香港城市大學
City University of Hong Kong

UGC
KNOWLEDGE TRANSFER ANNUAL REPORT
2023 – 2024

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Executive Summary

The academic year 2023/24 marked the 30th anniversary of City University of Hong Kong (CityUHK). We are pleased to report some exciting knowledge transfer accomplishments from the past year that will make significant contributions to Hong Kong, the mainland, and beyond.

First and foremost, the CityU Academy of Innovation announced its formal establishment in January 2024, marking a significant milestone in the development of the HK Tech 300 programme and helping uphold the University's position as a leader in the field with unparalleled excellence in innovation education, talent cultivation, and entrepreneurship development. A series of innovative academic programmes at the PhD, Master's, and undergraduate levels focusing on deep-tech venture creation will be offered.

HK Tech 300 is moving into its fourth year of operation. We are pleased to report a three-year overview of its achievements in terms of the number of young entrepreneurs trained, seed fund projects funded and the number of start-ups receiving investment funding from the University. The HK Tech 300 National Start-up Competition and the HK Tech 300 Southeast Asia Start-up Competition nurture innovators and young entrepreneurs in nearby regions, including mainland China and Southeast Asia. A new book titled 《300+城大創新社群》 has been published that features HK Tech 300 to promote a spirit of innovation and entrepreneurship among the young generation.

In the area of intellectual property (IP) creation, CityUHK ranked 44th in the Top 100 Worldwide Universities Granted US Utility Patents for the calendar year 2023, with 70 US patents granted. CityUHK has been the top-ranking university in Hong Kong in terms of US utility patents for the past eight consecutive years.

In the area of research, CityUHK is the first local university to adopt and implement the pioneering "One Health" concept and is uniquely positioned to lead in this area. The University established an Institute of Digital Medicine in April 2024, aiming to seek digital health solutions and shape the future of healthcare. Three InnoHK world-class research clusters, together with five new RAISe+ research and commercialisation projects, showcase CityUHK's continued commitment to fostering high-quality research and innovation for the betterment of society.

City University of Hong Kong (Dongguan) has obtained official approval from the Ministry of Education, which will deepen research collaboration and knowledge transfer on the mainland.

Lastly, five examples of CityUHK's impact are described to illustrate the University's dedication to advancing sustainability through innovation and research, making a positive impact on society and the world.

1. Innovation and Entrepreneurship Ecosystem – Innovating into the Future

1.1 CityU Academy of Innovation

To reinforce the vision of HK Tech 300, CityUHK's large-scale flagship innovation and entrepreneurship programme cultivating talents and shaping a society driven by innovation and technology (I&T), CityU Academy of Innovation was officially established in January 2024, coinciding with the 30th anniversary of CityUHK. The establishment of the Academy marks a significant milestone in the development of HK Tech 300 and supports the University's position as a leader in the field, demonstrating its unparalleled excellence in innovation education, talent cultivation, and entrepreneurship development.

1.1.1 Offering Innovative Academic Programmes

As an integral part of HK Tech 300, the Academy will serve as a regional hub for nurturing young tech talents and offering a series of innovative academic programmes at the PhD, Master's, and undergraduate levels, focusing on deep-tech venture creation. The Academy aims to develop a leading international ecosystem that nurtures young entrepreneurs, incubates deep-tech start-ups and promotes university–industry collaboration in Hong Kong and beyond.

- **Graduate Research and Innovation Trek Programme (GRIT)**

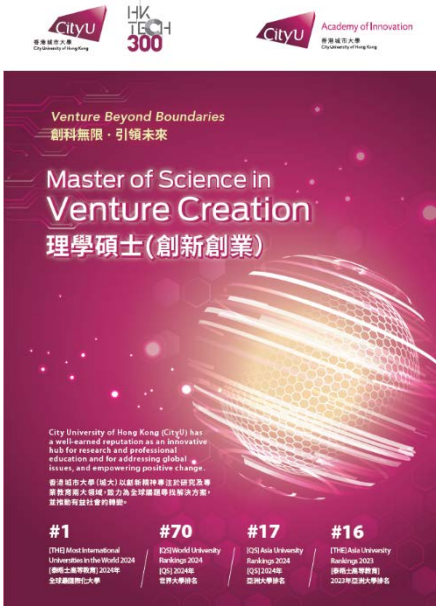
  GRIT is a comprehensive course featuring hands-on guidance from experienced industrialists and entrepreneurs aimed at empowering researchers and postgraduate students to transform their research into thriving deep-tech ventures. The first and second runs of the programme commenced in November 2023 and April 2024, respectively, and involved a total of 20 HK Tech 300 start-up teams and 16 business leaders who paired up to participate in one-on-one 12-week intensive training.

- **PhD by Innovation**

  PhD by Innovation is a graduate research programme that allows doctoral candidates to pursue research in innovation-driven fields with a strong emphasis on practical applications, IP generation and real-world impact. The programme commenced in Semester B 2023/2024.

- **Master of Science in Venture Creation**

  The MSc in Venture Creation programme is designed to equip recent graduates, aspiring entrepreneurs, and working professionals with the comprehensive knowledge and skills necessary for successful venture creation. It is an experiential programme that offers students valuable opportunities to develop the essential skills for converting their innovative ideas into viable business proposals. This is the first MSc programme in Hong Kong to focus on venture creation. The key features of the programme include (i) offering real-world experiential training through the Graduate Research and Innovation Trek (GRIT) programme, (ii) providing strong connections to the innovation and entrepreneurship ecosystems with possible venture funding from HK Tech 300, (iii) providing access to CityUHK's IP and technical support, and (iv) serving as a gateway to overseas and mainland Chinese markets. The programme will commence in Semester A 2024/2025.



- **Overseas Start-up Technology Entrepreneur Programme**

  The Overseas programme offers selected CityUHK undergraduate students a unique opportunity to intern at top start-up locations worldwide, gaining valuable hands-on experience and exposure to diverse entrepreneurial ecosystems across the globe. The programme is expected to commence in Fall 2024.

1.1.2 Bridging Academia with Industry

The Academy seeks to leverage the support of seasoned industrialists and entrepreneurs in the I&T sector. It invites distinguished faculty members with knowledge transfer experience within CityUHK to serve as Affiliate Professors, while esteemed industry figures and experienced professionals in innovation and entrepreneurship are invited to serve as Adjunct or Visiting Professors. These accomplished individuals play a crucial role in providing teaching, training, and mentoring for the programmes offered by the Academy. Furthermore, the Academy recognises the importance of guidance and advice from distinguished leaders in the industrial and commercial sectors. Therefore, it extends invitations to these influential figures to serve as Academy Advisors. Their invaluable expertise and insights contribute to the strategic development of the Academy, ensuring its alignment with industry needs and fostering its growth as a prominent hub for innovation and entrepreneurship.

1.2 HK Tech 300 Highlights

Moving into the fourth year of HK Tech 300, we are pleased to highlight some of the programme's achievements over the past three years.

The HK Tech 300 programme provides four stages of support for the establishment and development of start-ups: (1) recruiting and training, (2) seeding, (3) incubating (Angel Fund Investment), and (4) launching (acceleration) with partners.

1.2.1 Training

Entrepreneurship training for potential start-up teams is packaged into an eight-week or three-day intensive bootcamp programme delivered by external acceleration and training firms. Around 1,750 participants (over 800 teams) have received HK Tech 300 training since the programme's inception.

1.2.2 HK Tech 300 Seed Fund

The HK Tech 300 Seed Fund transforms innovative ideas into start-ups. Recipients receive funding of HK$100,000 to develop and test their business ideas. A total of 1,500 applications have been received to date and around 700 project teams have been approved for funding support. The applications span diverse disciplines including biotech and health, fintech, advanced tech and ESG, EdTech, information and communications technology (ICT) and artificial intelligence (AI).

1.2.3 HK Tech 300 Angel Fund

The HK Tech 300 Angel Fund is an investment fund that supports early-stage start-ups to develop a minimum viable product/service and business model validation. Around 950 applications have been received and over 170 start-ups have been approved to receive Angel Fund investment of up to HK$ 1 million each after stringent assessment.

1.2.4 TSSSU

In addition to the above funding schemes, the Technology Start-up Support Scheme for Universities (TSSSU) continues to offer funding support to CityUHK start-ups at different stages of their life cycle. For the 2023/24 round of applications, 21 start-ups were approved to receive total funds of HK$16 million under TSSSU-O and TSSSU+.

1.2.5 Support from Mentors and Partners

HK Tech 300 is well-recognised both locally and regionally and has received strong support from successful entrepreneurs and business leaders acting as mentors to provide guidance and advice. Over 180 mentors have been assigned to the Seed Fund teams. Moreover, the programme has secured close to 100 collaborative partners, including major chambers of commerce, incubators, accelerators, venture capitalists, and industry associations, to provide start-up teams with a range of services and business opportunities, ultimately benefitting the whole HK Tech 300 entrepreneurship ecosystem.

1.2.6 HK Tech 300 Southeast Asia Start-up Competition and HK Tech 300 National Start-up Competition

Not only does HK Tech 300 nurture local talents in entrepreneurship, it also aspires to nurture young innovators in the nearby regions. The HK Tech 300 Southeast Asia Start-up Competition (SEA Competition) and HK Tech 300 National Start-up Competition (National Competition) are held

precisely for this purpose. Leveraging Hong Kong's unique advantages and resources, the SEA Competition helps start-ups expand their business to Hong Kong and mainland China. The competition also promotes technology transfer and commercialisation in the Southeast Asian region, fostering closer ties between the entrepreneurship and innovation ecosystems in Hong Kong and Southeast Asia. The National Competition synergises the strengths and resources of Hong Kong and the mainland to build a more robust start-up environment in the region.

The SEA Competition 2024 was supported by 11 local partners from Malaysia, Brunei, Thailand, Indonesia, Vietnam and Singapore who jointly recruited technology start-ups to participate in the competition. Ten start-ups beat over 100 teams in the region and were awarded Angel Fund investment of up to HK$1 million each from the HK Tech 300 programme. An awards presentation ceremony was held on 27 June 2024.

The National Competition helps foster I&T development in Hong Kong and the mainland. The competition is held biennially nationwide in 10 cities: Hong Kong, Beijing, Chengdu, Changsha, Chongqing, Qingdao, Shanghai, Suzhou, Shenzhen and Wuxi (Chongqing and Wuxi were added after the first competition). As reported last year, the first competition selected the top 14 start-ups to receive up to HK$1 million in Angel Fund investment. The second competition received more than 60 nominations in diverse fields including Biotech and Health, Advanced Tech and ESG, FinTech, and ICT and AI. The semi-final of the second National Competition was held online from 26 to 28 March 2024 and the top 12 winners were shortlisted. Eligible winners will receive up to HK$1 million in Angel Fund investment. The winning teams will compete for the major awards at the National Grand Final Competition scheduled later this year.

1.2.7 Publication of a Book on HK Tech 300

A book titled《300+城大創新社群》has been published by City University of Hong Kong Press with support from the Office of the Senior Vice-President (Innovation and Enterprise). The book features HK Tech 300 through interviews with eight start-ups incubated by the programme, six strategic partners and co-investors from the HK Tech 300 community, and Professor Michael Yang, Senior Vice-President (Innovation and Enterprise) of CityUHK, who led the HK Tech 300 programme.

The book delves into the journey of transforming research achievements into practical applications by turning innovative ideas into products and services

through collaborations between industry, academia and research sectors. It also shares stories of start-up founders' entrepreneurship journeys and how HK Tech 300 has supported them.

The book was officially launched at the Hong Kong Book Fair on 28 June 2024. Over 100 secondary school students from the "Strive and Rise Programme" and members of the public were present at the launch. The book will be distributed to secondary schools to promote a spirit of innovation and entrepreneurship among the new generation.

2. Facilitating Knowledge Transfer and Commercialisation

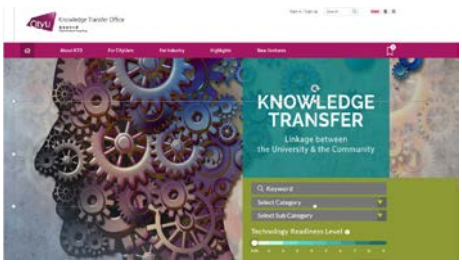
2.1 IP Management

The University has in place a well-established administrative framework and policy to protect the IP generated from its research activities. After a stringent vetting process, patent filing is pursued for inventions of high commercialisation value. In the year under review, 328 new patent applications were filed in the US, mainland China, and other jurisdictions in various fields of technology, with 116 patents granted during this period. In June 2024, CityUHK's IP portfolio consisted of 815 patents granted and 868 patents pending.

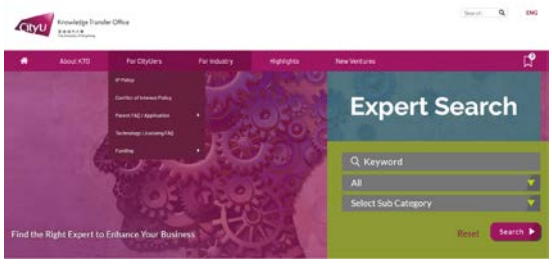
Each year for the past eight years, CityUHK has received the highest number of US utility patents among Hong Kong universities. In calendar year 2023, CityUHK received 70 US patents and ranked 44th in the Top 100 Worldwide Universities ranking for number of US utility patents granted. The University will continue to make efforts to sustain this leading position and excel in this area.

2.2 IP Portal and Expert Search Portal

Uncover Technologies from this IP Portal



Find the Right Expert to Enhance Your Business



CityUHK's Knowledge Transfer Office website hosts a list of IPs, the IP Portal, to broaden the marketing channels for licensing, as well as a list of experts, the Expert Search Portal, to help industry and businesses solve problems. The IP Portal offers Technology Briefs in layperson's terms, with an emphasis on applications and usage. Together, the two portals serve as effective channels for technology licensing and industry collaboration for research and consultancy.

2.3 Outreach

By participating in innovation exhibitions and organising outreaching activities, CityUHK aims to showcase its latest inventions for commercialisation and expand its client base. The following activities were held/joined during the year under review:

- BIOHK 2023, organised by the Hong Kong Biotechnology Organization (13–16 September 2023)

- InnoCarnival 2023, organised by the Innovation and Technology Commission of the HKSAR Government (28 October–5 November 2023)
- 3rd Asia Exhibition of Innovation and Inventions Hong Kong, organised by Palexpo, Geneva (7–8 December 2023)
- Sharing CityUHK research capabilities and potential collaborations with Thai tech start-ups/companies (28 February 2024)
- 49th International Exhibition of Inventions Geneva, organised by Palexpo, Geneva (17–21 April 2024)
- International Exhibition of Inventions Geneva 2024 awardee presentation day and meet-up with potential investors (13 June 2024)
- 6th Clean Enviro Summit Singapore, organised by Singapore's National Environment Agency (19-21 June 2024)

InnoCarnival

BIOHK

Asia Exhibition of I&I HK

2.4 49th International Exhibition of Inventions Geneva

It was another triumphant year for CityUHK at the International Exhibition of Inventios Geneva, one of the biggest global events showcasing innovations and inventions, as our professors and students won a total of 36 awards. The awards included two Special Prizes, eight Gold Medals with Congratulations of the Jury, 10 Gold Medals, 11 Silver Medals and five Bronze Medals. In particular, winning eight Gold Medals with Congratulations of the Jury this year is a record high for CityUHK. This success keenly demonstrates CityUHK's excellence in high-quality research and innovation on the global stage.

2.5 Incentivising IP Commercialisation

To drive IP commercialisation, the University has modified its commercialisation income distribution model to provide greater incentives for faculty members to produce more commercially valuable patents and license them for application locally and globally. The revised model is in line with the guidelines set by the HKSAR Government's Innovation and Technology Commission for the Research, Academic, and Industry Sectors One-plus Scheme (RAISe+) funding.

2.6 Promoting Knowledge Transfer beyond Science and Engineering Disciplines

To encourage knowledge transfer and nurture a knowledge-transfer culture in non-science disciplines, the Excellence in Knowledge Transfer Award has been offered since 2011. The Award

gives recognition to faculty members in the College of Liberal Arts and Social Sciences (CLASS) who have made outstanding achievements in applying their knowledge to create a high social impact. The 2023/24 Excellence in Knowledge Transfer Award and Certificate of Merit winners were as follows:

Project Title	Department	Recipient
Excellence in Knowledge Transfer Award		
Dissemination of the Caregiver Support Project for Caregivers of Frail Older Adults	Department of Social and Behavioural Sciences	Professor Ben LI Kin-kit Professor Dannii YEUNG
Certificate of Merit		
AI for Farmers: A Speech Dialogue App for Pesticide Safe Use	Department of Media and Communication	Professor LIU Xiaofan
Urban Graduation Approach to Uplift Poor Households out of Poverty	Department of Social and Behavioural Sciences	Professor CHAN Siu-ming

3. Striving for Excellence in Research and University–Industry Collaboration

3.1 Institute of Digital Medicine: Shaping the Future of Healthcare

As the first local university to adopt and implement the pioneering "One Health" concept, CityUHK is uniquely positioned to lead in this area. In April 2024, the University announced the establishment of an Institute of Digital Medicine (IDM) that aims to find digital health solutions for the betterment of society. In collaboration with renowned universities and medical schools around the world, as well as clinical and industry partners and health tech investors, the IDM will utilise our research strengths in engineering, data science and life science to develop innovative technologies to support doctors and explore digital health solutions for the long-term benefit of patients.

The IDM will focus on cell and gene therapy, bioinformatics, biomedical engineering, advanced therapies and clinical trials, with the ultimate goal of generating a positive societal impact through innovative solutions. The plan is to explore opportunities for collaborative research and development as well as the transformation and commercialisation of cutting-edge technology in life sciences. By empowering doctors with advanced technologies and exploring the long-term benefits of digital health solutions for patients, CityUHK is solidifying its commitment to shaping the future of healthcare.

3.2 RAISe+ Scheme

Five CityUHK research projects in areas as diverse as biomedical sciences, material sciences, big data, energy, and the environment were granted funds through the Research, Academic, and Industry Sectors One-plus Scheme (RAISe+). The scheme was launched by the HKSAR Government's Innovation and Technology Commission in October 2023, aiming to unleash the potential of local universities to transform and commercialise R&D outcomes and facilitate collaboration among the government, industry, university, and research sectors.

The five funded projects are as follows:

	Project Title	**Person-in-Charge**
1	*Revolutionising Climate Resilience: A Universal Solution via Next-Generation Radiative Cooling Technologies for a Greener Community*	Professor Chi-yan TSO
2	*Research and Development of Federated Learning Technology with Research Knowledge Graphs and Large Language Models for the Digital Transformation of Science, Technology and Innovation Services*	Professor Jian MA
3	*Microfluidics-Based Detection Platform for Circulating Tumour Cells and its Applications in Cancer Early Screening and Disease Monitoring*	Professor Michael Mengsu YANG
4	*Commercialisation of Pulse Hollow Cone Hybrid TEM/SEM*	Professor Fu-rong CHEN
5	*Scalable Production of Next-Generation High-Performance Printable Solar Cells*	Professor Alex Kwan-yue JEN

This remarkable achievement showcases CityUHK's commitment to fostering high-quality research and innovation, as well as its efforts to transform scientific breakthroughs into practical applications that generate both commercial and social value.

3.3 InnoHK World-class Research Clusters

Over the past three years, the three InnoHK research centres established under CityUHK have consistently demonstrated excellence in their research, commercialisation, and knowledge transfer endeavours. These remarkable centres have not only upheld their strong foundations but have also propelled innovation forward, leaving a notable and tangible impact.

The Hong Kong Centre for Cerebro-Cardiovascular Health Engineering (COCHE) has deepened its industry collaborations, further enhancing its work on commercialisation. The centre has established a strategic partnership with VTech Communication Limited, one of the world's leading electronic manufacturing service providers, for contract manufacturing services. This collaboration signifies the joint effort of COCHE and VTech to advance the research and development of innovative technologies and solutions in the field of cerebro-cardiovascular health, driving the innovation of medical device technology. COCHE has also established a strong partnership with Yan Chai Hospital Board (YCHB) to deploy its technologies in novel medical applications within YCHB's facilities.

The Laboratory for AI-powered Financial Technology (AIFT) has continued to strengthen its collaboration with Bank of China (Hong Kong) Limited (BOCHK) and reached further consensus on new collaborative directions in AI and FinTech. AIFT has introduced newly developed structural risk control models and FinTech application technologies. AIFT has also shown how cutting-edge AI models can bridge the gap in credit assessment for small and medium-sized enterprises (SMEs), addressing the existing shortfall in financing services for SMEs.

The Centre for Intelligent Multidimensional Data Analysis (CIMDA) has expanded its latest AI-based technologies into a wider range of applications. CIMDA has been invited by several local schools to deploy their sports data analysis systems, including the Auto Runner Tracker for Physical Education and Simultaneous Large Class Assessment for Sports Activities, at their sports events. CIMDA also showcased its latest AI-based innovation in gerontechnology, CIMDA Care, a one-stop elderly-assisting system that provides help with daily living for elderly people, at Golden Age Expo and Summit 2023. These advancements and applications of technologies demonstrate how CIMDA is taking further steps towards commercialisation.

4. Deepening Research Collaboration and Knowledge Transfer on the Mainland

In April 2024, CityUHK obtained official approval from the Ministry of Education for the establishment of City University of Hong Kong (Dongguan). Situated in the Songshan Lake High-Tech Industrial Development Zone (Science City), a state-level, comprehensive high-tech industrial development zone, CityUHK (Dongguan) is poised to become another hub for industry–academia research collaboration on the mainland, in addition to the CityU Shenzhen Research Institute, CityU Shenzhen Futian Research Institute and CityU Chengdu Research Institute. CityUHK (Dongguan) will concentrate on fields such as computer science, AI and data science, high-end electronic communications, biomedical engineering, intelligent manufacturing, advanced materials, new energy, civil and architectural engineering, and the digital economy.

5. Impact Cases

CityUHK is dedicated to advancing sustainability through innovation and research, thereby making a positive impact on society and the world. Below are some examples of our concerted efforts that are playing an important role in addressing global issues and achieving sustainable development.

5.1 Electricity-free Cooling Technology

Global warming has led to hotter, longer, and more frequent heatwaves. To combat sweltering heat, especially during hot and humid summers, people resort to running air conditioners all day, which poses a significant financial burden, particularly for the underprivileged. The increased energy consumption also contributes to a vicious cycle of increased heat and greenhouse gas emissions. To tackle this global issue, CityUHK's researchers and students from the School of Energy and Environment established the start-up company i^{2}Cool Ltd. They commercialised Professor Tso Chi-yan's breakthrough technology of a zero-energy, low-cost, and highly efficient passive radiative cooling paint that saves energy and reduces the carbon emissions from buildings.

Inspired by the surface hair structure of ants in the Sahara Desert, the innovative radiative paint reflects most sunlight and dissipates a building's heat as mid-infrared radiation when applied to exterior walls. This results in a significant decrease in indoor temperatures. Building on this passive radiative cooling technology, i^{2}Cool Ltd has developed novel daytime passive radiative cooling (DPRC) materials for building envelopes, including coloured DPRC paints (iPaint) and ceramic tiles (iCeramic) for roofs and walls, as well as transparent DPRC films (iFilm) for windows. DPRC paint for vehicles (iPaint-Auto) and DPRC textiles (iTextile) for personal thermal comfort have also been developed for wider applications.

With over 130 implemented projects worldwide, iPaint has been applied to a total area of 91,244 square metres, leading to savings of over 1.65 million kWh of energy and a reduction of nearly 1.5 million kg in carbon emissions. The DPRC materials from i^{2}Cool Ltd not only contribute to energy conservation but also bring environmental and social benefits. They create better indoor living conditions, mitigate urban heat effects, and combat global warming.

In a community service initiative in Sham Shui Po, in collaboration with the Lee Hysan Foundation, DPRC materials were applied to coat the rooftops of subdivided units across nine buildings, covering an area of approximately 2,000 square metres. After the application of these materials, each household reported monthly electricity bill savings of HK$100–200, thereby reducing living costs and significantly enhancing quality of life during the summer. This initiative has provided relief to around 100 low-income families by reducing their individual electricity expenses and improving their comfort. Thus, in addition to energy conservation, the project is improving indoor comfort for low-income residents, mitigating the urban heat island effect, and contributing to a more sustainable environment, showcasing i^{2}Cool's commitment to sustainability and social responsibility.

In the second TERA-Award Smart Energy Innovation Competition (2023) co-organised by the Hong Kong and China Gas Company Limited and the State Power Investment Corporation Limited, i^{2}Cool won the Gold Award for their electricity-free cooling technology, receiving a prize of US$1 million.

iPaint	iFilm	iCeramic
		

iPaint-Auto	iTextile
	

Applications:

Huashang College	Dubai Mall - Emaar	Citi Tower	Crowne Plaza
			

Sham Shui Po Community Services



5.2 Breakthroughs in Adapting Perovskite Solar Cells for Renewable Energy

Perovskite solar cells, known for their impressive power conversion efficiency, are a promising frontier in the solar energy landscape. However, their thermal instability has been a significant drawback, affecting their performance under high temperatures. Professor Zhu Zonglong from the Department of Chemistry, in collaboration with Huazhong University of Science and Technology, engineered a unique self-assembled monolayer and anchored it on a nickel oxide nanoparticle surface as a charge extraction layer. This breakthrough dramatically enhances the thermal robustness of the cells, enabling them to retain over 90% of their efficiency even after operating at high temperatures (around 65 °C) for more than 1,000 hours. This accomplishment addresses a major obstacle that previously hindered the wider adoption of perovskite solar cells. The findings have the potential to broaden the utilisation of these cells, expanding their application to environments and climates where high temperatures were previously a barrier to their use. Once fully commercialised, this technology could help decrease our dependence on fossil fuels and make a substantial contribution to combating the global climate crisis.

5.3 Breakthrough in Highly Efficient Electrocatalyst for Clean Energy

Professor Zhang Hua, Herman Hu Chair Professor of Nanomaterials, and his research team have achieved a ground-breaking advancement in nanomaterials by developing a highly efficient electrocatalyst that significantly enhances hydrogen generation through electrochemical water splitting. This breakthrough has immense potential for the clean energy industry. The research team

developed the electrocatalyst using transition-metal dichalcogenide nanosheets with unconventional crystal phases as supports. The electrocatalyst exhibits superior activity and excellent stability in the electrocatalytic hydrogen evolution reaction in acidic media. This research finding is significant because hydrogen generated through electrochemical water splitting is considered one of the most promising clean energy sources to replace fossil fuels in the near future, reducing environmental pollution and the greenhouse effect.

5.4 Zero-Emission Droplet-Based Nanogenerator to Harvest Water, Electricity and Nutrients from the Air

CityUHK's research project titled "Zero-Emission Droplet-Based Nanogenerator to Harvest Water, Electricity and Nutrients from the Air" addresses the current crises in freshwater supply, electricity production and nutrient shortages. The project was selected the Research Project of the Year: STEM at the Times Higher Education (THE) Awards Asia 2024. CityUHK was the only university in Hong Kong to win this prestigious award this year.

The project focuses on developing an integrated system combining a nature-inspired fog-based water harvester and a nutrient producer to harvest three life-essential resources from the air in response to the global crises of freshwater and nutrient/energy production shortages. To tackle the freshwater shortages and provide green power and nutrients, the technology can produce a high fog-to-energy/nutrient conversion rate, providing a sustainable, stable, low-cost, portable and eco-friendly nutrient supply solution and helping tackle the freshwater crisis.

5.5 Highly Sensitive Plasmonic Sensors for Early Disease Screening and Cancer Diagnosis

Health is a major global issue affecting everyone. Professor Stella W. Pang, Chair Professor of Electrical Engineering, has made significant contributions to early disease detection and diagnosis with her breakthrough invention, a highly sensitive plasmonic biosensor. This engineered platform features an array of plasmonic sensors on a microfluidic chip for detecting cells and biomolecules. What sets this innovation apart is the inclusion of a separator positioned atop the biosensors, enabling the detection for the first time of nanometre-sized filopodia separated from micrometre-sized cell bodies. This compact system is designed for point-of-care applications and operates in a user-friendly manner, eliminating the need for medical personnel. With its highly sensitive biosensors, this technology enables the unique detection of nanometre-sized biomolecules and cell membrane protrusions.

The invention gained widespread recognition at the 49th International Exhibition of Inventions Geneva, receiving two prestigious awards: a Special Prize for the Best International Invention and a Gold Medal with Congratulations of the Jury. These accolades highlight the significant impact of Professor Pang's research and its potential to revolutionise the field of early disease detection and diagnosis.

Appendix 1

Summary of Knowledge Transfer Performance Indicators

(Amounts are in Hong Kong dollars)

Performance Indicators	2023/24
[1]Intellectual Property (IP)	
No. of patents filed	328
No. of patents granted	116
IP Licensing	
No. of newly signed and ongoing licensing agreements (exclusive of evaluation licence agreements)	New: 24 / Ongoing: 70
Industry Engagement	
[2]No. of collaborative research projects and income thereby generated (inclusive of ongoing and new projects)	93 / $35.8M
[2]No. of contract research projects (other than those included in "collaborative researches" above), and income thereby generated (inclusive of ongoing and new projects)	205 / $170.6M
No. of consultancies, and income thereby generated	59 / $9.1M
Continuing Professional Development (CPD) courses	
Income received from and number of attendees of CPD courses (inclusive of professional doctorate programmes and taught postgraduate programmes except for PCLL)	$1,298M / 10,729
Community Engagement	
No. of public lectures/symposiums/exhibitions and speeches to a community audience organised/co-organised by CityUHK (seminars and workshops are included)	274
No. of performances and exhibitions of creative works (by staff or students) organised/co-organised by CityUHK	19
No. of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies	381

[1] The reported figures include the patents of the University's mainland research set-ups. The figures are updated as of December 2024.

[2] Research projects of the University's mainland research set-ups are included. The reported income represents the funds received during the year. Typically, funding for a research project is disbursed in instalments.

Performance Indicators	2023/24
Entrepreneurship	
[3]Number of start-ups/projects (championed by our students/alumni/staff, inclusive of those championed by non-CityUHK members but using CityUHK IP) which have received CityUHK entrepreneurial funding/investment support	197

[3] The figure is derived from the summation of the number of recipients under different entrepreneurial funding and investment schemes of the University during the reporting period.