*, government departments in China seem to have different perceptions about the nature of core national interest. Neither is there a mechanism to coordinate actions by different departments. Prof. Hao mentioned in his article that it is imperative that China "better align its diplomatic interests with interests in other areas, such as safety, economy, politics, science and technology, energy, education and culture". But in reality, China seems to be unable to get the priorities right in dealing with different national interests, so it usually ends up attending to important and trivial matters with equal emphasis. It is common knowledge that different departments have different priorities, and every department thinks it plays a more important role than the next one. For instance, an economic department would place emphasis on developing the national economy, while a diplomatic department would advocate expanding international participation. A security department would stress the importance of national security, while a military department would strive to beef up the country's military muscle. Different national interests spawn different slogans, such as "Territorial and sovereign integrity should take precedence over all else," "Stability overrides everything," "Science and technology constitute the primary productive force," "Education is the foundation," and so on. While there is some truth to all these slogans, when different interests compete for the core status, conflicts ensue and the rational allocation of limited resources becomes extremely difficult, if not impossible. Therefore, the question of how to coordinate different national interests should become a key part of the study of the *Grand Strategy* in China.

Mr. Niu Xianzhong, who has systematically studied strategic thought in China and the West, holds that over the past 3000 years China and the West went through opposite trends in the development of strategic thought. In Mr. Niu's opinion, China went through a budding period in the Pre-Qin Times, a maturing period in the Qin-Han Times, a declining period in the Middle Ancient Times, and a transformative period during the Yuan, Ming and Qing dynasties. The West, in contrast, experienced a budding period in the ancient times, a stagnating period in the Middle Ages, a reviving period in the Age of Enlightenment, and a flourishing period in modern times. China's growing national power necessitates the advancement of strategy studies. Let's hope that Prof. Hao Yufan and the research team at UM can contribute to the development of the study of China's diplomatic strategies. ▮



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