



Research and Discoveries

科研發現

Innovation is crucial to research and discoveries. Without creative, original ideas, we will not be able to address the world's most pressing problems. The following CityUHK academics have proved worthy of the mantle of "Outstanding" researchers for their incredible achievements in their respective fields.

創新是推動科研發現的關鍵。若缺少了富創意和原創性的理念，我們將無法應對世界上種種亟待解決的問題。以下的城大學者因其在各自學術領域的卓越成就，獲公認為傑出的研究人員。

Research and Discoveries

科研發現



Five CityUHK research projects were granted funds through the RAISE+ Scheme.
城大五個科研項目獲「產學研1+計劃」撥款資助。

Research Excellence 卓越研究

RAISE-ing the bar

Five research projects were granted funds from the first round of the HKSAR Government's Research Academic and Industry Sectors One-plus Scheme (RAISE+ Scheme) in biomedical sciences, materials science, big data, energy and the environment.

The five funded projects are as follows:

- Microfluidics-Based Detection Platform for Circulating Tumor Cells and Its Applications in Cancer Early Screening and Disease Monitoring led by Professor Michael Yang Mengsu, Yeung Kin Man Chair Professor of Biomedical Sciences.

多個科研項目獲撥款

城大五個科研項目獲政府「產學研1+計劃」首輪資助，涵蓋生物醫學、材料科學、大數據、能源及環境等領域。

五個獲撥款的項目包括：

- 由楊建文講座教授(生物醫學)楊夢甦教授領導的「基於微流控技術的循環腫瘤細胞檢測平台及其在癌症早期篩查和精準監測中的應用」。

- Commercialisation of Pulse Hollow Cone Hybrid Transmission Electron Microscopy (TEM) /Scanning Electron Microscopy (SEM) led by Professor Chen Fu-rong, Chair Professor in the Department of Materials Science and Engineering.
- Scalable Production of Next-Generation High-Performance Printable Solar Cells led by Professor Alex Jen Kwan-yue, Lee Shau Kee Chair Professor of Materials Science.
- ScholarMate led by Professor Ma Jian in the Department of Information Systems, College of Business.
- Revolutionising Climate Resilience: A Universal Solution via Next-Generation Radiative Cooling Technologies for a Greener Community led by Professor Tso Chi-yan of the School of Energy and Environment.

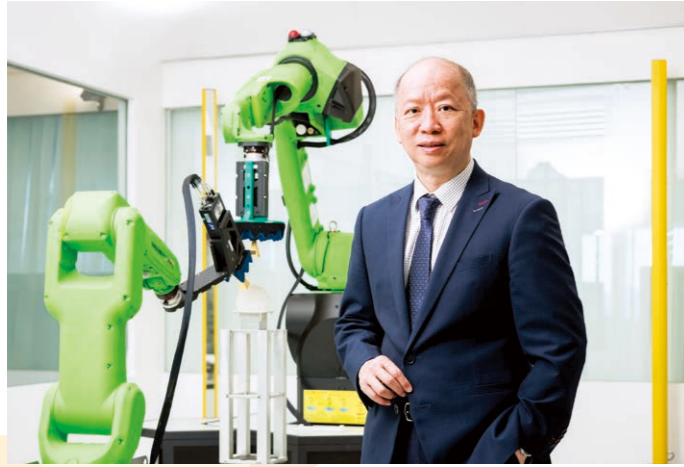
- 由材料科學及工程學系講座教授陳福榮教授領導的「脈衝空心錐掃描與透射一體化電子顯微鏡的商業化計劃」。
- 由李兆基講座教授(材料科學)任廣禹教授領導的「新一代可印刷式高效光伏的批量化生產」。
- 由商學院資訊系統學系馬建教授帶領團隊研發「科研之友 ScholarMate.com」。
- 由能源及環境學院曹之胤教授領導的「氣候革命：用於實現綠色社區的新一代輻射製冷全方位解決方案」。

廣獲研究資助

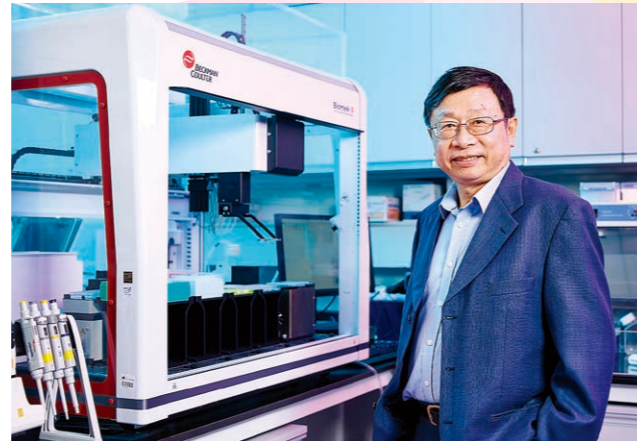
城大四位學者因其「研究計劃的突出貢獻和潛在影響」，獲香港研究資助局(研資局)2023/24年「高級研究學者計劃」及「研究學者計劃」資助。獲高級研究學者計劃資助的學者包括神經科學系賀菊方教授、材料科學及工程學系Andrey L. Rogach教授及支春義教授，而生物醫學工程學系于欣格教授則獲研究學者計劃資助。獲高級研究學者計劃或研究學者計劃資助的學者，將於60個月內分別獲資助約780萬港元及520萬港元。

Funding success

Four CityUHK academics were recognised under the 2023/24 Senior Research Fellow Scheme (SRFS) and the Research Fellow Scheme (RFS) established by the Research Grants Council (RGC) for their "exceptional contributions and the potential impact of their proposed research projects". The SRFS awardees were Professor He Jufang, Department of Neuroscience, and Professor Andrey L. Rogach and Professor Zhi Chunyi, both from the Department of Materials Science and Engineering. The RFS awardee was Professor Yu Xinge, Department of Biomedical Engineering. Each SRFS and RFS awardee receives a fellowship grant of approximately HK\$7.8 million and HK\$5.2 million, respectively, for a period of 60 months to boost their quest for research excellence.



Professor Luk Kwai-man
陸貴文教授



Professor Huang Yu
黃聿教授

Our scientists secured grants in both the Areas of Excellence Scheme (AoE) and the Theme-based Research Scheme (TRS) funded by the RGC. The successful AoE project, “Advanced Antenna Technology for a Smart World,” is led by Professor Luk Kwai-man, Chair Professor in the Department of Electrical Engineering, and the TRS project is led by Professor Huang Yu, Jeanie Hu Professor of Biomedical Sciences and Head of the Department of Biomedical Sciences. The two projects involve multiple CityUHK faculty members, as well as local and international collaborators.

Five CityUHK academics were awarded the Excellent Young Scientists Fund (Hong Kong and Macau) by the National Natural Science Foundation of China (NSFC) for 2023. Each awardee receives funding of RMB 2 million. The researchers were Professor Dong Yining from the School of Data Science, Professor He Yukun from the Department of Mathematics, Professor Wang Shubo from the Department of Physics, Professor Wu Wei from the School of Energy and Environment, and Professor Zhu Zonglong from the Department of Chemistry.

城大科學家分別獲得研資局轄下的「卓越學科領域計劃」及「主題研究計劃」批出撥款資助。榮獲卓越學科領域計劃撥款的研究項目「先進天線技術引領智慧未來」由電機工程學系講座教授陸貴文教授領導，而獲主題研究計劃撥款的項目則由胡梁子慧生物醫學教授兼生物醫學系系主任黃聿教授領導。上述兩個研究項目均由多位城大學術人員聯同本地及國際學者協作進行。

此外，城大五位學者的研究項目，入選國家自然科學基金委員會的2023年度「優秀青年科學基金項目(港澳)」。每人分別獲頒發200萬人民幣研究經費資助。獲嘉許學者包括數據科學學院董一凝教授、數學系何煜坤教授、物理學系王書波教授、能源及環境學院吳偉教授及化學系朱宗龍教授。

Lifetime award for heart research

Vascular biologist Professor Huang Yu, Jeanie Hu Professor of Biomedical Sciences and Head of the Department of Biomedical Sciences, became the first Chinese to receive the Peter Harris Distinguished Scientist Award 2024 from the International Society for Heart Research. The award recognises Professor Huang’s lifetime contributions to advancing cardiovascular science to help combat conditions like hypertension, diabetes, and clogged arteries.

Humboldt Research Award

Professor Charles Xu Chunbao, Chair Professor of Advanced Biorefinery in the School of Energy and Environment, was awarded the Humboldt Research Award 2023 from the Alexander von Humboldt Foundation in recognition of his research and academic achievements. The award is one of the highest recognitions in Germany for researchers living and working outside Germany. The Foundation maintains a network of over 30,000 Humboldt Foundation sponsorship recipients in more than 140 countries, including 61 Nobel Prize winners.

Ministry of Education awards

State-of-the-art research into the precise delivery of cells using microrobots and the study of the medium-range structure of metallic glass developed at CityUHK were honoured with two second-class awards in the Natural Science category at the Higher Education Outstanding Scientific Research Output Awards (Science and Technology) 2022 from the Ministry of Education. The award-winning projects were led by Professor Sun Dong, a former CityUHK professor and now Secretary for Innovation, Technology and Industry in the HKSAR Government, and Professor Wang Xunli, Chair Professor of Physics.

心血管科學終身成就獎

血管生物學家、胡梁子慧生物醫學教授兼生物醫學系系主任黃聿教授獲得國際心臟研究學會頒發的2024年度Peter Harris傑出科學家獎，成為首位獲此殊榮的中國學者。該獎項表彰黃教授為促進心血管科學發展以治療高血壓、糖尿病、血管阻塞等疾病所作的終身貢獻。

洪堡研究獎

能源及環境學院先進生物精煉講座教授徐春保教授獲德國洪堡基金會頒發2023年洪堡研究獎，以表彰其研究和學術成就。此獎是德國其中一項授予在該國以外居住及工作的研究學者的最高榮譽。洪堡基金會歷年各項獎項得獎者逾30,000位，他們來自140多個國家，當中包括61位諾貝爾獎得主。

國家教育部獎項

城大有關利用微型機械人於人體內精準運送細胞及非晶合金中程序結構兩個研究項目，分別獲得國家教育部2022年度高等學校科學研究優秀成果獎(科學技術)自然科學獎二等獎。兩個獲獎項目分別由城大前教授、現任創新科技及工業局局長孫東教授，以及城大物理學系講座教授王循理教授領導。

Outstanding Research Award & Thetos Young Scholar Award 2023

Achieving success across disciplines, the Outstanding Research Award for CityUHK scholars was awarded to Professor Julien Chaisse of the School of Law, Professor Kannie Chan Wai-yan of the Department of Biomedical Engineering, and Professor Zhi Chunyi, who is Chair Professor in the Department of Materials Science and Engineering.

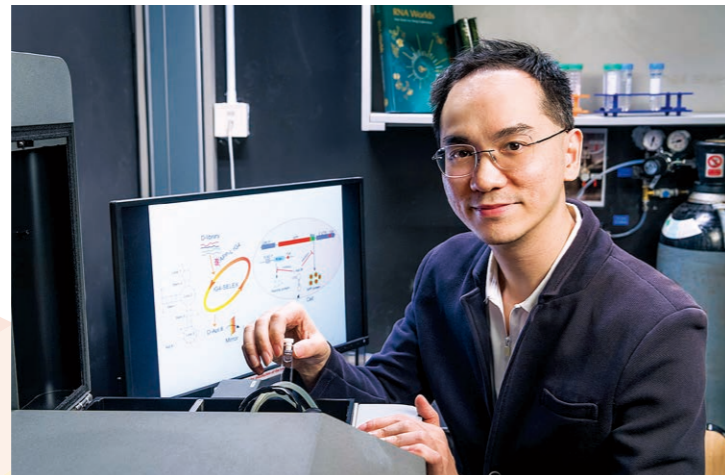
In a boost to scholars at the start of their careers, the Outstanding Research Award for Junior Faculty went to Professor Alicia An Kyoung-jin of the School of Energy and Environment and Professor Deng Xin of the Department of Biomedical Sciences.

Also, in keeping with our drive to encourage early-stage faculty, the Thetos Young Scholar Award was given to Professor James O'Donovan of the Department of Economics and Finance and Professor Ming Wai-kit of the Department of Infectious Diseases and Public Health.

Early career boost

Professor Kwok Chun-kit from the Department of Chemistry was honoured with the 2024 RNA Society Early-Career Research Award in recognition of his achievement as an emerging leader in the field of ribonucleic acid research. He is the first Hong Kong scientist awarded in the early-career category.

Professor Kwok Chun-kit 郭駿傑教授



2023年傑出研究獎與賦勵青年學者獎勵計劃

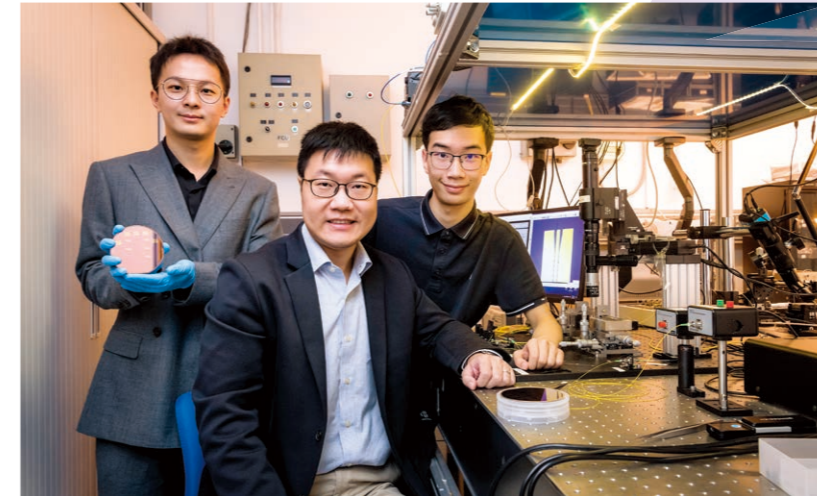
獲頒城大2023年「傑出研究獎」的學者包括法律學院夏竹立教授、生物醫學工程學系陳葦恩教授，以及材料科學及工程學系講座教授支春義教授，以表彰他們在各自學科領域的成就。

「傑出研究獎——青年學者」旨在鼓勵初展學術生涯的年青學者，2023年的得主是能源及環境學院安京珍教授和生物醫學系鄧新教授。

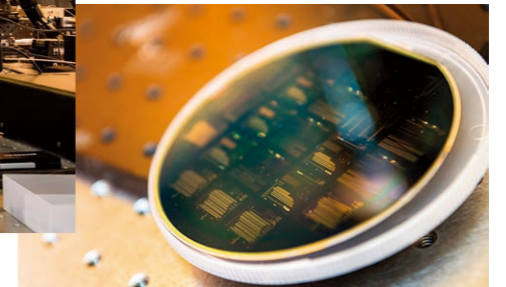
此外，為延續城大鼓勵青年學者的精神，「賦勵青年學者獎勵計劃」向經濟及金融系James O'Donovan教授和傳染病及公共衛生學系明偉傑教授頒發獎項。

傑出青年學者研究獎項

化學系郭駿傑教授榮獲RNA學會2024年度傑出青年學者研究獎，表彰他在核糖核酸(RNA)研究領域擔當新晉領袖並取得傑出成就。郭教授是首位香港科學家獲得上述青年學者組別獎項。



A research team led by Professor Wang Cheng (centre) developed a world-leading microwave photonic chip. 電機工程學系王聘教授(中)領導的研究團隊，開發出全球領先的微波光子芯片。



Groundbreaking Discoveries 重大突破

World-leading microwave photonics chip

A collaborative research team from the Department of Electrical Engineering developed a microwave photonic chip capable of performing ultrafast analog electronic signal processing and computation using optics. The chip is 1,000 times faster and consumes less energy than a traditional electronic processor. The range of applications includes 5/6G wireless communication systems, high-resolution radar systems, AI, computer vision, and image/video processing. The findings were published in *Nature* under the title "Integrated Lithium Niobate Microwave Photonic Processing Engine".

全球領先的微波光子晶片

城大電機工程學系的研究團隊開發微波光子晶片，能運用光學進行超高速模擬電子訊號處理及運算。這種晶片比傳統電子處理器的速度快1,000倍、耗能更低，而且用途廣泛，能涵蓋5G及6G無線通訊系統、高解像度雷達系統、人工智能、計算機視覺、圖像/影像處理等範疇。相關研究成果於《自然》期刊發表，題為「集成鋰酸鋰微波光子處理引擎」。

Super permeable wearable electronics

Our newly designed super wearable electronics that are lightweight, stretchable and increase sweat permeability by 4,000-fold enable reliable long-term monitoring of biomedical devices. Developed by researchers from the Department of Biomedical Engineering, these super wearable electronics help mitigate the interference of sweat with wearable devices used for monitoring health status, predicting diseases and managing chronic health conditions. The research was published in *Nature*, titled "A three-dimensional liquid diode for soft, integrated permeable electronics".

超級透氣穿戴式電子設備

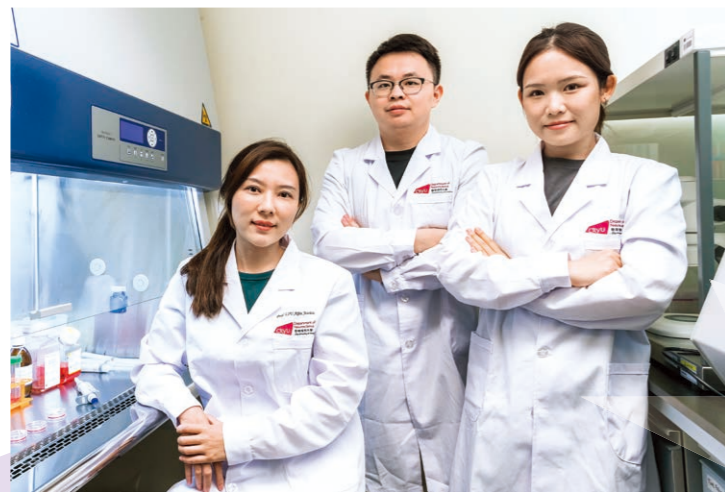
城大生物醫學工程學系的研究員研發出輕便、可伸展，並將排汗度提高4,000倍的超級透氣穿戴式電子設備，有助生物醫學設備長期並可靠地監測生物信號。這類超級可穿戴式電子設備有助減少汗液對監測健康狀況、預測早期疾病及慢性疾病管理的穿戴式設備所構成的干擾。研究成果於《自然》期刊發表，題為「用於柔軟、集成透氣電子設備的三維液體二極體」。

Innovative tool for avian influenza tracking

A cutting-edge computer tool that enables the mapping and tracking of avian influenza virus has been developed in collaboration with the One Health Poultry Hub. The study will allow decision-makers to better understand infectious disease threats associated with global food systems and more effectively target actions and interventions to minimise risk. CityUHK's partners include scientists from the University of Oxford, Royal Veterinary College, Chattogram Veterinary and Animal Sciences University, The University of Queensland, and the London School of Hygiene and Tropical Medicine.

Genetically modified neural stem cells

A major advance in treating spinal cord injuries using genetically modified human neural stem cells (hNSCs) has been recorded by a collaborative team co-led by CityUHK. The team has discovered that modifying specific genes in hNSCs can alter their intrinsic actions, effectively driving nerve regeneration to repair damage and ultimately restoring locomotor functions. The finding offers excellent potential for new therapeutic opportunities for spinal cord injury. The research was funded by the RGC.



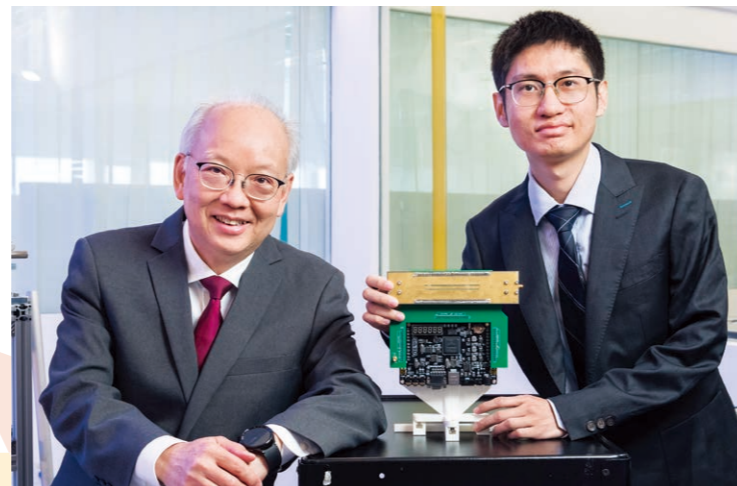
Research co-led by Professor Jessica Liu Aijia (left) made a major advance in treating spinal cord injuries. 由劉艾佳教授(左)共同領導的團隊，在治療脊髓損傷方面取得重大進展。

創新系統追蹤禽流感病毒

城大與英國的健康一體化家禽中心(One Health Poultry Hub)合作，研發出檢測與追蹤禽流感病毒的先進電腦工具。這項研究成果有助決策者更清楚了解有關全球食物系統的傳染病威脅，從而更有效地作出針對性的行動及干預以降低風險。城大的合作夥伴包括來自牛津大學、皇家獸醫學院、孟加拉吉大港獸醫及動物科學大學、澳洲昆士蘭大學及英國倫敦衛生與熱帶醫學院的科學家。

基因改造神經幹細胞

城大擔當共同領導角色的研究團隊，在研發基因改造人體神經幹細胞(hNSCs)治療脊髓損傷方面取得重大進展。團隊發現修改人體神經幹細胞中的特定基因能有效激發神經再生修復的能力，令病人恢復活動機能，這為治療脊髓損傷帶來新的曙光。此項目獲研資局撥款資助。



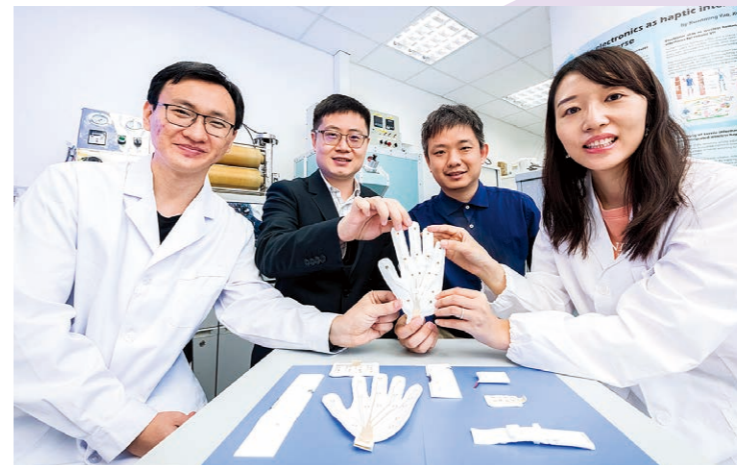
Professor Chan Chi-hou (left) and Professor Wu Gengbo showcase the universal metasurface antenna developed at CityUHK. 陳志豪教授(左)與吳耿波教授展示在城大研發的通用超表面天線。

Antenna for high-security 6G communications

An unprecedented advance in antenna technology can make possible the manipulation of all five fundamental properties of electromagnetic waves through software control. In a world first, the team's universal metasurface antenna allows the independent and simultaneous manipulation of amplitude, phase, frequency, polarisation and direction of electromagnetic radiation. Their paper, titled "A universal metasurface antenna to manipulate all fundamental characteristics of electromagnetic waves", was published in *Nature Communications*.

Skin-integrated interface

A skin-integrated multimodal haptic feedback interface capable of stimulating different sensory receptors in the skin can drastically enhance haptic feedback performance. The CityUHK team's innovative approach reproduces thermal sensations between the skin and objects by using thermoelectric stimulation to control temperature changes on the skin. The research, titled "A skin-integrated multimodal haptic interface for immersive tactile feedback", was published in *Nature Electronics*.



Professor Yu Xinge (2nd from left) and his team developed a skin-integrated multimodal haptic feedback interface. 于欣格教授(左二)及其團隊開發出貼皮式多模態觸覺反饋介面。

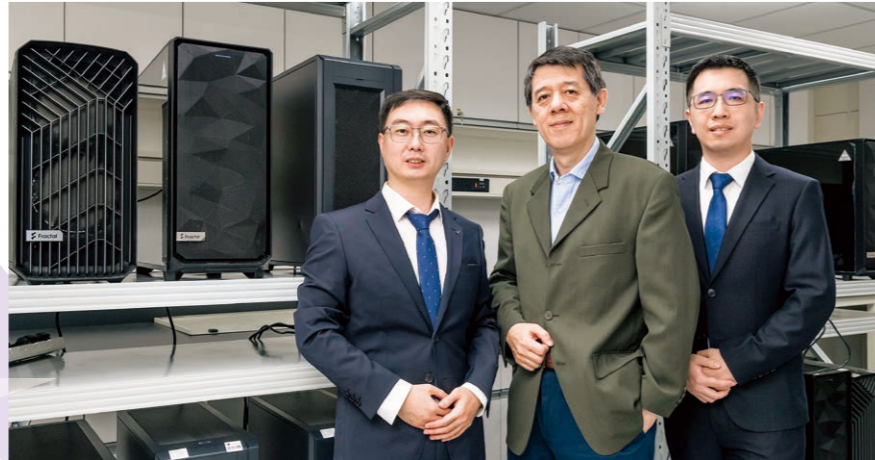
新研發天線冀加強6G無線通訊保安

城大團隊研發出全球首創的先進天線技術，能夠通過軟件控制調控電磁波的所有五項特性。這種通用超表面天線，可個別或同時調控電磁幅射的波幅、相位、頻率、極化及方向。研究成果刊載於國際期刊《自然通訊》，題為「可調控電磁波所有基本特性的通用超表面天線」。

貼皮式介面

城大團隊成功研發一種貼皮式多模態觸覺反饋介面，能夠刺激皮膚中的不同感覺受體，大幅提升觸覺反饋表現。團隊使用熱電刺激以控制皮膚的溫度變化，以創新方法重現皮膚和物體之間的熱觸感。研究成果在國際期刊《自然電子》發表，題為「用於沉浸式觸覺反饋的貼皮式多模態觸覺反饋介面」。

Professor Zeng Xiaocheng (centre) and his team conducted research on nanoscale superlubricity. 曾曉成教授(中)及其團隊研究納米級超潤滑表現。



Nanoscale superlubricity

Direct measurement and simulation of the nanoscale superlubricity behaviour of a 2D water/ice on a graphene sheet achieved by CityUHK and Peking University scientists revealed for the first time the nearly vanishing static friction behaviour between a 2D bilayer water/ice and a graphene sheet. This finding represents a major advancement in nanofluidic engineering and nanotribology, prompting calls for potential applications in nano-filtration and reduced tribological consumption. The research titled “Probing structural superlubricity of two-dimensional water transport with atomic resolution”, was published in *Science*.

納米級超潤滑表現

城大與北京大學的科學家在石墨烯片上直接測量及模擬二維(2D)水/冰的納米級超潤滑表現，首次揭示二維雙層水/冰和石墨烯片之間的靜態摩擦幾乎完全消失的狀態。有關發現為納米流體工程及納米摩擦學領域的研究帶來重大進展，有助促進發掘納米過濾及減少摩擦消耗的應用潛能。研究成果在《科學》期刊發表，題為「利用原子分辨率探究二維水傳輸的結構超滑潤性」。

Academic Publications by CityUHK Staff in 2023/24 2023/24年度城大教職員的學術著作

Total number of books (including research books or monographs, textbooks, literary works and translation) authored by CityUHK staff	城大教職員的學術著作(包括研究書籍、課本、文學及翻譯作品)總數	39
Total number of research papers authored by CityUHK staff in peer-reviewed academic journals, externally refereed policy or professional journals worldwide	刊登在世界各地學術及專業期刊的城大教職員研究論文總數	5,783
Arts and Humanities	藝術及人文	226
Business and Economics	商業及經濟	284
Science (including Medicine)	科學(包括醫學)	4,908
Social Sciences (including Law)	社會科學(包括法律)	365

Note:
Figures as at end of June 2024.

註：
數字以2024年6月底為準。

Research Projects 2023/24 2023/24年度研究項目

Total number of on-going research projects funded by external funds and CityUHK research grants	由校外及校內撥款資助的研究項目總數	3,712
Number of on-going research projects by Colleges/Schools/support centres	各學院及學術支援部門的研究項目數目	
College of Business	商學院	376
College of Engineering	工學院	1,539
College of Liberal Arts and Social Sciences	人文社會科學院	371
College of Science	理學院	532
Jockey Club College of Veterinary Medicine and Life Sciences	賽馬會動物醫學及生命科學院	416
School of Creative Media	創意媒體學院	78
School of Data Science	數據科學學院	110
School of Energy and Environment	能源及環境學院	216
School of Law	法律學院	68
Other Academic Supporting and Administrative Units	其他學術支援及行政部門	6

Note:
Including CityUHK-funded, RGC-funded and externally funded research projects, with 831 new starts-ups during 2023/24. Figures as at end of June 2024.

註：
包括由城大、研究資助局及校外資助的研究項目，其中831項是2023/24年度內新發展的項目。數字以2024年6月底為準。

On-going Funded and Contract Research 2023/24 2023/24年度進行中的資助及合約研究

		Total Funding (HK\$ million) 資助總額 (百萬港元)
Innovation and Technology Fund (ITF) ¹	創新及科技基金 ¹	620.92
Contract and privately/government-funded projects	業界贊助合約研究項目及政府資助研究項目	473.86

Note:
¹ Included are ITF-Research Talent Hub (RTH) funds, industry sponsorship for ITF projects and annual funding support from the Innovation and Technology Commission at HK\$20 million each to the State Key Laboratory of Marine Pollution, State Key Laboratory of Terahertz and Millimeter Waves and Hong Kong Branch of National Precious Metals Material Engineering Research Center.

註：
¹ 包括研究人才庫創新及科技基金、業界對創新及科技基金研發項目的贊助，以及創新科技署每年分別向海洋污染國家重點實驗室、太赫茲及毫米波國家重點實驗室、國家貴金屬材料工程技術研究中心香港分中心提供的2,000萬港元資助。