Annual Report on Knowledge Transfer for 2018-2019

To University Grants Committee



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Executive Summary

Recurrent funding for knowledge transfer (KT) has been provided by the University Grants Committee since 2009 to build up universities' capability in KT. The funding triennium 2016-19 ended with significant progress in many aspects of KT in City University of Hong Kong (CityU).

First and foremost is the steady improvement in licensing activities as evidenced in its soaring average licensing incomes. The average annual licensing incomes jumped over 150% from HK\$2.81m in triennium 2012-15 to HK\$7.08m in triennium 2016-19. On the market development side, CityU has expanded its reach into inland market in particular the Greater Bay Areas, establishing new relationships with inland government agencies.

In the last three years in a row, CityU was ranked among the top 100 universities worldwide and topped in Hong Kong for receiving the most number of granted patents by US Patent and Trademark Office.

With increasing awareness of KT in the non-science/non-engineering disciplines, more KT activities were witnessed in the College of Business and College of Liberal Arts and Social Sciences. Two impact cases are cited from these two disciplines. Besides, KT in the Jockey Club College of Veterinary Medicine and Life Sciences is flourishing as evidenced in one of the impact cases provided in this report.

Lastly, active entrepreneurial activities were on-going in CityU. Apart from the continuation of our effort to promote the three funding schemes seamlessly designed for the early, mid-, and late stages of startup lifecycle, we further strengthened our innovation and entrepreneurship ecosystem. Our students shone at national and local innovation and startup competitions, winning top awards and startup funding.

1. Fostering Technology Transfer

1.1 Technology Licensing Results

With increasing importance in research commercialization, City University of Hong Kong (CityU) has stepped up efforts in forging this area of work and promising results have been witnessed. In the past triennium starting 2016-17, technology licensing has earned the University licensing incomes totalling HK\$21.23m on cash basis, equivalent to HK\$7.08m per year on average. Five new licensing agreements were signed in 2018-19, making the total number of active licensing agreements standing at 41.

The table below summarizes the five licensing agreements newly signed.

	Technologies Licensed	Nature of Business of Licensee	Where the Licensee is Based
1	Biotechnology	Biotechnology	Hong Kong
2	Biotechnology	Biotechnology	Hong Kong
3	Guided-wave-based inspection	Environment	Hong Kong
4	Power electronics	Construction and engineering	Hong Kong
5	Biotechnology	Biomedical	Mainland

1.2 Forming Strategic Partnership with Leading Universities for Technology Transfer in the Mainland and Expanding Capacity of Innovations under Management

Since 2014, CityU has been placing increasing emphasis on establishing strategic partnership with licensing offices of leading universities abroad. Leveraging on the strengths of Hong Kong being a technology and knowledge hub between East and West, CityU proactively formed strategic partnership with Stanford University, Cedars-Sinai Medical Center, Arizona State University and Louisiana State University in the US, McMaster University in Canada, King Abdullah University of Science and Technology in Saudi Arabia and Shanghai University in the Mainland. Such partnerships enable us to pool together state-of-the-art technologies from CityU as well as its partners for the vast market in the Mainland. Likewise, these strategic partners also help us identify licensing opportunities in their home countries for win-win collaboration.

To expand our marketing reach for the growing innovations under CityU's management, we have successfully created a comprehensive network of technology transfer platforms covering strategic locations for synergistic effect. These places include Shenzhen, Yangzhou, Nanjing, Suzhou, Hangzhou, Changzhou, Shanghai, and Beijing. In recent years, our focus also extended to the Greater Bay Areas especially Zhaoqing, Zhuhai, Foshan, and Dongguan.

1.3 Developing Partnership and Collaboration

CityU signed a collaborative agreement with Changsha Municipal People's Government in strengthening communication on collaboration between the two parties, promoting the establishment of the Changsha–Hong Kong–Macau Innovation Entrepreneurship Industrial Park, setting up new research and technology organisations, enhancing technology and knowledge transfer, and nurturing talent for innovation and entrepreneurship.

CityU also formed strategic partnership with Orbbec Co. Ltd. (Orbbec), a high-tech enterprise specialising in 3D sensing technology founded by an alumnus of CityU. Orbbec was included in the 2017 China Unicorn Enterprise Development Report compiled by the Ministry of Science and Technology. Orbbec will provide internship opportunities to CityU students studying in 3D sensing related curriculum and setting up Orbbec scholarship for outstanding students studying in these fields. CityU and Orbbec will also further explore other collaboration opportunities.

In July 2018, a delegation from Hong Kong Federation of Innovative Technologies and Manufacturing Industries (FITMI) spent one day at CityU, visiting university, college and departmental laboratories and meeting with our faculty members and researchers to explore collaboration opportunities. The Delegation consisted of 65 senior executives from various associations and industries including machinery, metal, electro-plating, electrical appliances, jewellery, vehicle, biological technology, footwear and healthy water technology, etc.

Besides, CityU also received delegations from the Chinese Academy of Sciences, Tsinghua University, Beijing Institute of Collaborative Innovation, Beijing Municipal Science & Technology Commission, Hong Kong and Macao Liaison Office of Beijing Leading Group for Talented Professionals, National Chung Hsing University and The Don State Technical University from Russia for exchange on technology transfer/entrepreneurship and possible collaboration.

1.4 Strengthening IP Management

The University has in place a well-established administrative framework and policy protecting the intellectual property generated from research activities. After a stringent vetting process, inventions of high commercialization value are pursued for patent filing. In the year under review, 94 new patent applications were filed in Hong Kong, Japan, US and Mainland in various fields of technologies with 45 patents granted during the same period. By June 2019, there are 439 patents granted with a further 421 patents pending.

After years of cultivation, our patenting work begins to bear fruits. With 38 US patents granted in calendar year 2018, CityU ranked 63rd in The Top 100 Worldwide Universities Granted US Utility Patents, and topped in Hong Kong in the last three years in a row for receiving the most number of US utility patents. We will make our best effort to sustain this leading position and continue to excel in this area.

In August 2018, CityU joined hands with the HKSAR Intellectual Property Department, Hong Kong Polytechnic University and the Association of University Technology Managers (AUTM) to provide IP management and commercialization training to the Hong Kong technology transfer community. Seasoned practitioners from overseas were invited to speak on the fundamental goals and processes of academic technology transfer, licensing and technology valuation. The 3-day training course was very well-received and attracted an average attendance of 110 participants per day.

1.5 Outreach

Through the CityU Business and Industrial Club (CUBIC), CityU has forged close ties with senior business executives and industrialists. CUBIC regularly organises events (e.g. Emerging Technologies Forums (ETFs), Special Interest Group gatherings, etc.) for its members, and aligns industrialists and academics from the University and other institutions to build a platform to advance technological development and promote cross-institution collaboration. In 2018-19, the membership of CUBIC has grown from 1,690 to 1,749, at an annual increase rate of 3.5%. The number of inland CUBIC members has also increased by an annual rate of 8.7% from 393 to 427 during the same period.

The flagship technology transfer and relationship building events run by CUBIC during the year included:

• Trip to Dongguan (24 August 2018) CUBIC organised a day trip to Dongguan to have exchanges with hi-tech industries. Seventeen CUBIC members joined the trip and found it rewarding. The participants attended a seminar hosted by the Association of Hi-Tech Industries (高新技術產業協會) and visited Tianan Cyber Park (天安數碼城). They learned a lot about the hi-tech landscape in Dongguan.

- Forum on "Innovation and Development in the Greater Bay Area (GBA)" (30 November 2018) The Chief Engineer from the Zhuhai Science and Technology Industrialization Information Bureau (珠海市科技和工業信息化局) and a senior executive with profound experience in the development of hi-tech ventures in Silicon Valley were invited to speak at the forum to share their vision in GBA development. The forum was well-received by 50 academics and senior business executives from local and mainland. There was fruitful exchange among the participants and speakers.
- Emerging Technologies Forum on RFID (3 May 2019)
 - In cooperation with CityU's Department of Electronic Engineering and the RFID General Chamber of Commerce in Hong Kong, the forum invited a guest speaker from a leading jewellery chain store in Hong Kong to share his smart retail journey on application of RFID while another internal speaker demonstrated how RFID could play an important role in 5G development.

Like previous years, CityU continued to participate actively in technology transfer or innovation exhibitions locally and overseas (e.g. Taiwan Automation Intelligence and Robot Show in Taipei, electronica China in Shanghai, TechInnovation Singapore, China Hi-Tech Fair in Shenzhen and InnoCarnival in Hong Kong) to showcase our latest inventions for commercialization and expand our client base.

In April 2019, CityU participated in the International Exhibition of Inventions of Geneva held in Switzerland. Four cutting-edge technologies on bioscience/materials science were showcased, all brought home distinguished awards including two Gold Medals and two Silver Medals. The winning projects were:

Gold Medals:

- Point of Care Devices from Food Safety to Non-Invasive Early Cancer Detection
- Microfluidics Array Technology with Nano-Amplification for Drug Screening and Molecular Diagnosis

Silver Medals:

- Structural Morphing Enabled Underwater Quality Monitoring System
- Origami and 4D Printing of Ceramic Structures

The Exhibition is one of the signature events in the technology world and showcases innovations and inventions from around the globe.

2. Broadening Knowledge Transfer beyond Science and Engineering Disciplines

2.1 Knowledge Transfer Award for Non-technology Disciplines

To broaden KT beyond science and engineering disciplines, funding has been provided since 2011 to support quality KT initiatives proposed by non-science Colleges/School, including the College of Liberal Arts and Social Sciences, College of Business and School of Law. Every year, each College/School holds an internal competition to prioritise the applications before submitting the proposals to the Knowledge Transfer Office. Seven projects were approved in this reporting year to receive up to HK\$0.2m each as below:

• "EnGenius" – Designing and Implementing a Game-based Language Acquisition and Evaluation Package for Hong Kong Primary School Students

- Promoting Codification of Cantonese through Jyutping and Terminology Standardization
- My Citizens Panel: Citizen Satisfaction
- Empowering the Nepalese Youth in Hong Kong through Engaged Anthropology and Ethnography-writing
- A Study to Examine the Successful Elements in Voluntary Drug Treatment and Rehabilitation Programmes
- Emotion Regulation Intervention among Newly Arrived Parents from Mainland China and Cross-border Parents in Shenzhen: An Evidence-based Approach
- Challenges and Opportunities in Transforming Social Enterprises from Starting Up to Scaling Up: an Analysis of Hong Kong Social Enterprises with Policy Implications to Support the Growth of the Sector

2.2 Recognition of Excellence in Knowledge Transfer

To encourage KT and nurture a KT culture in non-science disciplines, Excellence in Knowledge Transfer Awards was launched since 2011. The Awards give recognition to faculty members in the College of Liberal Arts and Social Sciences (CLASS) who have made outstanding achievement in applying their knowledge for creating high social impacts. The 2018-19 Excellence in Knowledge Transfer Awards went to:

Project Title	Department	Recipient					
Excellence in Knowledge Transfer Award							
Develop the Ten-year Rehabilitation Programme Plan for Macau 2016-2025	Department of Social and Behavioural Sciences	Professor Lo Tit Wing					
Certificate of Merit							
Working in Partnership with Social Work Students to Promote Service Users' Perspective on the Qualities of Social Workers	Department of Social and Behavioural Sciences	Dr. Kam Ping Kwong					
Computer-Assisted Conversation Analysis	Department of Linguistics and Translation	Dr. Lee John Sie Yuen					

CLASS also launched the Research Impact Award in 2018-19 to honour high quality impact case studies by five faculty members: Professor Zhu Jian Hua Jonathan (Department of Media and Communication), Dr. Christoph Hafner (Department of English), Professor Li Che Lan Linda (Department of Public Policy), Professor Yep Kin Man Ray (Department of Public Policy) and Dr. Fung Lai Chu Annis (Department of Social and Behavioural Sciences).

3. Upholding Research Excellence

3.1 Contract and Collaborative Research

Part of CityU's mission is to anticipate and respond to the needs of industry, commerce and the community by engaging in applied research with its results used for direct benefit to Hong Kong and beyond. The University continues to maintain its close ties with local and overseas industries through various forms of collaboration including contract research. In the year under review, 104 contract, ITF and collaborative research projects totalling HK\$142m were approved by government, industry and other organisations. Highlights of some contract research projects are development of materials or systems in a wide spectrum of disciplines as set out below:

- Improving Pig/ Poultry Health and Production in Hong Kong
- The Development of Upconversion-based Wireless Optogenetics as an All-optical Therapeutic Strategy to Study and Treat Parkinson's Disease
- Investigating the Use of Nanobubble Technology in Aquaculture
- Developing Sustainable Organic Fertilisers for Crop Yield Maximisation in Outdoor and Indoor Plant Factories
- Engineering Analysis of Railway Materials and Structure
- Mobile Storage Optimisation
- Caregiver Support Model & Psycho-education Program on Empowerment: Development and Validation
- Single-use Plastics Reduction in Hong Kong: Promoting Environmentally Sustainable Behaviours through Public Engagement Campaigns

3.2 Research Breakthroughs

Noteworthy to report here are some of our research breakthroughs.

Professor Jian Lu, Vice-President (Research & Technology), and his research team have invented novel "ceramic inks" and developed the world's first-ever 4D printing for ceramics. This technology combines 3D printing, self-shaping assembly, and elastomer-derived ceramics. Breakthroughs have been achieved in building large-scale ceramic structures, including the geometrical complexity, mechanical property, cost-efficiency, and shape-morphing capability, which could turn a new page in the structural application of ceramics. With the arrival of 5G networks and wireless charging, ceramics will play a more important role in the manufacture of 3C products, such as cellphone and watch back plate. The artistic nature of ceramics also provides the potential for the design of decoration arts.

In the area of biomedical science, CityU has discovered a shortcut for developing new drugs which can potentially reduce time and costs by sorting out high potential candidates out of a long list of chemical compounds, with an accuracy of around 50%. This breakthrough in neuropharmacology came following five years of collaborated research by CityU's Department of Biomedical Engineering and Department of Biomedical Sciences, and Harvard Medical School. The research was published in the scientific journal *Nature Communications* and titled "High-throughput Brain Activity Mapping and Machine Learning as a Foundation for Systems Neuropharmacology". The research, led by Dr. Shi Peng, provides a platform to predict compounds that have the potential to be developed into new drugs to treat brain diseases. It can help speed up the new drug discovery process and save costs. Even a 1% increase in the drug development success rate would make a huge difference for central nervous system disorder patients.

4. Expanding Research Platform and Technology Transfer to the Mainland

4.1 CityU Shenzhen Research Institute

Mainland research development continued to fare well in 2018-19. A total of 58 new research projects were obtained via the research platform in Shenzhen, CityU Shenzhen Research Institute (CityUSRI), including 29 projects funded by the National Natural Science Foundation of China (NSFC), 21 funded by the Shenzhen Science, Technology and Innovation Commission, and two funded by the Shenzhen Philosophy and Social Science Office. Moreover, two contract projects were successfully collaborated with the Chinese Academy of Sciences and Liaocheng University with a total contract value of RMB1.47m.

	2016-17	2017-18	2018-19
Number of active research	264	213	265
projects			
Total grants of the active research	RMB185.43m	RMB187.15m	RMB212.36m
projects			

During this period, NSFC has funded altogether 29 research projects with RMB18.04m, locating CityU firmly among the top local universities in terms of number of projects received from NSFC and the total amount of grants has increased by RMB2.67m. The number of approved general programs was also the highest among all research institutes set up in Shenzhen by universities in Hong Kong.

Outstanding new projects:

- Dr. Zhang Xiaoling, Associate Professor in the Department of Public Policy, obtained RMB2.80m in funding from NSFC for her Key Programme "Transitional Development and Governance of Small Towns in China". This is the first time that CityUSRI obtained funding under the Key Programme of NSFC.
- Dr. Shuaicheng Li, Associate Professor in the Department of Computer Science has a technical cooperation with Liaocheng University with multi-omics genomic sequencing data, including the Texas genome assembled by Next Generation Sequencing technique and Third Generation Sequencing technique, Hi-C technology, transcriptome data of more than 70 samples from 17 organisations. The project will perform bioinformatics and computational analysis to illustrate the DNA data in multiple views.

4.2 City University of Hong Kong Chengdu Research Institute

City University of Hong Kong Chengdu Research Institute (CityUCRI) continues to play the role as the second strategic platform of the University after Shenzhen for research and development, incubation and innovation, as well as professional education and training.

Research activity at CityUCRI is gaining momentum and five research projects are ongoing.

5. Nurturing Inno-preneurship Ecosystem

5.1 Funding Schemes to Provide Seamless Financial Support at all Stages of Innovation and Entrepreneurship

To support different stages of discovery and innovation, three funding schemes are in place.

- a. Student Early Entrepreneurship Development Scheme (SEEDS) supports early-stage idea validation, feasibility and marketing studies on a project basis. In the fourth round of application, 29 student teams submitted applications, five of which eventually beat out others to win a maximum funding of HK\$200,000 per team. Since its launch in late 2015, SEEDS has granted funding support of around HK\$4.3m to 24 student teams.
- b. Technology Start-up Support Scheme for Universities (TSSSU), helps commercialising business ideas at pre-seed start-up stage, moved into its sixth year of operation. Thirty-three applications were received in the 2019-20 round of application. Fifteen teams were selected to receive a total funding of HK\$8m. After six rounds of application since 2014, TSSSU has granted funding support totaling HK\$28m to 40 startups.

c. CityUE Investment Fund, a venture-capital-style investment fund, is in place to support CityU spinoff companies in exchange for stock ownership. No funding investment was made during the reporting period.

5.2 Incubation Programmes

There are in place three incubation programmes at CityU supporting different stages of development of CityU innovators/entrepreneurs. In collaboration with the Hong Kong Science and Technology Parks Corporation (HKSTP) are the CityU-HKSTP Pre-Incubation and Incubation Programmes, both are housed at Lion Rock 72 at the InnoCentre next to our campus. Teams under the Joint Incubation Programme can also enjoy the facilities and benefits of HKSTP's own incubation programme at Science Park in Shatin. Ten CityU teams have joined the CityU-HKSTP Pre-Incubation Programme while six teams have received conditional offer proceeding to the Incubation Programme. We also run our own incubation centre which is housed in the library on campus.

Across the border in the CityUSRI Building, the University's research and professional education establishment in Shenzhen, Innovation Commons (Shenzhen) (香港城市大學創新創業中心(深圳)) has been set up to serve as additional incubator for technology startups of our students, staff members and alumni. Twenty-four projects in areas of artificial intelligence, pharmaceutical & biology, internet and IoT are under incubation, of which seven successfully raised funding and five received government grants.

5.3 Innovation and Startup Competitions

In the annual flagship event Cyberport University Partnership Programme (CUPP), four student teams of CityU, namely "ADT", "Chum Pool", "FinCity" and "Vertex", won the competition and received a seed funding of HK\$100,000 each and incubation support from Cyberport. The programme offered a unique opportunity for participants to gain insights into the global market, and receive top-notch training through company visits, a week-long entrepreneurship boot camp at University of Chicago Booth – School of Business, plus intensive pre-camp nurturing sessions and mentorship in Hong Kong.

Chuang Qing Chun (「創青春」) is a National Entrepreneurship Competition held in China. Three teams of CityU students joined the 2018 competition held in Hangzhou in November and brought home three Silver Awards in the categories of Start-up Business Plan and Entrepreneurial Practice respectively.

Our students also shone in overseas startup competitions. In "iCAN" held in September 2018 in Canada, our student clinched a Gold Medal and a SPECIAL PRIZE for his project entitled "Intelligent Glasses for Parkinson's Disease Patients with Safety Feedback System" which helps to improve the safety of people with Parkinson's disease when they walk.

During the reporting period, CityU co-organised with HKSTP, the Hong Kong Polytechnic University and Hong Kong Baptist University a pitching competition known as the Hong Kong Techathon. One hundred and twenty-four CityU members (including students and alumni), out of a total of 388 registrants, participated in the competition to pitch for seed funding and incubation support. Four themes were set to seek innovative tech-enabled solutions from participants, namely Education/Social Technology, Fintech, Medical/Healthcare Technology, and Smart City, respectively. The programme comprised a three-day pre-event meet-up and seminars, and a three-day intensive camp where the participants formed their teams, developed their business ideas and did their pitching to have a taste of entrepreneurship. The judges were impressed by the creativity of the teams, and we're proud to report that three out of the four winning teams involved CityU members.

5.4 Innovation/Entrepreneurship (I/E) Support

The Office of Education and Gateway Education (EDGE) of the University provides support to our students on I/E learning. Forty class visits involving over 1,800 undergraduate and nearly 1,000 postgraduate students were conducted in 2018-19 to draw students' awareness of intellectual property (IP) via a 5-minute video clip. In addition, EDGE also provided flexible learning opportunity for students to learn the concept of IP via an online course. To stimulate and nurture entrepreneurship among our students, EDGE collaborated with HKSTP to offer "Getting Started with Startups" series, in the form of combining seminars with experiential learning activities. EDGE also held the Re-explore Workshop Series to allow students learn and apply design thinking skills under coaching by startup founders. In addition, face-to-face coaching services and maker space were provided for students to realize their innovative ideas.

To promote I/E and build up an entrepreneurial culture on campus, a week-long IC/entrepreneurship promotion event entitled "Celebration of Innovations" was held from 15 to 19 October 2018. The university-wide promotion campaign attracted over 600 students from different Colleges/Schools.

A mentoring scheme is in place whereby business leaders and professionals, some of whom are CityU alumni, provide guidance and advice to our young entrepreneurs on their long journey to successful enterprising through regular mentor-mentee meet-ups.

Apart from the above, funding support will be provided to our students for participation in startup competitions overseas and patent application.

In November 2018, CityU co-organised a Startup Entrepreneurship Tour to Taipei with the Hong Kong Polytechnic University and HKSTP. Six teams from CityU joined the tour which was an eye-opening experience to our students. Not only did they visit the largest startup festival in Asia—2018 Meet Taipei Startup Festival, they also visited the startup incubators/accelerators in Taiwan including the Taiwan Tech Arena (TTA), Taiwan Startup Stadium (TSS), AppWorks and iiiNNO. It was an enlightening and rewarding trip for the students.

6. Impact Cases

6.1 Breakthrough for Drug Delivery

RNA-based therapeutics have generated significant attention in recent years due to their potential to treat a variety of chronic and rare diseases, and address targets that have proven to be intractable to antibody and small-molecule approaches. Drs. Minh Le and Jiahai Shi in the Department of Biomedical Sciences under the Jockey Club College of Veterinary Medicine and Life Sciences have successfully developed a novel delivery platform for RNA-based drugs using red blood cell extracellular vesicles (RBCEVs) which can efficiently deliver both small and large RNAs to solid and liquid tumours; hence overcoming one of the major challenges of RNA-based therapeutics of delivering fragile RNA molecules. CityU's RBCEVs platform features exceptional merits over conventional RNA delivery methods in biosafety, biocompatibility, efficiency, accessibility, and cost effectiveness. This technology has been licensed to a biotechnology startup with first-round VC funding support. The promising startup is attracting further investment from various ventures and is preparing for its establishment in Boston, the hub of global biotechnology.

Emerging RNA-based therapeutics can be used for a wide array of druggable targets, which are difficult to achieve by conventional therapies, with high specificity and great versatility. The advantages of RNA-based therapeutics boost the translation into various clinical applications, from repairing genetic disorders, fighting against cancers to silencing virus replication. However, there

currently exist two major challenges in RNA-based therapeutics: instability of RNA drugs in physiological environment and difficulty in delivery of RNA drugs. The former can be resolved by chemical modifications to enhance the stability with many reached clinical trials, whereas the delivery remains complicated. Delivery via viruses and/or lipid-based nanoparticles/reagents is suboptimal due to cytotoxicity, immunogenicity, and uncertainty in biosafety. Hence, the CityU research team loaded a variety of RNA-based therapeutics into RBCEVs, used the powerful RBCEVs delivery platform to treat both solid and liquid tumours and observed impressive efficacies. Cancer cells could uptake RNA-loaded RBCEVs easily at high efficiency and low toxicity as compared to commercial transfection reagents. They have also developed specific targeting of RBCEVs, which can be achieved by conjugating antibodies or peptides to RBCEVs with the capacity to bind to their target cancer cells specifically. The targeted delivery of RBCEVs will not only enhance the efficacy of RNA drugs, but also significantly reduce side effects on normal tissues, thus weaponizing RBCEVs to cope with various diseases.

6.2 Portable Histamine Analyzer for Detection of Food Contamination

Biogenic amines, e.g. histamine, occur in many different foods. At high concentrations, they are risk factors for food intoxication, whereas moderate levels may lead to food intolerance. About 1% of the global population suffers from biogenic amines intolerance. Besides spoiled foodstuffs, especially fermented foods tend to contain elevated levels of biogenic amines. The existence of biogenic amines is one of the indicators of food decay. To address the above problem, a cheap and easy-to-use dietary histamine detector has been developed by Dr. Roy Vallaisamy from the Department of Materials Science and Engineering and Professor Michael Lam from the Department of Chemistry. The innovative device will improve the safety and overall health of millions of people worldwide and bring positive impact on the food and catering industries.

Conventional tests for biogenic amines take about one day in a laboratory, and most people do not have access to affordable onsite testing devices. The new device developed by CityU is portable and reliable which can detect contaminants in food with concentrations of less than 0.2ppm. It contains a nanosensor that prescreens food samples on the spot using a mobile phone, and identifies the presence of biogenic amines and formaldehyde in 10 to 25 minutes. The research team went a step further by modifying the device to detect cancer biomarkers, such as conducting non-invasive urine tests to screen for prostate cancer biomarkers.

Funding of RMB20m has been obtained from the government and industry to support the above research. A spin-off company was formed with a technology license granted by the University. The technology clinched a Gold Medal in the 47th International Exhibition of Inventions of Geneva held in Switzerland in April 2019 which is one of the biggest global events showcasing innovations and inventions from around the world.

6.3 "ANIMAL: Art Science Nature Society" Exhibition

The School of Creative Media collaborated with the National Palace Museum (NPM) in Taipei for the third time to present the "ANiMAL: Art Science Nature Society" exhibition, featuring animals from different historical eras and geographic contexts. Following its debut in Hong Kong from October 2018 to January 2019, the ANiMAL exhibition travelled to Taichung City Seaport Art Centre in Taiwan from January to May 2019. The ANiMAL exhibition attracted a very broad audience of 20,000 people in Hong Kong from the general public, schools, organisations and the media. Thirty-three guided tours were arranged. It has also won a Gold prize at the MUSE Awards,

presented by the American Alliance of Museums, which recognize outstanding achievements in Galleries, Libraries, Archives or Museums (GLAM) media.

This unique exhibition brought to the public a fascinating blend of old and new, classical and modern, and traditional art and high-tech creative media. Cutting-edge technology and multimedia arts were applied to bring animals in ancient paintings and sculpture collections alive to the audiences on the CityU campus.

The ANiMAL exhibition showcased various representative animals from different eras by making use of ultra-high-resolution facsimiles of the NPM's Chinese classical art treasury, digital and interactive installations, projection mapping, augmented and virtual reality, movies, photographs, sculptures, paintings and music. It included works by more than 40 Chinese and international artists, including historical and contemporary pieces, and collaborative works from various galleries, collections and institutions.

The exhibits were put together in five thematic collections, starting with "Encyclopedia, Compendia and Scientific Inquiry", then "Auspicious Symbols and Homophonic Puns", and lastly "Revisioning Animal Identity in Contemporary Art".

The ANiMAL exhibition sought to weave these threads together into a compelling narrative that elucidated our multi-various interactions with the animal domain via the treasury of animal-related artworks in the collection of the National Palace Museum. The exhibition also highlighted today's growing threats to animal life posed by climate change, pollution, population growth, wars, poaching and cross-species virus transmission. By interacting with the exhibits, visitors made new connection with animals, gained understanding of animals' habits and acknowledged their ability to perceive and feel things.

6.4 Bullying and Aggressive Behaviours Among Schoolchildren

In January 2019, three videos depicting bullying incidents in a secondary school in Ma On Shan went viral on the internet. The general public was alarmed by the school bullying acts in Hong Kong. In the 2015 survey of the Programme for International Students Assessment (PISA), held every three years, Hong Kong scored the highest rate of school bullying among 72 countries and regions in the world.

Dr. Annis Fung in the Department of Social and Behavioural Sciences under the College of Liberal Arts and Social Sciences has pioneered research into youth aggression and peer victimization of school bullying in Hong Kong since early 2000s. She adopted the innovative approach of two-factor model in distinguishing aggressors into two subtypes: Proactive Aggressors (bullies) and Reactive Aggressors (non-bullies). After identifying the at-risk children and youth with a specific subtype, a specific innovative intervention based on that subtype will be provided to them. Dr. Fung and her research team have started a number of global pioneering intervention projects since 2001 prioritizing the reduction of reactive and proactive aggressive behaviours in children, with various diverse approaches in school settings. The most notable projects included Project C.A.R.E. (Children and Adolescents at Risk Education) based on Cognitive Behavioural Therapy, Chinese Martial Arts combined with Moral Education, Consumption of Omega-3 Supplements, Group Storytelling Intervention, etc. The Project C.A.R.E. was a five-year project commencing from 2006 and received funding of HK\$11m from the Quality Education Fund (QEF) of the Education Bureau. It was selected one of the 20 outstanding projects by QEF from more than 7,000 funded projects between 1998 and 2008.

CityU's research team under Dr. Fung's leadership has served 120 out of 1,013 primary and secondary schools with 110,000 participants in Hong Kong. 36,000 parents and 6,500 teachers have been trained and participated, which is the largest participation of the two-factor model of aggression in the world. Dr. Fung has generated the evidence-based intervention outcomes into publications, of which 25 Q1/Q2 ranked journal articles have been published across multi-disciplines since 2007.

CityU's Department of Social and Behavioural Sciences has been highly regarded in its professional knowledge in school bullying as evidenced by Dr. Fung's appointment to be Consultant to the HKSAR Government's Education Bureau (EDB)'s anti-bullying campaign for schools in Hong Kong from July 2018 to June 2019. Through the campaign, Dr. Fung conducted a series of training sessions for principals, teachers, school social workers, and educational psychologists to adopt the well-developed assessment tools and respective interventions for proactive and reactive aggressors. Between July 2018 and June 2019, at least 830 participants have been served and very positive comments were received. Her educational packages were uploaded on EDB's website for public use. She has been providing training programmes for the Hong Kong Police Force, different branches under the Social Welfare Department (SWD), NGOs and schools. Approximately 130 staff members from the Family and Child Welfare Branch, Rehabilitation and Medical Social Services Branch, Youth and Corrections Branch, and Clinical Psychological Service Branch at the SWD and NGOs were trained between July 2018 and June 2019.

Not only does Dr. Fung's professional knowledge in school bullying benefit the frontline practitioners, it is also impactful on government policy. In June 2018, Dr. Fung was appointed one of the seventeen members of the Welfare Services Child Fatality Review Panel in the Legislative Council Panel for two years, allowing her to make further contribution to the society through influencing government policy on prevention of child suicide.

6.5 AI Application on Healthcare, Urban Seismic Prevention and Disaster Mitigation

Impactful knowledge transfer activities from the College of Business are many. Worth mentioning here is work from the Department of Information Systems about AI application on healthcare, urban seismic prevention and disaster mitigation information systems.

The Advanced Intelligent Information Systems Research Center led by Professor Stephen Liao focuses on research and knowledge transfer on AI. In the application on healthcare, the Center collaborated with a healthcare startup formed by CityU alumni to work on AI-assisted reproductive technology development, especially the scoring and potential identification of embryos enabled by computer vision, and the gene sequence data de-noising and analysis enabled by signal processing and related deep learning models. The Center also collaborated with a reproductive technology company to research into employing AI enabled technology for assisting gene experts better capture the information in the Preimplantation Screening Diagnosis / Preimplantation Genetic Diagnosis. In addition, the Center collaborated with a maternity and child health hospital in Jinjiang, Fujian Province, to research into utilizing proper deep learning models to help doctors easily judge the quality of embryos by using medical image information extraction method.

In the area of urban seismic prevention and disaster mitigation, the Center has established long-term cooperation with the Guangdong Seismological Bureau and Shenzhen Academy of Disaster Prevention and Reduction. One of the completed projects is about Wi-Fi-based positioning system for identification of victims buried underground after an earthquake.

Summary of Knowledge Transfer Performance Indicators

(Amounts are in Hong Kong dollars)

Performance Indicators	Performance Indicators2017-18					
¹ No. of patents filed in the year	² 96		94			
³ No. of patents granted in the year	² 70		45			
No. of active licenses during the	Туре	⁴ No.	Туре	⁴ No.		
reporting year (inclusive of newly	Exclusive	9	Exclusive	9		
granted ones)	Non-exclusive	34	Non-exclusive	32		
	Total	43	Total	41		
Income generated from intellectual property rights	⁵ \$18.37n	1	\$2.07m			
Expenditure involved in generating income from intellectual property rights	\$8.41m	\$8.96m				
No. of economically active spin-off companies	9		⁶ 14			
⁷ Net income generated (or net loss arising) from spin-off companies of the University	N/A		N/A			
No. of collaborative research projects and income thereby generated (inclusive of ongoing and new projects)	borative research projects thereby generated 55/\$37m 45/\$36n Fongoing and new		45/\$36m	I		
No. of contract research projects (other than those included in "collaborative researches" above), and income thereby generated (inclusive of ongoing and new projects)	149/\$53m		149/\$53m		180/\$79n	n

¹ See breakdown in Appendix 2.

² Adjustment has been made due to a time delay in receiving formal notification from patent offices.

³ See breakdown in Appendix 3.

⁴ Figures reported include licenses of IP not protected by patents.

⁵ The income included an outstanding royalty payment of HK\$5.36m recovered during 2017-18.

⁶ See breakdown in Appendix 4.

⁷ Financial information of the companies cannot be obtained.

Performance Indicators	2017-18	2018-19
No. of consultancies, and income thereby generated	54/\$7m	68/\$6.01m
No. of equipment and facilities service agreements, and income thereby generated	56/\$0.11m	16/\$0.02m
Income received from Continuing Professional Development (CPD) courses	\$165m	⁸ \$860m
No. of student contact hours of the CPD courses	1.07m	⁹ 2.5m
No. of public lectures/symposiums/exhibitions and speeches to a community audience organised/co-organised by CityU (seminars and workshops are included)	378	329
No. of performances and exhibitions of creative works (by staff or students) organised/co-organised by CityU	36	31
No. of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies	318	346
Number of startups formed by our students/alumni/faculty members which have received CityU funding support	27	40

⁸ Starting from 2018-19, CPD courses also include professional doctorate programmes and taught postgraduate programmes except for PCLL in accordance with the definition of CPD courses laid down by UGC under the Common Data Collection Format (CDCF).

⁹ The number reported is our best estimation based on the information available.

Number	of	Patents	Filed	in	the	Year	2018-201	9 ((with	breakdown	by	country	and	type
following	th	e Commo	on Dat	a C	ollec	tion F	Format (C	DC	(F)					

Country	Туре	Number
Hong Kong	G01	1
Japan	C21	2
The Mainland of China	B01	1
	B41	4
	B82	1
	C21	1
	G01	7
	H01	2
	H03	2
USA	A61	2
	B01	2
	B41	2
	B82	1
	C07	1
	C23	1
	G01	22
	G03	2
	G06	1
	G08	1
	H01	33
	H02	1
	H03	1
	H05	1
	Grand Total	92

Countries	Туре	Number
T.	C12	1
Europe	H01	2
Hong Kong	H02	1
	A61	1
	B81	1
The Mainland of China	G11	1
	H01	3
	H02	1
	A61	2
	B22	1
	C01	2
	C09	1
	C12	1
	G01	4
	G02	1
USA	G03	1
	G06	2
	H01	6
	H02	3
	H03	2
	H04	2
	H05	1
	Grand Total	40

Number of Patents Granted in the Year 2018-2019 (with breakdown by country and type following the Common Data Collection Format (CDCF))

Appendix 4

Economically Active Spin-off Companies 2018-19

Туре	Name	Business	Year of formation
Biotechnology	Vitargent (International) Biotechnology Limited	Specialise in biosensor technologies for providing testing services for food, pharmaceuticals, cosmetics and the aquatic environment	2010
New Materials Power Electronics	*Cinme Tech Limited *Jacky Instruments Limited	Develop electronic chemical sensor Develop smart thermostat	2014 2015
Air Purifying	*ASA Innovation & Technology Limited	Specialise in technological solutions to protect people from airborne pollutants	2016
Biotechnology	*6J Biotechnology (Hong Kong) Limited	Develop new generation anti-cancer drugs	2017
Biotechnology	*Cellomics Holdings Limited	Develop Microfluidic platform nucleic acid detection kits to sensitively detect circulating cancer biomarkers	2017
Textile/clothing	*J&K Brassiere Co. Limited	Online intimate apparel shop with a unique universal fitting scale that can achieve best-fit by simple self-measurement at home	2017
Electrical & Electronics	*AI Motion Sports Limited	Digitise youth sports performance and leverage big data to revolutionise sports education	2018
Nanotechnology & Materials Science	* Medi Biotech Limited	Provide customised solutions of plant-derived antimicrobial materials for developing pet hygiene and healthcare products	2018
Biotechnology	*PATECH Limited	Provide customised biomedical imaging system solutions	2018
Nanotechnology & Materials Science	*Portalyze Point of Care Limited	Develop solutions for next-generation point-of-care medical devices for disease diagnostics and chemical analysis	2018
Biotechnology	*Xiaomo Biotech Limited	Develop RNAi-based products and services for gene functional characterisations and provide solutions for human and agricultural diseases	2018
Nanotechnology & Materials Science	*AmaZinc Energy Limited	Design highly safe flexible batteries for the emerging field of flexible and wearable electronics	2019
Electronics	*Genie6 Technology Limited	Develop battery diagnostics technology for providing battery management solutions, systems and services	2019

Remark: *No institutional ownership but using CityU IP

Knowledge Transfer in College of Business

The College of Business (CB) and its member departments have been involving in a wide range of KT activities. These KT activities typically include (i) community engagement such as delivering public lectures, media interviews, press conferences and workshops; (ii) involvement in external advisory bodies including professional, industrial and the government; and (iii) student placement and internship.

Highlights of KT Activities of Member Departments

College of Business Exchange Team

In summer 2018, College of Business's Internationalisation Team organised a summer programme namely "Multi-Cultural Collaboration Community Service Project – SHAWCO" for its business students. This 5-week programme aimed to provide students with experiential learning experience on the concepts of Social Enterprise (SE), Social Entrepreneurship and Social Innovation, through pre-trip research, structured classes, placements and post-trip event/project, while providing a full cultural immersion. After attending the classes at University of Cape Town and doing placement at real local SEs/NGOs, the students have shared their unique experience and what they have learnt about the country and SE with the public via an event/project upon returning to Hong Kong.

Department of Accountancy (AC)

The Department of Accountancy's KT effort focuses on applying its professional accounting and business knowledge to serving professional accounting bodies, business community, and SEs/NGOs.

In order to make a strong research and KT impact in facilitating the development of social enterprise sector in Hong Kong, Dr. Sidney Leung led a KT research team with Professor Phyllis Mo and Dr. Raymond Wong in partnership with the Hong Kong Council of Social Services (HKCSS) - Social Enterprise Business Centre (SEBC) and produced a report entitled "Enhancing the Competitiveness and Sustainability of Social Enterprises in Hong Kong: A Three-Dimensional Analysis" that covered key findings of the research team and policy recommendations to enhance sustainability of SEs in Hong Kong. The report is publicly the available at www.cb.cityu.edu.hk/ac/research/knowledgetransfer. AC disseminated the findings and recommendations through meetings and seminars, and met with government officials such as secretariats of the Social Innovation and Entrepreneurship Development Fund (SIE Fund). AC also co-organised two seminars with Research Centre for Sustainable Hong Kong, Hong Kong Council of Social Services, KPMG and Davis Polk, an international law firm.

AC also started another related KT project in examining the challenges and opportunities in transforming SEs in Hong Kong from start-up to scale-up. The project is funded by the UGC KT Earmarked Fund. A report will be produced on major findings and recommendations on government policies and other supporting mechanisms to facilitate the expansion of SEs in Hong Kong. AC will also disseminate the findings and recommendations to HKCSS, the relevant HKSAR Government agencies, funding bodies, and give presentations in seminars organised by SEBC in which major players of the SE sector will participate.

Besides, AC colleagues are enthusiastic to engage in external advisory appointment in serving committees, editorial boards, directorship in various organisations such as HKSAR Government, investment companies, higher education institutions, and professional bodies, such as ACCA, HKICPA, HKICS, and HKMA. In recent years, AC has produced its own newsletter on its

homepage, which is part of AC's efforts to contribute to KT and make its research impactful. The Research Newsletter is designed to disseminate the research findings and policy implications of recent top-tier accounting publications by AC faculty members to accounting professionals, professional accounting bodies, regulators, and the business community. Apart from this, AC has successfully organised professional seminars and expert talks for alumni and secondary school students respectively.

Department of Economics and Finance (EF)

During the reporting period of 2018-19, faculty members of the Department of Economics and Finance (EF) continued to serve on prestigious advisory boards of academic, professional, governmental and industry organisations, for instance, Hong Kong Insurance Authority, Hong Kong Institute of Bankers, Hong Kong Blockchain Society, Hong Kong Independent Non-Executive Directors Association, Vocational Training Council, Hang Seng University of Hong Kong, etc.

EF also organised / participated in two well-attended events for the academic, professional and industry communities, namely "Fintech Education and Talent Cultivation in HK – Society Needs and Challenges", and "China Feels Trade War: Currency Falls, Companies are Considering Leaving the Country".

EF faculty members will continue sharing their insights with local and overseas academic, professional and industry communities through workshops, media interviews, and public lectures.

EF has reported an impact case on the development of a professional certificate programme for Hong Kong Independent Non-Executive Directors Association during this reporting period. This is the first certificate programme for independent non-executive directors (INEDs) in Hong Kong. The certificate programme, covering six core areas in corporate finance and risk management, aims at strengthening the standard of INEDs' professional practices, corporate governance and board management.

EF continues to actively encourage its faculty members to take part in a wide range of KT activities.

Department of Information Systems (IS)

1. Editorial service of conferences and journals, especially in A+ or A journals and conferences

Academic colleagues in the Department of Information Systems (IS) have been serving as committee members, editorial board members and editors of a number of renowned international conferences. Representative examples are: Professor Robert Davison as Editor in Chief for *Information Systems Journal*, Editor in Chief for *Electronic Journal of Information Systems in Developing Countries*; Professor Jane Feng as Associate Editor for *Information Systems Research (ISR)*, Senior Editor for *E-Commerce Research and Application*; Professor Choon Ling Sia as Senior Editor for *Journal of Association for Information Systems (JAIS)*, Associate Editor for *Information Systems Research (ISR)*, Editorial Board Member for *Information and Management;* Dr. Alan Zhang and Dr. Ron Kwok as Associate Editors for *Information for Information Systems Journal of Computing*, ACM, TMIS and ICIS2018; Dr. Wei Thoo Yue as Associate Editor for *Electronic Commerce Research and Applications*.

2. Talks and seminars

Professor Robert Davion has been invited as conference keynote speaker/seminar speaker on

many occasions overseas, e.g. Pre-ECIS working conference on the SDGs, Stockholm, Sweden; the 2nd International Multiconference, Lusaka, Zambia; as well as seminar speakers in Tongji University; Tilburg University, Netherlands; RMIT University, Australia; Loughborough University, UK; Assumption University, Thailand; Pre-IDIA PhD Workshop, Hartbeestpoort, South Africa; Keio University, Japan; University of Oslo, Norway; Umea University, Sweden; Deakin University, Australia; University of Cape Town, South Africa. In addition, Professor Juan Feng was the invited speaker in Fudan University, Sun Yat-Sen University, CEIBS (Chinese-Europe International Business School), Southwest University of Finance & Economics, Southwest Jiaotong University. Professor Choon Ling Sia was invited as the panelist for 8th MIS Academic Leadership Conference (MALC) at UT Dallas, and Panel on Undergraduate Programmes. Dr. Xin Li was the invited speaker in Tsinghua University and Renmin University.

3. Organising of conferences, academic/research events and research collaboration with industries

Dr. Roy Ho was invited as the Lecturer of an AI workshop for CB's summer workshop programme held on 1 June 2019 which was well-received by secondary school students. Dr. Xin Li had research collaboration with Tencent. Dr. Wei Thoo Yue had research collaboration with Pfizer consumer healthcare China on optimizing a large-scale digital advertising campaign.

4. Serving on the Advisory Boards of other universities or companies, key appointments in professional associations/organisations, as well as external academic appointments

Professor Kai Lim was appointed Honorary Professor at Fudan University. Professor Robert Davison was appointed Visiting Professor at Loughborough University (UK), University of Sydney (Australia), as well as External Assessor for University of Malaya (Malaysia). Dr. Ron Kwok served as Corporate Relations Committee member of Physical Fitness Association of Hong Kong; and as Advisory Board member of The Hong Kong Federation of Business Students. Mrs. Chiamin Fung was appointed Executive Committee member for Hong Kong Association of Interactive Marketing; Sub-Committee Young PM Development member for Project Management Institute Hong Kong Chapter. Dr. Daniel Tse was appointed Technical Committee Member of ICSEB2018, ICEEG2019, ICMSAO'19, and ANT2019.

Department of Marketing (MKT)

The Department of Marketing (MKT) continues to actively engage in various knowledge transfer activities in the academic year 2018-19.

In the area of industry consultancy service, MKT has provided more than 30 consultancy services for over 25 companies through the final year projects supervised by faculty members and conducted by both undergraduates and Master students in 2018-19. The companies include Otsuka Pharmaceutical (HK) Limited, Telford International Company Limited, Advanced Sleep Innovations (HK) Co., Ltd., BRITA Hong Kong Ltd., The Great Eagle Company Limited, Audi Hong Kong, Bayer HealthCare Limited, EMMAS Mattress, Trappist Dairy Limited, iBigHealth Technology Limited, Coopervision Hong Kong Ltd., Eatojoy, eBay Hong Kong (International) Limited, Eatojoy, CooperVision Hong Kong Ltd., MoneyBack, Patisserie La Lune, SMIT Holdings Limited, Transported Asset Protection Association, Target Insurance Co., Ltd., Shing Hing Plastic Manufacturing Limited, Autotoll Limited, Nearby Limited, etc.

In the area of community engagement, colleagues have proactively engaged in media interviews and community activities. More than 40 media exposures were completed. More than 10 workshops were provided to secondary schools. One colleague has served as the program host of

Metro Radio since September 2017. Colleagues contributed to the success of various community events in different capacities, e.g. panel member of Hong Kong Brand Development Council, board member of Autotoll Limited and Judge for MTR Advertising THE BEST OF THE BEST AWARDS 2018. The Department has organised 21 Business Leader Forums in 2018-19. MKT also organised social service projects such as Marine Conservation Leadership Program for underprivileged kids.

In the area of professional service, colleagues have taken up the roles of members of external advisory bodies including professional, industry, and government agencies. One colleague serves as advisory board member for HKSAR Government - Agriculture, Fisheries and Conservation Department and Scout Association of Hong Kong. Examples of international conferences chaired by faculty members include "China Marketing international Conference". Moreover, almost all faculty members have served as reviewers and ad-hoc reviewers for journals such as *Industry Marketing Management*, *Journal of Management, Journal of International Marketing, Journal of Operations Management* and *Journal of Consumer Research*. Some colleagues served as editorial board members, e.g. *Asia-pacific Journal of Management, Journal of Management, Journal of International Marketing, Journal of Management, Journal of Management, Journal of International Marketing, Journal of International Marketing, Journal of Marketing Science and Strategic Management Journal. One colleague serves as Panel member in Research Grants Council Competitive Research Funding Schemes for the Local Self-financing Degree Sector and Specialist of the Hong Kong Council for Accreditation of Academic and Vocational Qualifications (HKCAAVQ).*

The Department always encourages faculty members to engage in KT activities including community services. Contract research will be an area to be promoted.

Department of Management (MGT)

In the Department of Management (MGT), Professor Li Xiao is Editorial Board Member of two A+ journals, Professor Ma Xuefei is Editorial Board Member of another A journal, and Dr. Long Wang is Editorial Board Member of a fourth A journal.

With regard to the area of professional services, MGT faculty members have served as editorial review board as well as reviewers of major academic journals including the Academy of International Business Journal, Academy of Management, Academy of Management Discoveries, Entrepreneurship Theory and Practice, Journal of Management, Journal of Management Studies, Organizational Research Methods, Journal of Managerial Psychology, Industrial Marketing Management, etc. MGT faculty members also offer professional consulting services by serving different committee boards such as Korean Academy of Leadership and advising service to local higher education institutions, including SSE Riga in Latvia.

Department of Management Sciences (MS)

The Department of Management Sciences (MS) keeps promoting KT via providing consultancy services to the external organisations, academic activities, student internship and social media.

The Statistical Consulting Unit releases quarterly Consumer Confidence Index for four locations across the straits (https://www.cb.cityu.edu.hk/ms/scu/?page=CCCI) and it conducted five projects last year. MS also assisted the University to set up a Food Safety Index Project with Vitargent (International) Biotechnology Limited (Vitargent) in 2017 to build a platform for research and development of innovative technologies to reflect food safety level in Hong Kong. Recently the project team has submitted a sample report to the University and Vitargent, and the contract is pending for signing.

For students, two groups of undergraduate students participated in the projects with ParknShop and Fortress. Thirty-nine undergraduate and 31 postgraduate students enrolled credit-bearing internship

scheme that benefits both students and employers in terms of career planning and manpower resources.

MS hosted the 10th POMS-HK International Conference on 5-6 January 2019. The conference themed "Operations Excellence for a Better World" attracted more than 400 participants from 14 countries and regions. In addition, MS, the International networks of Computational and Financial Econometrics (CFEnetwork) and the Computational and Methodological Statistics (CMStatistics) co-hosted the 2nd International Conference on Econometrics and Statistics (EcoSta 2018) on 19-21 June 2018. Six hundred and fifty participants from around the world attended the conference.

MS faculty members also actively take up honorary consultant roles in the committees of the public/private organisations, hence directly providing professional comments and advice to the community. MS will keep enhancing KT via different means and explore more possible aspects such as social events, community engagement, publications, and e-platforms, etc.

Knowledge Transfer in College of Engineering

Department of Architecture and Civil Engineering (ACE)

During the reporting period, ACE has been continuing in promoting KT through providing high-level consultancy services (10 projects amounting to HK\$1.81m) and contract/collaborative research for the public and private organisations (six projects amounting to HK\$1.13m). There were 70 externally funded research projects with a total funding of over HK\$50m (TRS, ECF, ITF, RIF, ECS/GRF and other-RGC joint schemes) in progress. Besides, ACE faculty members have been undertaking 28 Mainland funded projects with a total amount of RMB34.25m. ACE's research activities are supported by a range of the state-of-the-art equipment including a 600-ton MTS Universal Testing Machine, the Wind Tunnel Facility, an experimental water flume (i.e. 12.5 meters long test section), and a well-equipped Indoor Air Quality Laboratory to facilitate multi-disciplinary research approaches and activities.

ACE actively engages in various KT activities to build up KT capabilities and improve its KT performance. ACE colleagues have contributed their expertise by taking up external advisory appointments, serving as panel members of statutory bodies and committees at the HKSAR Government and professional institutions such as the Appeal Board Members, Disciplinary Tribunal Panel Members for Buildings Department and Accreditation Board Members. They also took up the role of editor or editorial board members for prestigious journals as well as committee members of international conferences and judging panels, etc. During the reporting period, more than 20 ACE faculty members served on over 60 HKSAR Government Committees, professional institutions, non-profit making organisations and the industry. Their professional comments and advice facilitate the formulation and development of government policies in the respective disciplines and for the accreditation requirements for professions, etc. They also engaged in community activities such as giving public lectures/seminars and attending media interviews.

Department of Biomedical Engineering (BME)

In the period 2018-19, faculty members in BME have made great effort to apply their expertise and innovations to benefit industries and community in Hong Kong and mainland. They were engaged as members of external advisory bodies including professional, industry, government, statutory and non-statutory bodies, such as the Institute of Electrical and Electronics Engineers (IEEE), Canadian Academy of Engineering, Chinese Association of Automation, Hong Kong Institution of Engineers, Ministry of Education of China; the HKSAR Government's Research Grants Council, Innovation and Technology Commission, Hong Kong Examinations and Assessment Authority, and Curriculum Development Council; as editorial board members of international journals; and as adjunct and visiting professors of universities and institutes in mainland China and overseas.

In addition, to improve related KT developments and practices, BME also started to enhance the pool of patented innovations and technologies with commercialisation potential. A notable example is Professor Dong Sun's patented intelligent sensor technology which is being used in the e-channel auto-pass systems at Hong Kong's boundary-crossing facilities.

There were a total of nine on-going consultancy and collaborative projects (including CRFs, ITFs, contract research, donations, and NSFC/RGC Joint Research Scheme) at a total value of HK\$9.75m undertaken by BME faculty members during the reporting period, including projects with and donations from The Hong Kong and China Gas Co. Ltd., mainland universities, and a local manufacturer. An ITF project costing HK\$1.4m was approved during the reporting year. In addition, two US patents were granted and one US patent was filed.

Division of Building Science and Technology (BST)

Faculty members of BST are encouraged to contribute to the development of the building industry through applied research, consultancy services, contract research, engagement in advisory bodies, and delivery of public lectures to practitioners.

In 2018-19, BST staff members have been awarded Research Impact Fund (RIF) in a joint project with a local university. The total value granted to the project is about HK\$9.6m, and the share to BST is over HK\$1.3m. In addition, BST also has three on-going contract research for private companies and government departments. As the Division is well-connected with many related government departments and reputable professional institutions such as HKIS, CIOB, CIC, and HKIE, our staff members have actively served in many external advisory bodies, as well as holding various leading positions in these professional bodies and government departments in this year. The Division will continue to explore KT opportunities in the areas of building energy and environmental technology, construction management and engineering, and surveying so as to benefit the community and promote the image of the Division.

Department of Computer Science (CS)

The CS Department has received worldwide recognition for its outstanding research and pedagogical development. Ranked the 11th best Computer Science Department globally by the US News & World Report (2019), and top-50 worldwide by QS World University Rankings by Subject (2018), the Department is engaged in an on-going pursuit of excellence.

CS conducts world-class fundamental and applied research. With more than 180 research projects worthing over HK\$105m in progress, the vital areas covered bioinformatics, cloud computing, data science, evolutionary computation and metaheuristic, information security, machine learning, mobile computing, multimedia computing, software engineering, vision and graphics.

CS has established strong reputation in the research community and actively participated in various KT activities. It regularly hosts major international conferences and workshops such as the Workshop on Artificial Intelligence in the Era of Big Data with EiC Panel Discussion on 7 June 2018. CS staff members have been serving as journal editors, committee members of international conferences, judging panels & committees for government, learned societies and professional bodies (e.g. Editor-in-Chief of IEEE Transactions on Evolutionary Computation and IEEE Transactions on Cybernetics; Vice President of IEEE Systems, Man and Cybernetics; Vice President of Chief Executive's Award for Teaching Excellence, Education Bureau; and HKIE Accreditation Committee Members for Computer Science).

Collaboration with Industry

CS has developed a wide range of applied research initiatives in collaboration with leading-edge institutions and companies. These include projects on advanced video coding, smart handwriting analysis, blockchain applications, and social media analysis which have attracted funding amounts of over HK\$16m from the Innovation and Technology Commission in the past year.

Nurture Entrepreneurship and Encourage Startups

The Department recognises the importance of nurturing students' entrepreneurial spirits in leveraging the knowledge to applicable business practices. Our efforts in promoting entrepreneurship have reaped fruits with a number of recent graduates starting up their own companies. On record, seven startups were formed by five CS graduates.

IT Professional Placement

Since its introduction in 1988, CS's IT Professional Placement (at least 9 months) has constituted a fundamental and strong component of our undergraduate BScCS programme, allowing the students to gain experience within a workplace and transfer their knowledge learned at the University to the industries. The number of organisations participating in the IT Professional Placement programme has increased every year since its inception. There were around 84 companies offering placement in 2018-19. They included very prestigious companies like HK Electric, HSBC, IBM, HK Exchanges and Clearing, Smartone, Jardine Matheson, Hospital Authority, with extension to overseas institutions in recent years. Through expanded liaison with industry partners and enhanced administrative support, CS successfully placed 139 students in 2018-19 and received a mean score of 4.03 out of 5 rated by employers.

Department of Electronic Engineering (EE)

Faculty members in the EE Department have continued to actively engage in a wide range of KT activities. They have produced respectable paper publications in top-notch international journals such as IEEE transactions/ magazines or Nature. The average yearly number of journal publications per faculty is about five. They have also delivered a number of technical seminars or workshops to both local and overseas communities. In collaboration with Knowledge Transfer Office of CityU, Emerging Technologies Forum was held on 3 May 2019, providing a platform for the EE community and the industry to exchange on topics related to the prevailing technology "RFID". EE also reached out to the public through different media. One Chair Professor was invited to be guest lecturer on topic "AI" for broadcasting on Phoenix TV in July 2018. The Final Year Project Competition cum Product Design Competition 2019 was held on 30 April 2019 where about 40 student-faculty developed projects were showcased to the industrial partners.

EE always strives for promoting the transfer of knowledge to the local community through providing consultancy services (six projects amounting to HK\$2.24m) and contract research (10 projects amounting to HK\$10.71m). Building on its strong commitment on conducting fundamental and high impact research, there are more than 80 externally funded projects in progress with total funding of over HK\$140m (GRF/ ECS, CRF, TRS, ITF, NFSC-RGC, other-RGC joint schemes, AoE, CROU, donations, various mainland funding schemes, contract research), in which seven are industrial related in an amount of HK\$49m. The research works carried out over the year have resulted in 17 active licenses generating gross profit of HK\$12.33m. To date, there is a total of 140 patents granted (eight are newly granted patents in the reporting period) and 82 patents filed.

In terms of professional services and community engagement, EE faculty members have been serving as editors or editorial board members for prestigious journals, committee chairs/members for international conferences, as well as advisory roles for the government, professional institutions, education sector, etc. For example, two faculty members have served as the Appeal Board Panel Members and Disciplinary Tribunal Panel Members for the Electrical and Mechanical Services Department for three years. Another one has served as the Steering Committee Member to guide the development and implementation of the "Girls Go Tech" programme organised by The Women's Foundation which aims to expose junior secondary school girls from under-privileged backgrounds to traditionally male-dominated STEM (Science, Technology, Engineering, Mathematics) related subjects to maximize their future career options.

Department of Mechanical Engineering (MNE)

Over the past year, faculty members in MNE have been actively engaged in a variety of activities aimed at promoting KT and collaboration/partnership with different social/governmental entities. These include organizing academic visits, giving invited/plenary speeches and public lectures. It is worth reporting that the Low Carbon Energy Education Centre has hosted over 200 visits by local schools (primary, secondary schools, IVE and etc.), industries (such as CLP), political parties (such

as New People's Party) and various non-governmental organisations (NGOs). Through these visits, the Centre introduced to the public the notions related to the harness and safe use of green energy, particularly nuclear energy, in our daily life. In addition, MNE faculty members serve in the editorial boards of different journals and their research outcomes have produced a number of patents mainly filed in the US and Mainland China.

Department of Materials Science and Engineering (MSE)

Since MSE's establishment in July 2017, our faculty members have made impressive achievements in KT activities such as contract research and patent applications. In addition, MSE colleagues are active in serving the community as editors or editorial board members for prestigious scientific journals. They are also invited to review research grant proposals for overseas research funding agencies. Several MSE colleagues serve as External Examiners for degree programme in overseas universities and for local tertiary education sector.

Department of Systems Engineering and Engineering Management (SEEM)

SEEM has continued its effort in KT by engaging in various contract research projects. SEEM faculty members have established a strong network of industrial linkage worldwide. Industrial collaborators include companies and organisations in diverse industries such as public utilities, transportation, healthcare, government organisations, etc.

SEEM proactively hosts and organises international conferences and workshops, bringing together international academics, industry experts, CityU faculty and students to share their knowledge and research ideas. In the reporting year, SEEM organised and hosted the 11th International Conference on Mathematical Methods in Reliability (MMR2019) at CityU. The conference served as a forum for presenting the latest advances of research in the mathematical theory of reliability and risk management as well as their applications. SEEM also organised and hosted the International Research Conference on Systems Engineering and Management Science 2019 (IRC-SEMS 2019) in Nanjing, China which provided a platform for academics and researchers to share their experience and research findings in various disciplines of Systems Engineering and Management Science.

Knowledge Transfer in College of Liberal Arts and Social Sciences

CLASS was the first College in CityU to launch the Excellence in Knowledge Transfer Awards in 2011 and this has become an annual event of CLASS since then. In the year of 2018-19, three winning projects were selected as follows:

Project Title	Department	Recipient
Excellence in Knowledge Transfer Awa	ord	
Develop the Ten-year Rehabilitation Programme Plan for Macau 2016-2025	Department of Social and Behavioural Sciences	Professor Lo Tit Wing
Certificate of Merit		
Working in partnership with social work students to promote service users' perspective on the qualities of social workers	Department of Social and Behavioural Sciences	Dr Kam Ping Kwong
Computer-Assisted Conversation Analysis	Department of Linguistics and Translation	Dr Lee John Sie Yuen

CLASS also launched the Research Impact Award in 2018-19 to honour high quality impact case studies by five faculty members: Professor Zhu Jian Hua Jonathan (Department of Media and Communication), Dr. Christoph Hafner (Department of English), Professor Li Che Lan Linda (Department of Public Policy), Professor Yep Kin Man Ray (Department of Public Policy) and Dr. Fung Lai Chu Annis (Department of Social and Behavioural Sciences).

CLASS continued to publish the College magazine "CITY CLASS" bi-annually to report KT and research, as well as academic achievement. The magazine is able to reach a wide range of readers including academics, potential donors, prospective students, alumni, CityU supporters and the general public with a circulation of 4,000 copies. Electronic version is also available on the College website.

Departments of CLASS were also actively engaged in various KT activities and their significant highlights are summarized as follows:

Department of Asian and International Studies (AIS)

AIS faculty members have deep linkages with the community, including NGOs, the private sector and foundations with which they co-host events while engaging in extensive media outreach. AIS remains CityU's leading academic unit for media availability, with a focus on Asia's changing cultural, political and social affairs. AIS scholars contributed, in particular, by means of opinion pieces (op-eds) and interviews in key regional and global media. Examples of 2018-19 media outlets included ASEAN Post, Bloomberg, China Daily, Financial Times, Reuters, RTHK and the Wall Street Journal. This year's impact case is the combined effect of the CityU Sustainability Debate Series and the CityU Sustainability Lecture Series, both organised by AIS. The four events in these series during 2018-19 served to transfer knowledge to the community about sustainability challenges and solutions and energized, in particular, secondary school students to take environmental action.

Department of Chinese and History (CAH)

CAH transferred knowledge to the community via:

- 1. Mainstream and online media interviews including HK01, RTHK TV 31 "This Week", and RTHK Radio 1;
- 2. International and high-profile public talks in events such as "香港的聲音" and German Hamburg Chinese Literature Festival;
- 3. Public Exhibitions and Historical Trials such as The Kowloon City Themed Walking Trail Project, "動與醒:五四新文化運動" at Dr Sun Yat-sen Museum, and "Inventing Traditions" at CityU;
- 4. Active participation as board members in Governmental bodies such as the Antiquities Advisory Board and as Shinhan Distinguished Professor at the Underwood International College of Yonsei University in Seoul, Korea;
- 5. Workshops focusing on helping HKDSE students in taking Chinese History examinations, and Putonghua Shuiping Ceshi.

Department of Media and Communication (COM)

In 2018-19, COM carried out the following KT activities:

- 1. Seven public lectures and workshops to a variety of audiences, including:
 - sharing sessions with young scholars from mainland China universities;
 - workshops on computational methods in regional conferences;
 - public lecture to undergraduate students of Chongqing University;
 - two lecture sessions on suicide prevention using hotlines, with each session attracting 20 audience members of volunteer hotline workers.
- 2. Three media interviews were recorded including:
 - two interviews with major national media outlets in Japan;
 - one advertorial with local Hong Kong press Ming Pao.
- 3. Supervision of the production of a short documentary on retired soldiers in Hong Kong by a group of COM undergraduate students.

Department of English (EN)

EN has engaged in diverse KT activities. These include: 1) outreach teaching with students delivering English lessons to underprivileged Hong Kong youth; 2) community outreach; 3) advisory and consultative work for public and professional bodies; 4) media coverage. The department organised a number of events and activities aimed at fostering creativity in the community through literature and drama. These include: 1) a public reading and creative writing workshop, co-organised by EN and the Hong Kong Public Libraries and facilitated by Dr. Klaudia Lee; 2) a public performance of a drama production, *The George Wong Case*, written and directed by Dr. Peter Jordan, and disseminated to a wide public audience; 3) a writing competition for secondary school students and the publication of a collection of creative writing by Hong Kong secondary and tertiary students, entitled *Halfway Home IX*, launched on the CityU campus in April 2019 with over 80 students, teachers and parents in attendance.

Department of Linguistics and Translation (LT)

In this reporting period, faculty members at LT continued to contribute their expertise outside CityU by serving as conference committee members and panel members at government bodies, and taking up leadership roles in a number of academic associations and journals. LT faculty members have been supervising two projects awarded by the Knowledge Transfer Initiative in Business, Law and Liberal Arts and Social Science Disciplines, as well as an externally funded KT project. Further, a Material Transfer Agreement was concluded with a commercial company for training automatic speech recognition systems. Finally, LT's KT transfer efforts were recognised with a Certificate of Merit in the CLASS Excellence in Knowledge Transfer Award.

Department of Public Policy (POL)

During the reporting period, POL colleagues have engaged in both traditional KT activities, community engagement activities and professional service, served on editorial board of internationally leading journals, regional to transnational knowledge bodies, as well as local professional associations and industrial bodies.

The impact case of the Research Centre for Sustainable Hong Kong (CSHK), as a research centre facilitating cross-sector, cross-disciplinary and cross-border collaborations, showcases coordinated effort to build up KT capabilities and improve KT performance of colleagues within and beyond POL, by bridging academic studies, the business professionals and policy-making bodies. The two major themes of sustainable development and the Belt and Road Initiatives weave together trans-disciplinary actions that reach out to countries along the Silk Roads.

Department of Social and Behavioural Sciences (SS)

The growing spotlight on achieving impact through academic activities has inspired SS to strive for developing KT activities with community collaborators. A culture of collaboration is being promoted among faculties, students, alumni, and community partners to discover and innovate to best practice to build capacities, improve health and education, and inform public policy to benefit our society. In 2018-19, SS colleagues continue leading actively in conducting public lectures, workshops, and exhibitions of students' creative work, have organised international conferences, received media interviews, press conferences and radio shows, providing consultation and conducting contract research for external bodies, including professional, government statutory and non-statutory bodies and NGOs.

Chan Feng Men-ling Chan Shuk-lin English Language Centre (ELC)

ELC's KT activities include the membership on an advisory board, reviewer for a journal, and engagement in accreditation.

The membership on the advisory board of Lingnan University helped raising the profile of the ELC, by recognition of the expertise and professionalism of the Head of ELC. Those selected for these advisory boards were recognised by their peers in other universities. The work, examining the courses and services of another language centre was also extremely useful in that comparisons can be made in language support offered to students.

The engagement in accreditation exercises organised by HKCAAVQ provided the ELC with up-to-date knowledge in quality assurance and qualification frameworks. The experience also strengthens the ELC's network, including the Industry Training Advisory Committee, professional bodies and representatives of education institutions.

The role of journal reviewer helps to bring insights about current research trends in the English teaching field, which may benefit the ELC in proposal and grant submissions.

Knowledge Transfer in College of Science

Member departments of the College of Science are active in KT with accomplishments given below:

Department of Chemistry (CHEM)

The Department of Chemistry strongly encourages faculty members to participate in various KT activities. There are two examples in 2018-19.

One provisional patent has been approved (application number: 62/919,075) and filed on 26 February 2019, entitled "An Extremely Stable AIEgen for Public Security: Non-Destructive Visualization of Latent Bloodstain in High Resolution and Sensitivity" based on the invention by Dr. Ruquan Ye and his collaborators.

Professor Paul Lam's project "Establishment and demonstration of recirculation aquaculture system for fry culture on rafts" is supported by the Sustainable Fisheries Development Fund (SFDF), Agriculture, Fisheries and Conservation Department. This project aims to develop grouper fry culture techniques with the use of a seawater recirculating system on fish rafts and to promote such culture techniques to local fish farmers.

Department of Mathematics (MA)

During the reporting period, MA successfully established a connection with Han Academy and offered a new programme "3D Math Modelling Workshop for Math@STEM Education" to the gifted students of the Academy. This outreach activity also supports the University's TAE programme to motivate students a positive attitude to be creative and innovative, foster their ability and skills to discover and innovate. MA organised career talks to undergraduate students and invited the Dean of College of Mathematical Science of University of Electronic Science and Technology of China to give a recruitment talk to our PhD students. Teams of undergraduate students obtained remarkable achievements including Second Prize and Top Quartile Certificate through participating in interdisciplinary and mathematical contests in modelling in 2018-19.

have Colleagues continued great engagement in serving numerous government bureaus/selection/advisory committees including but not limited to Committee on Mathematics Education of Curriculum Development Council, Academic Advisory Board of International Mathematical Modeling Challenge, and Hong Kong Mathematics Creative Problem Solving Competition, etc. Collaborations with the private sector and government bodies are also encouraged. Dr. Jon Lo collaborated with Dr. Razvan Arsenescu (Chief of the Atlantic Digestive Health Institute and Co-Director of the Inflammatory Bowel Diseases Center at Morristown Medical Center) to develop a data-driven computational model for studying the efficiency of the treatments for Imflammatory Bowel Disease. Another international research collaboration with Integrated Biomedical Imaging Laboratory of Washington University is explored by Professor Benny Hon aiming at developing a numerical algorithm for rapid and fully automatic early detection of stroke based on electrical impedance tomorgraphy images. The success of the proposed project will improve the efficiency of stroke management especially for the front-line clinicians.

Department of Physics (PHY)

The Physics Department (PHY) has entered its second year as a new department in the reporting period. Despite the relatively small faculty size of 17 members, PHY faculty members continued to play a wide variety of advisory roles in various academic and industrial institutions. Locally they served in various scientific as well as government agencies including as Chairman of Radiological Protection Advisory Group (Food and Health Bureau, HKSAR), Advisory Panel Member in the Biomedical Discipline of the Hong Kong Institute of Engineers, Chairman of the One committee

(Physics) of the Curriculum Development Council (CDC), and members of the Assessment Panel for Competitive Research Funding Schemes and Joint Research Scheme for the Research Grants Council. These activities have directly or indirectly influenced the academic, education as well as other public policies of the HKSAR Government. Internationally, our faculty members have been actively involved in many scientific panels and organisations. They served as Council Member of the Association of Asia Pacific Physical Societies, member of the Overseas Assessment Panel of Chinese Academy of Sciences, and member of the International Measurement Confederation. In the academic community, PHY faculty members served in the editorial boards of several academic journals and as Associate Editors of the Journal of Applied Physics and the Journal of Electronic Materials. In the industrial sector, one of our colleagues is on the Board of Shenzhen CAS Morefound Co., Ltd., the Board of Plasma Technology Limited as well as the Board of Chengdu PulseTech Electrical Co. Ltd. Moreover, some of the PHY colleagues also served as External Examiners for degree programmes and as reviewers for grant proposals and faculty promotion/tenure panels in overseas universities and research funding agencies. It is worth noting that in addition to numerous invited and plenary lectures given in various international scientific conferences, PHY faculty members have also been active in promoting physics education by delivering public lectures locally and in mainland universities.

PHY strongly encourages colleagues to reach out and contribute directly to the society. Contribution to consultancy and patent application are recognised in the department's performance appraisal scheme. PHY also facilitates the application for industrial related research funding, e.g. ITF, and contract research by colleagues in order to build up direct collaborative relationship with the industries. The Department will work towards maintaining high-level and high quality capabilities and external links for KT.

Knowledge Transfer in Jockey Club College of Veterinary Medicine and Life Sciences

Over the past year, the Jockey Club College of Veterinary Medicine and Life Sciences (JCC) continued its efforts to contribute to the transfer of knowledge through various channels and platforms to benefit the community at large. The following highlights showcase JCC's KT endeavours to make a difference at local, regional and international levels.

The Department of Biomedical Sciences and Department of Infectious Diseases and Public Health carry out internationally competitive research and promote interdisciplinary collaboration in fields of biomedical sciences and veterinary medicine. The research programmes aim at understanding fundamental mechanisms of biological processes and diseases, and translating new knowledge into the development of novel diagnostic and therapeutic strategies for prediction, prevention, and treatment of human and animal diseases.

The Centre for Applied One Health Research and Policy Advice (OHRP) in JCC provides a pivotal platform to facilitate KT activities. Its mission is to generate scientific knowledge that will lead to the development of evidence-led policies at local, national, regional and international levels for the prevention and control of infectious animal diseases affecting human health and animal production, welfare and health. It will also emphasise the societal impact of its outputs through effective science-policy communication.

In April 2019, Professor Dirk Pfeiffer participated in the 'International Symposium on Prevention and Control of African Swine Fever'. The symposium brought together leading scientists, clinicians and executives from all around the world who are experts in the area with a view to discussing and advancing global strategy in tackling African Swine Fever. There were 25 presentations in total with many presenters from Europe including European Commission and Chief Veterinary Officers from European countries. Professor Pfeiffer also gave a presentation on "Known and suspected Risk factors for spread of the African swine fever virus in Asian context" at the FAO OIE GF-TADs 1st Meeting of the Standing Group of Experts on African Swine Fever for Asia.

Knowledge Transfer in School of Creative Media

In this reporting year, the School of Creative Media (SCM) has spearheaded development in knowledge transfer and yielded remarkable progress in the area. The School's performance in KT is largely characterized by its community and public engagement through the organisation of art events, exhibitions and research projects.

With the support from Hong Kong Jockey Club Charities Trust, Dr. Lam Miu Ling has been leading a robust development of custom-designed rehabilitation aids and tools under the community-based research project "Technologies for the Elderly and Disabled People by Youths" (TEDY). Most of the innovatively crafted tools produced by TEDY were tested by targeted beneficiaries in organisations, as well as invited to meet investors and the public at community events.

The outreaching exhibition "Blown Away – Art, Science and Extreme Weather" was held in Tai Kwun in April 2019 under the School's flagship Extreme Environment Programme. Students transformed data from the Hong Kong Observatory to create artworks which explored extreme weather's damaging effects to people and called for sustainability concerns in the society.

The School has extended its application of top-notch motion capture and 3D visualization technologies from preservation of intangible heritage to protection of animal life. The exhibition "ANiMAL" co-presented with the National Palace Museum (NPM) introduced animals from different historical eras and geographic contexts to the local public, with an aim to cultivating people's love and understanding for animals. High-tech media art was applied to re-create animals from ancient paintings and sculpture collections to meet with the imagination of today's visitors.

To celebrate its 20th anniversary and advance its role in media art education and research, the School hosted the pioneering interdisciplinary conference on machine learning, "Art Machines: International Symposium on Computational Media Art", and the "Algorithmic Art" exhibition at City Hall, which revisited the prominent works of computational art in Hong Kong and Asia along an exclusive showcase of works from SCM faculty members and alumni. These two major events heightened the School's international profile and brought together world-acclaimed scientists, artists, scholars, computer experts, philosophers and the local public for discussion on hot topics including the application and future implication of machine learning on art and media design.

Since its pilot-run in the last reporting year, the ACIM Research Fellowships under the Centre for Applied Computing and Interactive Media (ACIM) have continued to promote interdisciplinary and collaborative research among faculty members and students. Funding support and research space have been awarded to individuals and teams to generate more outputs of KT. In addition, the School has practiced for years to reward faculty members who have submitted GRF applications an extra travel grant to encourage faculty members to engage in exchange with overseas institutions and present their research findings abroad. The increased mobility of faculty members, who serve as active agents of KT, maximises their influence to the world through delivering lectures, publishing research results and participating in external advisory bodies. Their artworks exhibited around the globe have successfully articulated the School's pioneering leadership in media art research, development and education. By involving staff members, students and alumni in home-grown events with participation from international audience - exhibitions, performances, symposiums and conferences - SCM has continued to build and expand the KT capacity of staff members and students.

The University's Student Early Entrepreneurship Development Scheme (SEEDS), administered by the Knowledge Transfer Office, promotes innovation and entrepreneurship among students by funding student projects with high potential of producing new products for the market or intellectual property. This year, Year 3 BACM student Yiu Lok-man and her teammates from outside CityU have been granted the maximum funding of HK\$200,000 for their project Swimguard. This is a newly invented monitoring system to facilitate the work of lifeguards for the protection of swimmers. Utilizing ultrasonic and exercise motion pattern recognition technology, the device can accurately detect any drowning swimmers and alert the lifeguards immediately. The student team provides a highly sustainable and cost-effective solution for public swimming pools, such as water parks, swimming pools in hotels or club houses, or even public swimming pools managed by the government to overcome the shortage of lifeguards. SCM students' KT and entrepreneurial capacity have been evidenced in the recognition they earn from SEEDS.

Knowledge Transfer in School of Energy and Environment

The School of Energy and Environment (SEE) was founded in July 2009 with the mission to perform state-of-the-art research and provide professional education in energy- and environment-related issues. The faculty members in SEE are enthusiastic in participating in KT activities, like contract research, community service, external advisory bodies, etc. which develop interactive exchanges with government, collaborators, related organisations, and society in general.

Contract Research

Faculty members in SEE have organised contract research with different institutions including Drainage Services Department (HKSAR), Hong Kong Federation of Insurers and LANCOME PARFUMS BEAUTE & CIE from 1 July 2018 to 30 June 2019.

Efforts to build up KT capabilities

- 1. SEE worked with South China Morning Post by contributing articles to promote SEE and the respective research areas of faculty members, and also inspire the general public to care and recognise the importance of energy and environment issues, so as to promote CityU's excellence in research and professional education, and care for the community and environment.
- 2. Faculty members in SEE have been interviewed by various media, such as RTHK Radio 3, Yahoo Learning, South China Morning Post/Young Post, Sky Post, Ming Pao and other newspaper publishers on innovative research and technology. The interviews help transfer innovative knowledge to the general public. Dr. Walid Daoud's research on solar self-cleaning technology and Professor Johnny Chan's research on climate and tropical cyclones have been selected as impact case studies for submission of RAE Exercises 2020 to University Grants Council (UGC).

Outstanding KT initiatives

1. Dr. Alicia An has received an Innovation and Technology Fund (HK\$2m) under the Innovation and Technology Commission with L Industries Limited. The research proposed a novel membrane distillation system for the efficient and sustainable treatment of textile wastewater. A novel membrane distillation system will be used which utilises waste heat and generates recycled treated water suitable for reuse allowing the process to achieve zero liquid discharge.

To promote outreach/KT on building-related technologies, SEE co-organised with The Hong Kong Institute of Housing for a SEE Tech Talk Series on 4 May 2019. Dr. Edwin Tso, Dr. Wei Wu and Dr. Keith Ngan were the speakers to present their ongoing research on advanced environmental technologies for various hit-hot topics.

Knowledge Transfer in School of Law

i) Research Contracting/Consultancy

Two of the major forms of KT by universities and academics are through research contracting and provision of consultancy services, which enable universities/individual scholars to transfer their expertise to the necessary organisations/institutions, the broader society at large, or even internationally. Below are some examples of contract research and consultancy services performed by SLW colleagues during the reporting period:

- In February 2019, the Centre for Chinese and Comparative Law (RCCL) renewed its research contract with Chuo University in Japan to carry out the research for Phase Two of the "Comprehensive Analysis on Diversity of Legal Systems in Asia-Pacific Region and Convergence towards Establishment of Rule of Law" research project. The Principal Investigator of this project is Dr. Chen Lei, Director of RCCL.
- In late August 2018, the RCCL accepted the invitation of Microsoft Hong Kong Limited (Microsoft) to participate in its legal research project to research on the "Proposal for Hong Kong to be a Data Centre Hub for the Greater Bay Area & China". The Principal Investigator of this project is RCCL Director Dr. Chen Lei. Other RCCL members who participated in this project are Dr. Ding Chunyan and Dr. He Tianxiang.

ii) Professional Services

In addition to their excellent achievements in teaching and research, SLW faculty members are also engaged in KT through serving as members of professional bodies, government bodies, statutory bodies, and being given visiting or adjunct appointments by other universities. Examples during the reporting period include:

- Professor Geraint Howells is advisor of the Legal Education Fund Company Ltd. and member of the Standing Committee on Legal Education and Training;
- Professor Lin Feng is member of the Law Reform Commission and member of the Telecommunications (Competition Provisions) Appeal Board;
- Ms. Theresa Low is a member of the Standing Committee on Legal Education and Training.

iii) Community Engagement Activities

As a law school, one of its missions is to facilitate academic exchange and provide a platform for disseminating legal information and knowledge to academics, students, practitioners, as well as the interested general public. The most direct method to achieve this mission is through organising conferences and public lectures/seminars.

During the reporting period, SLW together with its research centres including the Centre for Chinese and Comparative Law, the Centre for Judicial Education and Research, the Hong Kong Commercial and Maritime Law Centre and Human Rights Law and Policy Forum have organised various conferences / workshops / symposia / public lectures / seminars. Most of these events were open to the public for free.

Apart from the above, SLW faculty members were also invited to participate in various conferences/seminars and give lectures to different groups of audiences. Their active participation and contribution in these activities greatly enhanced SLW's achievements in KT.

iv) Mooting

Mooting competitions are important KT activities for law students. By participating in mooting competitions, students not only learn substantive legal principles related to different moots but also develop oratory and advocacy skills. These skills equip students for future learning and their pursuit of a legal career. Below were SLW students' participation during the reporting period.

- The International Chamber of Commerce Mediation Competition Hong Kong
- 14th International Chamber of Commerce International Commercial Mediation Competition
- The 2019 Philip C. Jessup International Law Moot Court Competition (HK Round)
- The 9th Asia-Pacific M&A Moot Competition
- The 16th Annual Willem C. Vis (East) International Commercial Arbitration Moot
- The 3rd AIAC-ICC Pre-Moot for 26th Annual Willem C. Vis International Commercial Arbitration Moot
- The 9th Annual Budapest Pre-Moot for 26th Annual Willem C. Vis International Commercial Arbitration Moot
- The 26th Annual Willem C. Vis International Commercial Arbitration Moot
- Manfred Lachs Space Law Moot Court Competition 2019

v) Training for Mainland Judges

SLW collaborates with the Supreme People's Court of the PRC and its National Judges College to admit Chinese judges to its Master of Laws (LLM) programme and to offer a tailor-made Doctor of Juridical Science (JSD) programme for Chinese senior judges, while a short-term and highly specialised programme is also organised for other Chinese senior judges. The presence of these mainland judges in SLW offers an exceptional opportunity to its students for exchange of views as well as a well-informed understanding of the current Chinese legal system and its development.

As of May 2019, there are 241 Chinese judge graduates from its Master of Laws (Common Law) programme. Fourteen rounds of Advanced Programme for Chinese Senior Judges were held from May 2009 to June 2019, and a total of 386 senior Mainland judges joined the programme. For the Doctor of Juridical Science programme, a total of 103 Chinese judges, out of which 99 are senior judges in mainland China, have been admitted.

vi) Student Placement

Legal placement enhances students' hands-on experiences apart from their theoretical learning in Hong Kong. Given its significance, legal placement is offered as one of the electives for the LLB and JD students. The students did placement in Hong Kong, mainland China and Seoul in a variety of organisations such as law firms, barrister chambers, international banks, insurance companies, NGOs, courts and international institutions.