ANNUAL REPORT 2016/17

Recurrent Funding for Knowledge Transfer for the 2016-19 Triennium

submitted to

University Grants Committee

香 港 大 學
THE UNIVERSITY OF HONG KONG

July 2017

CONTENTS

EXECUTIVE SUMMARY

The UGC's earmarked funding for Knowledge Transfer (KT)[1] continues to be the most important enabler for the University to develop its strategic priorities for the Knowledge Exchange (KE) mission, i.e. Enhancing Capabilities and Capacity for Realising and Corroborating Impactful Research, Strengthening Technology Transfer and Partnerships, Nurturing Innovation and Entrepreneurship, and Broadening Knowledge Access and Community Engagement.

KE (including technology transfer and commercialization) has been added as an assessment element in the revised **Performance Review and Development (PRD) process of professoriate and academic-related staff** from 2016/17 onward, alongside Teaching, Research, and Service/Administration. A weighting should be assigned to each of these key areas, including KE, in advance of the PRD of individual staff members. Objectives should be set, against which performance is to be reviewed. This advancement in the University's human resource policy is a significant milestone in the University's strategic development of KE as its third mission.

The **Interdisciplinary KE Project Fund** was launched to encourage interdisciplinarity in KE, with priority given to cross-Faculty collaboration. This funding exercise has successfully encouraged cross-Faculty KE projects, attracting 21 quality proposals, of which 9 were supported.

The University strongly supports the Government's policy direction of promoting the development of innovation and technology in Hong Kong. To strengthen the Technology Transfer Office (TTO), the University had recruited a full time professional, Dr Shin Cheul Kim, as the **new Director of TTO**, who assumed duty in January 2017. The University has also committed funding to recruit two managers in TTO to strengthen intellectual property management. During the reporting period, the University has started a multimillion-US-dollar collaboration with TCL Corporation Ltd on OLED display technology research, and a HKU-TCL joint laboratory will be set up at HKU to support the collaboration.

Since its launch in 2014/15, the Technology Start-up Support Scheme for Universities at HKU (TSSSU@HKU) has supported **22 new technology start-up companies** in total. Two of them were admitted to the Cyberport Incubation Programme, and another ten of them have been admitted to the corresponding programme at the Hong Kong Science Park. So far, at least seven of them have already secured angel and/or institutional investments.

DreamCatchers, HKU's entrepreneurship series launched in 2015, has become a well-known platform to inspire innovation and entrepreneurship. The Global Youth Entrepreneurs Forum 2017, for example, attracted about 1,000 participants from more than 30 countries to come and share inspiring ideas with 74 speakers. Our student entrepreneurs shine in both **local and overseas entrepreneurship competitions**, for example, being awarded top prizes in the 'Challenge Cup' National Competition – Hong Kong Regional Final 2017; four of the ten awards in the Cyberport University Partnership Programme 2016; and the first prize in the Airbus Fly Your Ideas 2017 global student competition.

Space has been identified on the main campus for setting up **i-Dendron**, the University's new hub for innovation and entrepreneurship. Works are in progress and i-Dendron is expected to be launched at the beginning of the 2017/18 academic year.

[1] In this report, "KE" is used when referring to HKU's third mission, i.e. Knowledge Exchange, whereas "KT" is used when referring to the UGC's earmarked funding for Knowledge Transfer.

HIGHLIGHTS OF KE DEVELOPMENTS IN 2016/17

1. KE in Performance Review and Development

In the last triennium we made a significant step forward in linking KE with the staffing process by enabling academic and related staff to include their KE contributions in their Academic Portfolio of Achievement (APA) each year. However, KE was not yet an assessment element in the yearly Performance Review and Development (PRD) process.

With persistent efforts made by the Knowledge Exchange Office (KEO), KE has now been added as an assessment element in the revised PRD process of professoriate and academic-related staff from 2016/17 onward, alongside Teaching, Research, and Service/Administration. A weighting should be assigned to each of these key areas, including KE, in advance of the PRD of individual staff members. A reviewer will set objectives for each of these key areas for the next review period for a reviewee, and assess the reviewee's achievements, and progress toward the objectives after the end of the review period. For KE, the reviewee should highlight the evidence of his/her meaningful contributions to the community, business/industry, or partner organizations, whether local or international. Such contributions include technology transfer and commercialization (patents, licenses, and spin-off/start-up companies), contract research or consultancy project outcomes, influence on public policy, community engagement activities, enhancing accessibility of HKU knowledge, etc.

The revised online PRD form and the corresponding revised APA system were launched by the Human Resource Section on July 24, 2017 for the 2016/17 PRD exercise. This advancement in the University's human resource policy is a significant milestone in the University's strategic development of KE as its third mission.

2. Enhancing Capabilities and Capacity for Realising and Corroborating Impactful Research

Impact Cases

Review of Animal Welfare Legislation in Hong Kong

The research of Ms Amanda Whitfort of the Department of Professional Legal Education provided the first and, to date, only empirical study of the adequacy of animal protection legislation in Hong Kong. The study generated widespread public discussion and impetus for law reform and was used by the Agriculture, Fisheries and Conservation Department of the HKSAR Government to introduce new legislation controlling the breeding and sale of companion animals in Hong Kong with the enactment of the Public Health (Animals and Birds) (Animal Traders) Regulations 2016. The study also resulted in significant policy change in stray-animal management and introduction of specialised training for police and prosecutors in presenting animal cruelty cases at court.

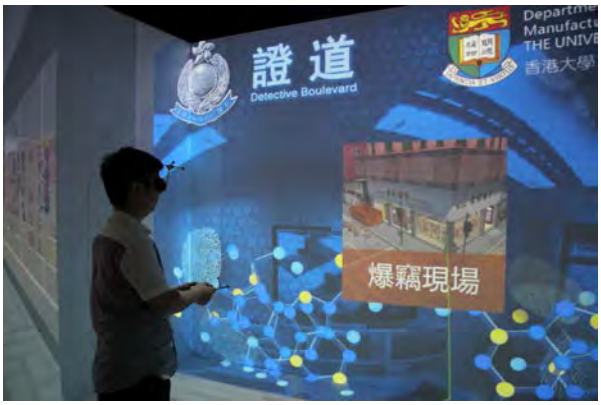
Following the Faculty KE Award 2011 of the Faculty of Law, Ms Whitfort received the University's KE Excellence Award 2016 for this project. More details are at Annex I-A.

RFID-Enabled Real-Time Ubiquitous Manufacturing Platform

Professor George Huang of the Department of Industrial and Manufacturing Systems Engineering and his team have pioneered a unique approach in developing and applying Internet of Things (IoT) or Physical Internet in manufacturing and logistics industries. Their RFID-enabled, real-time technology platform can upgrade and transform the traditional manufacturing workshop practices into a level that is real-time, ubiquitous, and intelligent. The use of the technology changes how supervisors make their shop floor decisions; how workers carry out their daily operations; and the design of the shop floor layout and processes. All the industrial collaborators in the Pearl River Delta region and Zhejiang Province have reported substantial economic and operational benefits, with reduced costs and improved efficiency.

Professor Huang's team received the Faculty KE Award 2015 of the Faculty of Engineering. More details are at Annex I-B.

An Immersive and Interactive Virtual Reality System - the imseCAVE



Dr Henry Y.K. Lau of the Department of Industrial and Manufacturing Systems Engineering and his team have developed the imseCAVE technology, creating an interactive virtual reality environment with multi-screen stereographic projection and multiple object tracking capability that is powered by a customizable and configurable virtual reality engine. It is an innovative solution that creates lifelike objects and scenarios without the limits of time and space in a cost effective manner, providing a versatile platform for industry, business and education sectors for training, skills evaluation, and system analysis. A wide range of clients, from the Airport Authority, Cathay Pacific, air cargo handling companies, to the Hospital Authority, have used the system. In more recent years the technology has even been used to train police detectives in inspecting a crime scene.

Dr Lau's team received the Faculty KE Award 2016 of the Faculty of Engineering. More details are at Annex I-C.

High Performance Phosphorescent Platinum(II) Emitters for OLED Application

The achievements of Professor Chi-Ming Che of the Department of Chemistry in advancing organic light-emitting diodes (OLED) technology with phosphorescent platinum(II) emitters have been internationally recognised. Patents were obtained for his OLED innovations that make groundbreaking use of platinum. Compared with iridium-based OLEDs, his novel and high performance phosphorescent platinum(II) OLED materials are brighter with a higher luminous efficiency and a longer lifetime, which are highly essential features for product development. He has been engaging with industries effectively, and several patents were licensed by leading high-tech companies that are working with him to develop platinum OLEDs into industrial applications. Collaborations with these leading OLEDs companies are on-going. His new OLED technology can potentially be used for developing new generation

TV screen panels, mobile devices, flexible panel devices, transparent panel devices and novel lighting systems.

Professor Che received the Faculty KE Award 2016 of the Faculty of Science. More details are at Annex I-D.

Evaluation of a Pioneering Service Delivery Model for Preschoolers with Special Educational Needs

Professor Shui-fong Lam of the Department of Psychology has worked with Heep Hong Society to develop a new service delivery model for early intervention for preschoolers with special educational needs (SEN). It adopts a multidisciplinary and multimodal approach that involves partnership across the school, family, and clinical contexts. Professor Lam evaluated the trial run of the new model in ten preschools, and the promising results prompted the Government to launch a pilot scheme on on-site pre-school rehabilitation services with funding of $420 million to provide 2,900 training places (almost 50% of the children on the waiting list) in 450 preschools in 2015-17. The pilot scheme, in terms of its scale and format, was unprecedented in the social welfare sector, involving a total of 16 social welfare organizations.

Professor Lam received the Faculty KE Award 2016 of the Faculty of Social Sciences. More details are at Annex I-E.

Impact Workshops

We continue our efforts to learn from the UK experience in its Research Excellence Framework (REF) 2014 exercise, which gave 20% weighting to impact for the first time, in order to raise the awareness of our researchers about the importance of achieving and corroborating impact beyond the academia. In the reporting year, six impact workshops were organised by KEO in collaboration with the Faculties concerned as follows:

- September 15, 2016: 'The Impact of Legal Research'
  Professor Paul Roberts, School of Law, University of Nottingham
- November 24, 2016: 'Development of Impact Case Studies for REF 2014 – Process and Issues'
  Professor Matthew Evans, Dean of Science, The University of Hong Kong
- March 8, 2017: 'Impact and the REF'
  Professor Lindsay Farmer, School of Law, University of Glasgow
- April 19, 2017: 'REF2014 and REF2021, thoughts from the past and thinking to the future'
  Dr Rafael Schacter, Department of Anthropology, University College London

- May 19, 2017: 'Routes to 'Impact': thinking creatively and strategically about the process'
  Dr Mark Johnson, Department of Anthropology, Goldsmiths, University of London
- May 22, 2017: 'Delivering Impact, with impact'
  Dr Sarah Perkins, GW4 Alliance

The UGC issued a consultation document on the Research Assessment Exercise (RAE) 2020 in May 2017, proposing, inter alia, that Impact be introduced as an element of assessment in the next RAE, with a weighting of 20%. The proposed framework is very close to that of the REF 2014. We are encouraged that KEO's efforts in the past years are in full alignment with this development and the UGC's direction.

Interdisciplinary KE Project Fund

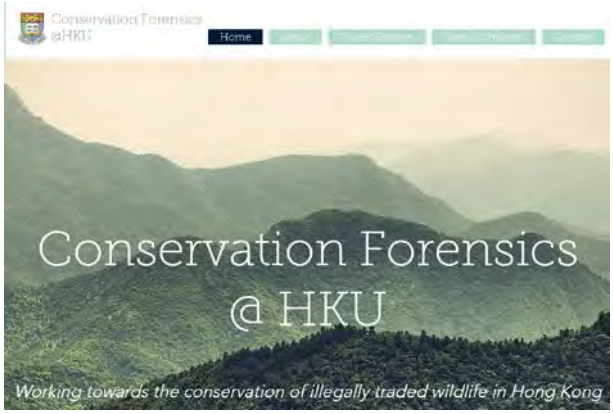
The University allocated $1.5 million to support KE, using the additional funding allocated by the UGC to the University at the end of the 2012-15 triennium. KEO has used this funding to conduct a one-off funding exercise to encourage interdisciplinarity in KE. This initiative supports the University's strategy to promote 'Interdisciplinarity', which is one of the (3+1)Is – *Internationalisation*, *Innovation* and *Interdisciplinarity*, which converge to create *Impact* – set out in the 'HKU Vision 2016-2025', the strategic outline that defines HKU as Asia's Global University.

The Interdisciplinary KE Project Fund aims to facilitate interdisciplinary KE projects that have the potential to create social, economic, environmental or cultural impacts for industry, business or the community by building on interdisciplinary research in the University, with priority given to cross-Faculty collaboration. Projects should last for no more than two years. The funding has successfully encouraged cross-Faculty KE projects, attracting 21 quality proposals, of which 9 were supported (list at Annex II).

Impact Project Funding Scheme

The University continued to use the KT funding to run the Impact Project Funding Scheme in 2016/17, which has become an important enabler for our academic staff to benefit the broader community with their expert knowledge. In the reporting year, 58 proposals were received, of which 51 were supported (list at Annex III). Two completed projects are highlighted below.

An Integrated Approach to Conservation Forensics: Reducing Wildlife Trade Globally Through Technology, Analytics and Education



As wildlife crime increases, additional pressures are placed on populations of already highly endangered species across the world. In Hong Kong, this is especially a problem, as free trade caters for much of the import, export and re-export of animal and plant products into the rest of Asia, for purposes such as Traditional Chinese Medicine, as well as the pet trade. Multiple efforts by researchers in the School of Biological Sciences have engaged with key global conservation concerns with respect to

wildlife trade.

With KE funding support, the project team led by Dr Timothy Bonebrake has built the 'Conservation Forensics @ HKU' website to highlight their technological and analytical capabilities, case studies and the impacts of their research. It aims to elevate HKU as a hub for wildlife trade research, and help build collaborative effort on an international level, both academic and non-academic. They have received much attention from local and international media, with interviews for radio, news and documentaries from the BBC (UK), Sustainable Eel Group (Germany), SPCA (HK), SCMP (HK), RTHK (HK) and TVB Pearl (HK), etc. Research collaborations with international NGOs have also expanded. These include: identifying trade networks and seizures of 'critically endangered' European eels with the Sustainable Eel Group (Germany); using genetic markers to determine population differences of 'critically endangered' Helmeted Hornbills with Trace Network International and the Department of National Park, Wildlife and Plant Conservation (DNP), Thailand; identifying the mislabelling of seafood around Hong Kong supermarkets with WWF and the Customs and Excise Department; and identifying illegal wildlife products traded into Hong Kong with TRAFFIC (HK). They also provide support to the Agriculture, Fisheries and Conservation Department to genetically identify the species of the seized shark fin and European eels for potential prosecution.

Empowering a Non-Governmental Non-Profit Organization to Deliver Oral Home Care and Promote Awareness of Dementia in Elderly Care Centers

Over 99% of the non-institutionalized older persons aged 65 to 74 have tooth decay experience but 48% of them left it untreated. With KE funding support, Dr Katherine Leung and Professor Chun Hung Chu of the Faculty of Dentistry collaborated with the Hong Kong Alzheimer's Disease Association to organise an outreach programme, 'Oral Health Promotion and Examination for the Elderly and the Elderly with Alzheimer's Disease', in eight elderly centres, four of which specifically serve people with Alzheimer's disease. The eight centres are located in different districts, from Kwun Tong, Wong Tai Sin, Kowloon city, Eastern district to Central and Western district, which have a high proportion of older persons. The programme aimed to provide home oral-care knowledge to the elderly, their caregivers and elderly centres' staff. The dentists, Faculty students and staff provided free oral examinations and preventive treatments to around 300 participants, and specific recommendations and oral health education to the elderly and their caregivers.

3. Strengthening Technology Transfer and Partnerships

To strengthen the Technology Transfer Office (TTO), the University had recruited a full time professional, Dr Shin Cheul Kim, as the new Director of TTO, who assumed duty in January 2017. Dr Kim was senior vice president in ETPL, the commercialization arm of Agency for Science, Technology and Research (A*STAR), Singapore, and has a strong track record in technology commercialization and investment.

The University has also committed funding to recruit two managers in TTO to strengthen

intellectual property (IP) management, and TTO will set up the IP management team by the end of 2017. Under the new leadership, TTO is engaging individual Faculties to promote IP filing and technology commercialization.

Strategic Partnerships

The University continues the efforts to build strategic collaboration and partnership with industry to tap into new sources of funding and maximize the value of our research. During the reporting period, HKU has started a multimillion-US-dollar collaboration with TCL Corporation Ltd (TCL) on OLED display technology research. This project is led by Professor Vivian Yam, Chair Professor in Chemistry, and a HKU-TCL joint laboratory will be set up at HKU to support the collaboration.

The University has also signed a Memorandum of Understanding (MoU) with the Hong Kong Applied Science and Technology Research Institute (ASTRI) to set up the HKU-ASTRI Joint Research Laboratory. According to the MoU, ASTRI and HKU will jointly carry out R&D projects in financial technologies (FinTech), health technologies and smart city technologies. The collaboration is expected to enable creative basic research to flow through the value chain to become innovative technology and impact, in the form of products, processes and services.

The HKU-Zhejiang Institute of Research and Innovation (HKU-ZIRI) and the Shenzhen Institute of Research and Innovation (HKU-SIRI) provide platforms for translational research, technology transfer and collaboration with industry in mainland China. The HKU-ZIRI has signed three agreements with industries in June 2017, namely Huadian Heavy Industries Co. Ltd. (华电重工股份有限公司) for collaboration in industrial noise control, Juhua Group Corporation (巨化集团有限公司) for collaboration in new materials in food packaging, and Jiaxing Rui Yi Environmental Technology Co. Ltd. (嘉兴瑞奕环保科技有限公司) for collaboration in environmental friendly materials.

Examples of HKU Technologies Transferred

Flow-through Hybridization

Developed by a research team in Biochemistry, the “flow-through hybridization” is a patented technology of the University to address the problems in conventional DNA hybridization techniques. In conventional hybridization of nucleic acids, DNA samples are dotted or transferred to a membrane by blotting techniques. Only a small part of the target DNA is located at the surface of the membrane, and fragments smaller than 300pb are undetectable because they are trapped inside the membrane, so multiple runs are always needed. A low density medical gene chip working platform, HybriMax, was developed based on the above-mentioned HKU technology, which was licensed to Guangdong Hybribio Biotech Co., Ltd (Hybribio). HybriMax provides rapid, sensitive and highly accurate diagnosis of diseases by analyzing nucleic acid samples.

Hybribio is gradually becoming a lead provider of in vitro diagnostic assays in Greater China, with fully integrated operation chain from R&D, manufacturing, sales & marketing to after-sales technical support service. One of the kits used with HybriMax is the next generation 37 HPV GenoArray Diagnostic Kit, which can simultaneously detect 37 HPV genotypes in a single run. More than 1,200 hospitals and medical institutes in China have adopted this HPV diagnostic technology, and more than 20 countries around the world have been using its products for clinical and research purposes. On April 12, 2017, Hybribio was successfully

listed on GEM of Shenzhen Stock Exchange.

'CR eFiling' Mobile Application

The Companies Registry's e-Registry was launched in 2011 to provide electronic incorporation (e-Incorporation) and electronic submission (e-Submission) services to users. The underlying electronic form processing technology was developed at the University, providing a cross-platform solution that allows end users to fill out and submit their e-Forms on desktop computers running different operating systems like Microsoft Windows, Apple OSX and the open-sourced Linux. With the enabling e-Form technology, the time to process a new company incorporation by the Companies Registry has been greatly reduced from four days to less than an hour.

Furthermore, a new mobile electronic form processing technology developed at the University has recently been adopted by the Companies Registry. The new 'CR eFiling' mobile solution was launched by the Companies Registry earlier this year, which enables users of its e-Registry service to submit 13 of the most commonly used e-Forms using mobile devices like Apple iPhones and Android tablets. The number of e-Forms supported will continue to grow in the near future as the Companies Registry rolls out new phases regularly.

Licensing of Daptomycin Analogs

Antimicrobial resistance is on the rise globally and has become a serious threat to human health, so there is a strong need for new antibiotics. The invention "Antibacterial Cyclic Lipopeptides", developed by a team of chemists from HKU, provides novel daptomycin derivatives as potential next-generation antibiotics for treatment of multidrug-resistant bacterial infections. An exclusive license has been granted to a Chinese pharmaceutical company, which has the capability and commitment to bring the new analogs of daptomycin to the market, with a view to helping to save millions of lives.

Technology Transfer Promotion

InnoTech Expo 2016

The InnoTech Expo 2016 organised by Our Hong Kong Foundation was held at the Hong Kong Convention and Exhibition Centre from September 24 to October 1, 2016, with the theme of 'Innovation Driving Developments, Technology Leading the Future'. The Expo attracted many visitors, including students and teachers from about 300 primary and secondary schools. HKU showcased the following two research projects from the Department of Electrical and Electronic Engineering:

- Passive LED Driver for Street Lighting (Professor Ron Hui)
- High Speed Imaging Technologies based on OCT and WET (Professor Kenneth Wong)

InnoCarnival 2016

The InnoCarnival 2016 organised by the Innovation and Technology Commission (ITC) was held at the Hong Kong Science Park from October 29 to November 6, 2016, with the theme of 'Smart Living. Innovative Hong Kong'. HKU showcased seven research projects, and the key exhibit was the solar car – Helios, which won the 2016 Overall Champion Award and Innovative Design Award of the 'New Energy New Generation' solar car competition held by the Electrical and Mechanical Services Department of the Government. The seven projects are as follows:

- Solar car – Helios (Dr Paddy K. L. Chan, Department of Mechanical Engineering)
- An Antibody for Predicting Tamoxifen Response in Breast Cancer Patients (Professor U.S. Khoo, Department of Pathology)
- Development of Bismuth Compounds as Novel Antagonists against Toxicity of Anticancer Drug Cisplatin (Professor H.Z. Sun, Department of Chemistry)
- Next Generation Bone Implant for the Elderly (Professor William Lu, Professor Frankie Leung, Dr Christian Fang, and Mr Sloan Kulper, Department of Orthopaedics and Traumatology)
- Reading Battle (Dr Samuel K.W. Chu, Faculty of Education)
- Research and Development on Techniques for Automatic Segmentation, Tracking and Reconstruction of Mitral Valve from 4D Echocardiogram (Dr K.K.Y. Wong, Department of Computer Science)
- Amazing Water Filters (Dr Chuyang Tang, Department of Civil Engineering)

AUTM ASIA 2017

The Association of University Technology Managers (AUTM) is a nonprofit organization based in the US dedicated to supporting and advancing academic technology transfer globally through education, professional development, partnering and advocacy. HKU co-organised AUTM Asia 2017 with other universities in Hong Kong and Macau, and the Hong Kong Science and Technology Parks Corporation (HKSTP), which was held on April 23 – 26, 2017 at the Hong Kong Science Park. This was the first time that this international technology transfer conference had been held in Hong Kong. It brought together speakers from academic research institutes and industries, entrepreneurs and technology transfer professionals to discuss the free movement of innovative ideas, interests of emerging Asia markets and trends in technology management.

The KT funding has enabled HKU to invite a number of prominent overseas speakers to deliver keynote address and panel discussions at the conference, including Judge Randall R. Rader (Former Chief Judge of U.S. Court of Appeals for the Federal Circuit), Professor Tim Swager (Professor of Chemistry, Massachusetts Institute of Technology), Mr Tom Hockaday (Former Managing Director of Oxford ISIS), Professor Teck-Seng Low (Chief Executive Officer, National Research Foundation, Singapore), Professor Poh Kam Wong (Director, Entrepreneurship Centre of National University of Singapore), Dr Jasemine Chambers (Of Counsel, Wilson Sonsini Goodrich and Rosati, P.C.) and Mr Takafumi Yamamoto (President and CEO, TODAI TLO, Ltd).

EmTech Hong Kong 2017

HKU was the Premier Innovation Partner of EmTech Hong Kong 2017, a leading technology conference co-organised by MIT Technology Review and Koelnmesse Pte Ltd, which was held on June 6 and 7, 2017 at the Hong Kong Convention and Exhibition Centre. It brought together some leading scientists and industry experts in artificial intelligence, materials science, biomedicine, cybersecurity and FinTech. Over 300 participants from different countries attended this event to learn about the latest emerging technologies in these areas. Professor Vivian Yam of our Department of Chemistry gave a talk on new classes of molecular materials for various optoelectronic applications.

Public Lectures and Professional Development Workshops

The following experts in technology transfer were invited to share with students and other technology transfer professionals their experience in driving innovation and commercialization:

- June 14, 2017: 'Dialogue with Dov Moran – the inventor of USB memory stick'
  Mr Dov Moran, a renowned inventor/entrepreneur/investor who invented the USB memory stick
- September 30, 2016: 'Innovation and Entrepreneurship – Opportunities for Start-ups in Hong Kong'
  Mr Herman Lam, Chief Executive Officer, Hong Kong Cyberport Management Company Limited
- April 28, 2017: 'Dialogue with Technology Transfer Office @HKU'
  Dr Shin Cheul Kim, Director of TTO, HKU
- June 24 – 25, 2017: 'Innovation and Entrepreneurship Education Alliance in China Symposium 2017', Zhengzhou University
  Dr Shin Cheul Kim, Director of TTO, HKU

4. Nurturing Innovation and Entrepreneurship

The University has been promoting and strengthening innovation and entrepreneurship, not just for and with staff members but importantly with our students and alumni.

Technology Start-ups

With support of the ITC, the Technology Start-up Support Scheme for Universities at HKU (TSSSU@HKU) has entered into its fourth round of application. A total of 22 applications were received in January 2017, and nine new start-up companies were awarded funding,

totalling $4 million. Out of these nine TSSSU@HKU awardees, seven are commercializing HKU technologies. As of June 30, 2017, TSSSU@HKU has supported 22 new technology start-up companies in total. Two of them were admitted to the Cyberport Incubation Programme, and another ten of them have been admitted to the corresponding programme at the Hong Kong Science Park. So far, at least seven of them have already secured angel and/or institutional investments.

Two start-ups funded by TSSSU@HKU are highlighted below.

Accosys Limited

Accosys Ltd is an artificial intelligence (AI) start-up founded by a recent engineering PhD graduate from HKU, Dr Miles Wen, and his former PhD supervisor, Professor Victor Li, Chair Professor of Information Engineering. It provides one-stop AI concierge services for the public sector and service industry that can give a much better user experience. Shopping malls and large institutions with a lot of contact with the public do not necessarily have enough customer servers to meet demand. The technology of Accosys can serve millions of customers at the same time. It works using both text and speech, and does not require customers to download anything – they can access via a client's website, Facebook page, WeChat or WhatsApp accounts and other social media. Accosys also provides a data analytics service to help clients understand their visitors better and conduct targeted marketing. The company has expanded its clientele to the telecommunications sector and started to develop its business in mainland China.

SkinData Ltd

SkinData Ltd was a start-up founded by Dr Shuting Hu, a PhD graduate of HKU who studied molecular pathways and new ingredients for skin whitening. With the encouragement of her PhD supervisor, Dr Mingfu Wang of the School of Biological Sciences, she started her own company after completing her PhD in 2014 and postdoc in 2015. SkinData aims to develop products for skin pigmentation, photoageing and inflammation, using naturally-sourced, active pharmaceutical-grade compounds that are put through rigorous testing. Dr Hu recently set up a lab with office at the Hong Kong Science Park under its Incubation programme to conduct cell or tissue culture studies, ingredient preparation and formulation development. The company will focus on designing and licensing patented products to cosmetic firms and may consider developing its own brand in the longer term.

DreamCatchers

DreamCatchers, HKU's entrepreneurship series launched in 2015, has become a well-known platform to inspire innovation and entrepreneurship, covering all tech, biz, social, cultural and media spheres. Through DreamCatchers, the University has captured the enthusiasm and imagination from different sectors to grow the entrepreneurship community. There is cross-sectional and coordinated effort within the University, involving TTO, Development and Alumni Affairs Office (DAAO), and Graduate School, etc. For example, DAAO helps the entrepreneurial community building and engagement by tapping into the HKU alumni and friends network through DreamCatchers activities such as the 100K Seed Fund Competition. The DreamCatchers events were partially supported by the KT funding.

DreamCatchers 100K Seed Fund Competition

HKU's entrepreneurship seed fund competition, 'DreamCatchers 100K', was held again in 2017. 20 teams formed by HKU students and young alumni were shortlisted from 104 applications to receive mentorship from seasoned entrepreneurs. The final pitch was held on April 2, 2017 at HKU, and ten outstanding teams were each awarded seed fund of $100,000 for development of their projects. The winning projects include 'Project Raphael', an automated and multi-sensory inspection software solution on drone for intelligent inspection in construction and buildings; 'BioCap', a portable and inexpensive chip that provides an easy and real-time diagnosis of influenza; and 'Peacify', a smart sock designed to keep track of a baby's vital signs, alerting parents if there are any abnormalities; etc.

Global Youth Entrepreneurs Forum 2017 – WE THE FUTURE

The Global Youth Entrepreneurs Forum 2017 was jointly organised by the Hong Kong Federation of Youth Groups and HKU DreamCatchers, and co-organisers included Shenzhen Youth Federation, Qianhai Shenzhen-Hong Kong Youth Innovation and Entrepreneur Hub, and the Dragon Foundation. About 1,000 participants from more than 30 countries and 74 speakers gathered on June 13, 2017 at HKU for a full-day forum, which featured the keynote speech by Mr Dov Moran from Israel who is the inventor of USB memory stick, 27 panel discussions, pitching demonstration, start-up exhibitions, roundtable discussions and networking opportunities. The Forum enabled speakers and participants to exchange ideas on the hot topics such as innovating global businesses, deconstructing fast-growing companies, Asia entrepreneurship blooms, FinTech, social media, cultural start-ups, etc. Participants also visited the Qianhai Shenzhen-Hong Kong Youth Innovation and Entrepreneur Hub on June 14, 2017.

DreamCatchers MedTech Hackathon Hong Kong 2017

The DreamCatchers MedTech Hackathon Hong Kong this year was again led by Dr Robert Chang and his team from Stanford University, HKU and HKSTP. Ten students from Stanford University together with 40 students and young entrepreneurs-to-be from Hong Kong spent a week from June 18 to 25, 2017 in the Hong Kong Science Park to demystify the process of healthcare innovation. Participants were given the opportunity to observe unmet medical needs in the hospitals and rehabilitation centers in Hong Kong. Lectures covering business model canvas, biodesign methodology, patents, medical policy, etc. were provided.

Each team, comprising medical, engineering, science and business students, had to come up with a clear need statement for an unmet need under the theme of 'Enabling Medical Care Outside the Hospital', apply what they learned in the Hackathon to create an innovative solution to address the unmet need, and present their solution at the Final Pitch on the last day of the event. The winning team, 'EyeCare', created a prototype to improve eyelid hygiene in patients with evaporative dry eye disease to reduce eye discomfort and inflammation.

Other Entrepreneurship Competitions

DreamCatchers works with TTO and the Graduate School to encourage HKU undergraduate and postgraduate students to join entrepreneurship competitions, both local and overseas. For example, in the 'Challenge Cup' National Competition – Hong Kong Regional Final 2017, HKU students won a total of 11 awards. Moreover, HKU received the Outstanding Participating Award, which was awarded to the institution with the most projects/awards. Some of the winning projects were introduced to the public at the HKU booth at the 'Innovation in Science and Technology, Realization of our Dreams' exhibition organised by the Hong Kong Celebrations Association, which was held at Victoria Park from June 28 to July 2, 2017, including:

- Development and Applications of Next Generation Histology for Three-Dimensional Interrogation of the Human Brain (First Place in Innovation [Life Sciences] category)
- Wavelength-dependent Light-driven Nanomotor for Potential Nanomedicine Application (First Place in Innovation [Energy & Chemical Engineering] category)
- 42-Lab: A Portable Hardware Platform of Biotech Experiments in STEM Education (Grand Award and First Place in Entrepreneurship [Start-up] category)

Another example is the Cyberport University Partnership Programme (CUPP) 2016, in which 65 students from 20 teams from different local universities pitched their FinTech ideas on October 27, 2016. Four of the ten winning CUPP teams were from HKU, which were each awarded with a cash grant of $100,000 and shortlisted as candidates of the Cyberport Incubation Programme to turn their business ideas into reality.

Our student entrepreneurs also shine overseas. Team DAELead, a team of four HKU third-year medical engineering students, won in the Airbus Fly Your Ideas 2017 global student competition on May 17, 2017. Team DAELead beat fierce global competition to win the €30,000 first prize with their effective design for a Private Stowage Compartment underneath passenger's feet. The HKU team was among the top 5 teams, shortlisted from 365 entries globally, to spend a week at the Airbus ProtoSpace facility in Toulouse, France to visualise, prototype and test their ideas using state-of-the-art equipment, before presenting them at the final.

5. Broadening Knowledge Access and Community Engagement

Integration at Faculty Level

Community engagement has become embedded not only in the regular activities of our Faculties but also in collaborative projects. For example, the Faculty of Arts and the University Museum and Art Gallery jointly organised the exhibition 'Rising Above: The Kinsey African American Arts & History Collection' from December 2016 to February 2017, in collaboration with KBK Enterprises, Inc. and the Bernard and Shirley Kinsey Foundation for Arts & Education. The exhibition brought the Kinsey Collection to Asia for the first time and introduced African American history and culture to over 20,000 local and international visitors. It inspired a series of public lectures and free musical performances, including one with the Hong Kong Philharmonic Orchestra, the development of new teaching resources, and strengthened engagement with supporting corporate and cultural organizations.

Gerontech and Innovation Expo cum Summit

The Gerontech and Innovation Expo cum Summit (GIES), held on June 16 – 18, 2017 in the Hong Kong Convention and Exhibition Centre, was jointly organised by the HKSAR Government, Hong Kong Council of Social Service and HKSTP. GIES aims to support the Government's policy of promoting healthy and active ageing. It is also one of the events of the Government to celebrate the 20th anniversary of the establishment of the HKSAR. KEO coordinated HKU's participation in GIES to showcase the following projects at the HKU pavilion:

- New Cartilage Regeneration Technology (Professor Barbara Pui Chan, Department of Mechanical Engineering)
- Next Generation Bone Implant for the Elderly (Mr Sloan Kulper and faculty members in Department of Orthopaedics and Traumatology)
- The Magic of Chinese Yam for Treatment of Menopausal Syndrome (Dr Stephen Cho Wing Sze, School of Chinese Medicine)
- Prevention of Aging-associated Neurodegeneration in Alzheimer's Disease and Glaucoma with a Wolfberry Extract (Dr Raymond Chuen Chung Chang, School of Biomedical Sciences)
- A Soft Robot Hand for Neural Rehabilitation of Degenerative Neurological Diseases and

Strokes (Dr Yong Hu, Department of Orthopaedics and Traumatology)

- Technology-based Management of Swallowing Difficulties (Dr Karen Man Kei Chan, Faculty of Education [Division of Speech and Hearing Sciences])
- A Wearable Transcranial DC-Stimulator to Help Prevent Degenerative Brain Diseases (Dr Yong Hu, Department of Orthopaedics and Traumatology)

The following talks delivered by HKU colleagues at the Summit were well-received:

- June 17, 2017: 'SeniorCLIC – free legal information website for seniors'
  Mr Michael Man-kit Cheung, Assistant Research Officer, Law and Technology Centre
- June 18, 2017: 'Prevention of Ageing-associated Neurodegeneration in Alzheimer's Disease and Glaucoma by Anti-ageing Chinese Medicine Wolfberry'
  Dr Raymond Chuen Chung Chang, Associate Professor, School of Biomedical Sciences

GIES attracted over 43,000 visitors during those three days, and many of them visited the HKU pavilion, showing keen interest in our projects.

Student KE Projects

The KT funding was used to support 30 student KE projects in the reporting year. The University also makes use of other funds to encourage students to undertake community projects, for example, the Service 100 Fund and the We Are With You Project Scheme that are administered by the Centre of Development and Resources for Students. Examples include 'Drug Usage Information Day' organised by pharmacy students to disseminate correct drug knowledge and promote drug safety to the public; and 'Social Inclusion Project for the Elderly' organised by speech and hearing sciences students to provide screening service for swallowing and hearing problems to help elderly people with disabilities, and to promote the social inclusion concept among university and secondary school students.

QUANTITATIVE INDICATORS

Given the broad definition of KE of the University, our performance indicators are not limited to the UGC required metrics, but also other indicators that are highly relevant to the University's KE efforts. Two tables on the UGC and HKU performance indicators respectively are at Annex IV.

LOOKING AHEAD

The University welcomes the Government's policy direction of promoting the development of innovation and technology in Hong Kong. In response to the 2017 Policy Address Initiative, HKU will further strengthen its technology transfer function in coordinating and commercializing research outputs. The University is in the process of establishing a new hub for innovation and entrepreneurship called i-Dendron. Space has been identified on the main campus for setting up i-Dendron, which is expected to be launched at the beginning of the 2017/18 academic year.

The University of Hong Kong
July 28, 2017

Annex I-A

Title of Impact Case Study: Review of Animal Welfare Legislation in Hong Kong

1. Summary of the impact

This research provided the first and, to date, only empirical study of the adequacy of animal protection legislation in Hong Kong. The study generated widespread public discussion and impetus for law reform and was used by the Agricultural Fisheries and Conservation Department (AFCD) to introduce new legislation controlling the breeding and sale of companion animals in Hong Kong with the enactment of the *Public Health (Animals and Birds) (Animal Traders) Regulations* 2016. The study also resulted in significant policy change in stray-animal management and introduction of specialised training for police and prosecutors in presenting animal cruelty cases at court.

2. Underpinning research

In 2008, **Amanda Whitfort** and **Dr Fiona Woodhouse** were awarded a Public Policy Research grant by the Research Grants Council to conduct a comparative study evaluating animal protection legislation (HKU 7010-PPR-5). As Hong Kong's animal welfare laws were drafted in the 1930's, the review was timely. Whitfort and Woodhouse empirically investigated local laws protecting animals kept for companionship, food, entertainment and laboratory use, and controlling wild and feral animals. They evaluated Hong Kong's laws against those enacted in other common law jurisdictions and provided a series of recommendations for law reform. The study was successfully completed in 2010 with the release of a comprehensive 180 page report: *Review of Animal Welfare Legislation in Hong Kong* [R1]. The report was disseminated to the public, interested NGOs and government.

The study found that Hong Kong's anti-cruelty legislation lacked the necessary power to assist animals in danger of suffering and abuse. The current law is enforced only when an animal is the victim of an overtly cruel act. Criminal neglect of animals is not regarded as an offence. The study recommended significant reform to Hong Kong's laws through the introduction of a new Animal Welfare Ordinance, which would impose on owners a positive duty to care properly for their animals [R1, R4]. In regard to sentencing practices in animal cruelty cases, the study found that despite the maximum penalty for the offence having been raised in 2006, court sentences had remained lenient, even following convictions for sustained and serious abuse [R1, R2].

The study also uncovered serious failures at local slaughterhouses and in live wet food markets to meet animal welfare standards prescribed by the OIE (World Organisation for Animal Health) Terrestrial Animal Health Code 2009 (Slaughter of Animals), to which China is a signatory [R1, R2, R4].

In relation to the pet trade, the study found Hong Kong's lack of legislative control on animal trading had resulted in only two licensed dog breeders offering animals for sale in Hong Kong, with the remaining animals coming from unlicensed hobby breeders or import dealers. The study highlighted that the continued lack of legislation requiring the licensing of all dog breeders had allowed animals of dubious origin and health to be widely sold throughout the Territory, threatening public health and compromising animal welfare standards [R1, R2].

The study also highlighted that licensing conditions for breeders and pet shops were seriously out of date with modern animal welfare laws, when compared with other jurisdictions, including Singapore. The study noted that animal traders in Hong Kong need not demonstrate any suitability for caring for animals, or provide animal welfare training to their staff and the government had no power to revoke an animal trader's licence, even after the trader had been convicted of an animal cruelty offence [R1, R2, R3].

In relation to stray dogs, the study investigated and rejected any legal impediments to the

introduction of new government policy permitting a Trap-Neuter-Return programme for feral dogs in Hong Kong. Whitfort's research investigated and evaluated TNR programmes supported by the World Health Organization (WHO) data and the OIE, which are utilized effectively for managing feral or community dog populations in other countries [R1, R2].

Amanda Whitfort was appointed Assistant Professor in the Department of Professional Legal Education in 2001 and promoted to Associate Professor in 2005.

Dr Fiona Woodhouse was appointed Deputy Director (Welfare) Society for Prevention of Cruelty to Animals (HK) in 2003.

3. References to the research

1. **Whitfort, A.S.** and Woodhouse, F.M. *Review of Animal Welfare Legislation in Hong Kong*, June 2010.

2. **Whitfort, A.S.** 'Advancing Animal Welfare Laws in Hong Kong', *Australian Animal Protection Law Journal*, 2009, v. 2: 65-78 (peer reviewed).

3. **Whitfort, A.S.** *Halsbury's Laws of Hong Kong*, 'Animals', Vol 1(2), 2008, v. 1 n. 2: 83-213 (reissued and updated by the author in 2013 and 2016).

4. **Whitfort, A.S**. 'Evaluating China's Draft Animal Protection Law', *The Sydney Law Review*, 2013, v. 34:347-370 (peer reviewed A* (top 5%) law journal in the Australian Research Council Ranking of Journals).

Selected external grant funding:

Review of Animal Welfare Legislation in Hong Kong (HKU 7010-PPR-5)

Funding Scheme:	Public Policy Research
Principal Investigator:	Ms Amanda Whitfort
Period:	2008-2010
Amount Awarded:	HK$497,000

4. Details of the impact

(1) Societal Awareness

The publication of Whitfort and Woodhouse's *Review of Animal Welfare Legislation in Hong Kong* raised a previously neglected field of study to a topic of widespread public debate and concern. Societal awareness of the poor state of Hong Kong's animal welfare laws has led to intense pressure on government to introduce law reform. Whitfort has given public lectures on the study, and has been invited to present her findings and recommendations to the AFCD, the Department of Food and Environmental Hygiene, the Department of Justice, the Hong Kong Police, Legislative Council members (LegCo) and other stakeholders, including veterinarians and animal welfare officers. Since 2010, Whitfort has provided input to numerous local and international news articles, radio talk back programmes and television exposes. Media publicity has focused on increasing public concern as to the adequacy of legislation available to address cases of cruelty to animals.

(2) Change in Legislation and Policy

In November 2010, Whitfort and Woodhouse's study was endorsed and adopted by six legislative parties sitting in LegCo who made a joint call on the government to implement the study's findings in new animal welfare policies for Hong Kong [1]. The study has been endorsed by the Administration in meetings of the LegCo Food and Environmental Hygiene Panel (chaired by Alan Leong SC and Dr Helena Wong) and both the former and current Secretary for Food and Health

have committed to studying Whitfort and Woodhouse's findings further [2, 3].

In 2010, Whitfort and Woodhouse were invited to join the AFCD's Animal Welfare Advisory Group's Legal Sub-committee, as expert advisors. The Sub-committee is charged with developing animal welfare initiatives in law and policy for the AFCD. In 2011, in response to one of the key recommendations made in the Whitfort and Woodhouse study, the AFCD announced the introduction of a trial "Trap-Neuter-Return" programme (in conjunction with the SPCA) for managing the welfare of feral dogs and improved policies for the management of abandoned animals which allow easier adoption access for the public [4, 5].

In 2016, the study's key recommendations for reform of the pet trade were passed into law by the *Public Health (Animals and Birds) (Animal Traders) Regulations* [6, 7]. Alongside the new regulations, legally enforceable *Licensing Conditions* and *Codes of Practice* for the care of companion animals in Hong Kong were also drafted by the Sub-committee, on the basis of Whitfort and Woodhouse's findings. These will come into effect in 2017 (initially for dogs and later for cats and exotic pets). The new laws not only combat animal cruelty by improving the welfare conditions of animals bred and sold in Hong Kong but close a legal loophole which had allowed the majority of dogs sold to be sourced from unlicensed breeders and puppy mills, which is a serious risk to public health. [8].

The Sub-committee continues to examine the study's findings to support further law reform initiatives including Hong's Kong's need to update its legislation to comply with OIE requirements for pre-slaughter stunning of food animals in wet markets and the modernisation of cruelty laws to recognise criminal negligence as a basis for liability for prosecution.

(3) Support for NGOs in effecting law reform

The study has provided critical support to NGO's working in the field. In 2011, the former Executive Director of SPCA (HK) made the following comments on the importance and impact of the study [9]:

> *This is the first review of its kind conducted in Hong Kong and its publication has been of immense value to society. It has created an excellent platform for positive change and much needed reform. We are currently utilising the Review's findings as a basis for dialogue with government and other animal welfare stakeholders. We have also disseminated the results of the Review to our members and are using the findings as a means to marshal support for law reform.*

In a 2014 video, prepared by the HKU KE Office, the former Secretary to the Hong Kong Law Reform Commission made the following observation on the study:

> *Professor Whitfort's research on animal welfare legislation is extremely important. It puts forward the case, very strongly, for reform of Hong Kong's legislation and it informs and encourages debate within government and the wider community. It is extremely difficult to have legislation changed. Virtually any government is conservative and resistant to change, but the process of change is hugely helped if you have, supporting your arguments, the kind of empirical, comparative research that Professor Whitfort has produced.*

(4) Improved prosecutions of animal related offences

Responding to the findings of the study, the AFCD is now meeting regularly with the police and SPCA (HK) to discuss animal welfare cases and the Department of Justice is proactively reviewing sentences for animal cruelty convictions. Whitfort has participated in training senior prosecutors and police to present animal prosecutions more effectively at court [10].

5. Sources to corroborate the impact

1. Hansard Report of 3 November 2010, showing all major political parties calling on

Government to introduce animal welfare friendly policies, and citing Whitfort and Woodhouse's *Review of Hong Kong's Animal Welfare Legislation,* pp1603- 1672 at 1611 and 1637.

http://www.legco.gov.hk/yr10-11/english/counmtg/hansard/cm1103-translate-e.pdf

2. LegCo Panel on Food Safety and Environmental Hygiene Meeting, 13 Nov 2012, Dr Alan Leong SC Chairman referred the Food and Health Bureau to Whitfort's *Review on Animal Welfare Legislation on Hong Kong* on the need for all dog traders in Hong Kong to be licensed in order to close puppy mills, LC Paper No CB (2) 408/12-13 at para 29.

   http://www.legco.gov.hk/yr12-13/english/panels/fseh/minutes/fe20121113.pdf

3. LegCo Panel on Food Safety and Environmental Hygiene, 14 January 2014, Dr Hon Helena Wong Pik-wan, Chairman, referred the Food and Health Bureau to Whitfort's *Review on Animal Welfare Legislation on Hong Kong* on the need to introduce a duty of care for animals in Hong Kong, LC Paper No CB (2) 1459-13-14, at para 31.

   http://www.legco.gov.hk/yr13-14/english/panels/fseh/minutes/fe20140114.pdf

4. Report of LegCo Finance Committee July 2011, establishing $1.7 million funding for the Introduction of a new policy implementing a "Trap Neuter Return" Trial Programme for Stray Dogs in Hong Kong. The report cites Whitfort's *Review of Hong Kong's Animal Welfare Legislation* in regard to the legal liabilities of a stray dog pilot scheme at paragraph 20.27-20.30.

   http://www.legco.gov.hk/yr10-11/english/fc/fc/minutes/sfc_rpt.pdf

5. LegCo Panel on Food and Safety and Environmental Hygiene Meeting "Trap-Neuter-Return trial scheme for stray dogs and handling of animal cases", 14 January 2014, Paper updating Members on progress of "Trap Neuter Return" Trial Programme for Stray Dogs and Handling of Animal Welfare Cases, LC Paper No CB (2) 621/13-14(03)

   http://www.legco.gov.hk/yr13-14/english/panels/fseh/papers/fe0114cb2-621-3-e.pdf

6. Agriculture, Fisheries and Conservation Department has provided a confirmation letter documenting the contribution of research from Whitfort to the Public Health (Animals and Birds) (Animal Traders) Regulations 2016, new Licence Conditions and Codes of Practice for dog traders and breeders and the AFCD's continuing animal welfare initiatives in Hong Kong.

7. Amendments to Cap 139B to close legal loophole permitting puppy mills in Hong Kong: *Public Health (Animals and Birds) (Animal Traders) Amendment Regulation 2016,* LN 64 of 2016.

   http://www.legco.gov.hk/yr15-16/english/subleg/negative/ln064-2016-e.pdf

8. South China Morning Post Report, 20 August 2016, No more puppy mills: Tighter animal welfare laws will clamp down on unscrupulous breeders.

   http://www.scmp.com/print/news/hong-kong/law-crime/article/2006612/no-more-puppy-mills-tighter-animal-welfare-laws-will-clamp

9. The former Executive Director of the Society for the Prevention of Cruelty to Animals (HK) has provided a confirmation letter documenting the contribution of Whitfort's research to the Society's efforts to initiate law reform benefitting animals.

10. Invited Seminar by Amanda Whitfort to Senior Public Prosecutors in 2013, cited in Department of Justice, Prosecution Division 2015 Report at page 61.

    http://www.doj.gov.hk/publications/doj2015/eng/pdf/07_prosecutions_e.pdf

Annex I-B

Taking the Guesswork Out of Logistics

A new platform developed by HKU engineers helps managers keep track of all the operations in their factories, monitor progress, and make better shop-floor decisions.

Manufacturers have to keep track of many different things at the same time to enhance the productivity of workers, from the movement of materials through shop-floor activities to product shipments. Trying to juggle all this efficiently is a constant challenge. But a new platform developed by HKU engineers is proving remarkably successful at the task and is also saving firms money.

The RFID-Enabled Real-time Ubiquitous Manufacturing Platform uses smart devices, such as RFID (radio frequency identification) tags and readers as well as smartphones, to keep track of all activities, so managers and operators can get an immediate picture of their operations.

"The entire factory is transparent because the data shows everything that is happening," said Professor George Huang of the Faculty of Engineering, who has led the platform's development. "When things are transparent and traceable, managers can monitor progress and make better shop-floor decisions. There is also less misunderstanding and teamwork can be improved."

The technology has been in development since 2007, supported by numerous research grants, and it has been adopted by several large companies in the Pearl River Delta region and Zhejiang Province.

The benefits can be seen in the example of a major paint manufacturer that used the technology to solve a problem in which orders were being dispatched until the early hours of the morning during peak time, creating extra costs because truck drivers were paid to wait on standby. A major reason for the hold-up turned out to be a delay in getting the right colours available from the warehouse for paint mixing. The technology helped to plan and streamline production and logistics, so dispatches could be done several hours earlier than before the solution was used.

An air-conditioner manufacturer used the technology to replace paper-based production orders, where the paper saving alone justifies the investment in this technology solution within two years, not to mention other benefits. An unexpected benefit was that it also enabled the firm to respond more quickly when orders changed, because managers now knew exactly where all materials were after they left the warehouse.

The technology has also been used to track the number of jobs done by workers so as to calculate their bonuses and, more recently, to bring social benefits through its application by the Hong Kong Housing Authority to plan construction work on a housing estate.

Professor Huang and his team have filed several patents, and seen the growing use of the technology, which has opened up new paths of research. “The research and KE work mutually stimulated each other,” he said.

Professor George Q. Huang and team members in the Department of Industrial and Manufacturing Systems Engineering – Dr Ji Fang, Dr Ray Y. Zhong, and Dr Zhi Li, received the Faculty Knowledge Exchange Award 2015 of the Faculty of Engineering for ‘RFID-Enabled Real-Time Ubiquitous Manufacturing Platform’.

Annex I-C

Where Virtual Worlds have Become a Reality

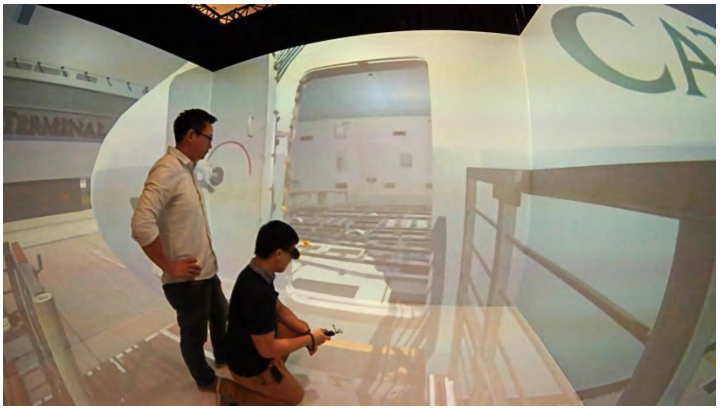
The imseCAVE, developed by the engineers at HKU, has become the go-to technology in Hong Kong for creating virtual worlds.

The imseCAVE, developed by the engineers at HKU, has become the go-to technology in Hong Kong for creating virtual worlds used by industry, business, educational institutions and government for training, system development and many other purposes.

The Department of Industrial and Manufacturing Systems Engineering uses high-end computers, projectors and motion detectors that not only immerse users in imaginary environments but let them interact with these environments.

Its work began in the late 1990s when it developed CAVE technology imported from the US – for 'cave automatic virtual environment' – and applied its own research to adapt it for training crane operators at the container terminal. The walls and floor of the imseCAVE are full-scale screens and the user sits in the middle and, with more recent developments, can move around the space.

In more recent years the technology has even been used to train police detectives in inspecting a crime scene. Real-time position tracking means trainers can follow and record the user's body position and their movements as they inspect the scene.



A wide range of other clients, from the Airport Authority and Cathay Pacific to the Hospital Authority, other universities and even an international games manufacturer, have used the system or shown keen interest in doing so. Each client gets a system tailor-made for their needs.

Dr Henry Y.K. Lau has been involved in the imseCAVE research from the early days. "This is a tool for creating a virtual world, with interactive objects, an interactive environment, even virtual people in it," he said. "Many fully immersive CAVE systems being used in Hong Kong has some involvement with us."

The imseCAVE technology is also being spun into a startup. Earlier this year Dr Lau's former PhD students received TSSSU@HKU (Technology Start-up Support Scheme for Universities) funding to set up a start-up company that will develop the technology for primary and secondary schools.

"Our vision for this startup is to push for a very reachable, low-cost immersive VR solution for school education. For example if you are talking about the Amazon basin, you can take schoolchildren there on a virtual boat ride and see what is living there. Or you can go to the base of the Himalayas and see the rubbish that is dumped there by mountaineers and ask students to discuss that," he said.

"The whole trajectory of imseCAVE is a fully successful roadmap to KE, from the university to commercial application. Ultimately we want to prove the concepts of virtual reality and if others want to commercialise it, they can do that."

Dr Henry Y.K. Lau and his team members, Dr Leith K.Y. Chan, Mr William W.L. Tam, Miss Yaqi Dai and Mr Ka Yik Chan, of the Department of Industrial and Manufacturing Systems Engineering received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Engineering for the project 'An Immersive and Interactive Virtual Reality System - the imseCAVE'.

Annex I-D

HKU at Forefront in Developing New Sources of Lighting

Professor Chi-Ming Che has several patents that have been licensed by local, national and international companies, who are working with him to develop platinum OLEDs into industrial applications.

The prospect of folding up a display screen and tucking it into a pocket or purse, or even having it sewn into a sleeve, is coming closer to reality thanks to the work of Professor Chi-Ming Che, the Dr Hui Wai Haan Chair of Chemistry, and his laboratory.

Professor Che holds patents for organic light-emitting diodes (OLEDs) that make groundbreaking use of platinum. OLED is an emerging technology for display, lighting and many other applications and it has huge potential over current technologies in terms of flexibility, efficiency and energy saving.

Professor Che first reported on the potential of platinum-based OLEDs in 2003 and since then he has been working to prove that this can be the case. He has several patents that have been licensed by local, national and international companies, who are working with him to develop platinum OLEDs into industrial applications.

“We are working interactively with industry to see what the problems are so we can address them. This is no longer basic research but real industrial research so we can see how it works in daily life. This is not an easy journey but we are making good progress,” he said.

Professor Che was the first in the world to discover that phosphorescent metal complexes can make OLEDs widely usable by greatly increasing the efficiency in electroluminescence, among other benefits. He reported his findings in 1998 but he did not patent that discovery due to lack of resources (HKU now has a well-established patenting and licensing system under the Technology Transfer Office). An American firm made a similar discovery around the same time and got patents; its OLEDs using iridium are now the world standard.

But iridium-based OLEDs have a complicated construction and, because they are through one company, the cost is quite high.

Professor Che is addressing the concerns with his platinum-based OLEDs, which have a more simple construction that is not only stable and robust, but also allows for pulsing of light and a high efficiency in switching colours.

There is still further research needed on the platinum-based OLEDs – Professor Che and his team have produced red and green emissions and are now working on blue, which is the third and final colour needed for lit displays, but he is confident this will be achieved. He has received funding from the Innovation and Technology Fund and the National Basic Research (973) Program for his work. And he has even started exploring a cheaper substitute for platinum: tungsten. "Platinum is just the beginning of the enormous potential of OLED technology," he said.

Professor Chi-Ming Che of the Department of Chemistry received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Science for the project 'High Performance Phosphorescent Platinum(II) Emitters for OLED Application'.

Annex I-E

Racing Against Time to Help Special Needs Pre-Schoolers

A pioneering service delivery model to improve the link between pre-schools and intervention services has influenced government policy on early intervention for children with special educational needs.

Children with special educational needs (SEN) benefit most when they receive early intervention, such as speech therapy. But in Hong Kong, achieving that goal has been difficult. More than 6,000 children are on a waiting list for help, held back by a shortage of services and a disconnect between schools and services. Now, with the government poised to provide free pre-school education from 2017, there is both an opportunity and an imperative to change things.

Professor Lam Shui-fong and Heep Hong Society spotted the opportunity in 2014 when they developed a model to improve the link between pre-schools and intervention services. Over the following school year, they tested their model in 10 kindergartens and showed it can improve children's outcomes.

The government was so impressed that in late 2015, it announced it would extend the model to 450 kindergartens for a two-year pilot project and thereby cut the waiting list for services in half, to about 3,000 children.

"This is a really big move because the queue is so long," Professor Lam said. "And the timing is so important. With a big leap coming in free education for pre-schools, if we are going to improve things for children with SEN, we have to act now. I'm pleased our model has had this big impact on government policy."

The model calls for specialists to provide therapy for children and training for their parents at their centres, and also visit pre-schools on a monthly basis to provide training to teachers.

"The teachers receive individual coaching on handling children's behaviour, for example when they throw tantrums in class. And they get advice on enhancing the curriculum and the physical environment for children with special needs," she said.

"The experts can give teachers a lot of specific and concrete support on the spot, and even students who are not identified as having special needs but who may be lagging behind can benefit – the entire school can benefit."

In terms of helping special needs children, results from the pilot study, which involved 120 children including a control group, found improvements in cognitive skills, language skills, motor skills and self-directed skills compared to children who did not receive the intervention.

Teachers also reported improved self-efficacy in their teaching. "The growth and development they witnessed were not only in their students with SEN but also in themselves and their schools. The results provide strong empirical support for the success of both centre-based and school-based services," Professor Lam said.

Professor Shui-fong Lam of the Department of Psychology received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Social Sciences for the project 'Evaluation of a Pioneering Service Delivery Model for Preschoolers with Special Educational Needs'.

INTERDISCIPLINARY KNOWLEDGE EXCHANGE (KE) PROJECT FUND 2016

Faculties	Co-Project Coordinators	Project Title	Summary Description
Architecture Arts	Dr Fung Fai Ng Associate Professor, Department of Real Estate and Construction Dr Peter A. Cunich Associate Professor, School of Humanities (History)	Keep Alive Beacons on the Sea – Decoding Historic Lighthouses in Hong Kong and Nearby Ports	The project aims to disseminate lighthouse-themed knowledge gained from years of interdisciplinary and cross-territorial research to secondary school teachers and students, lighthouse lovers, public policy makers and practitioners in tourism, and visitors of cultural heritage tours, via a tailored Digital Media Package (DMP) for Liberal Studies, public lectures, KE seminars, study tours and an Online Lighthouse Museum (OLM).
Architecture Arts	Mr Thomas H. K. Tsang Assistant Professor, Department of Architecture Dr Jose Vicente Neglia Assistant Professor, School of Humanities (Music)	Sounding Architecture	The project aims to exchange knowledge in the design and production of new musical instruments as inspired by the theory and practice of architectural furniture; then to offer the public a different experience of musical performance and the utilization of objects through workshops, an exhibition and an hour-long performance featuring new musical compositions with new musical instruments.
Arts Medicine	Dr Olga A. Zayts Assistant Professor, School of English Dr Brian Hon-Yin Chung Clinical Associate Professor, Department of Pediatrics and Adolescent Medicine	Working together across Arts, Medicine and Education: Enhancing genetic literacy in genetic counselling consultations	The project aims to design a Hong Kong specific genetic literacy assessment instrument for patients/ clients who have been diagnosed with or are at risk of a genetic disorder and who are making a decision about accepting/ declining genetic testing in genetic counselling consultations. Web-based information and education resources for these patients/ clients will be developed along with a training workshop for medical professionals and seminars.
Business and Economics Education	Professor Chen Lin Stelux Professor in Finance & Chair of Finance, School of Economics and Finance Dr Ming Fai Pang Associate Professor, Faculty of Education (Division of Policy, Administration and Social Sciences Education) Dr Zigan Wang Assistant Professor of Finance, School of Economics and Finance	Beyond Money: Positive Impacts of Financial Education on Student Academic Performance	The project aims to arouse the interest of Hong Kong junior secondary students in finance and develop their financial literacy through a well-designed financial education programme, which draws upon the expertise of Faculty of Business and Economics colleagues in finance and of Faculty of Education colleague in curriculum design and pedagogy.

INTERDISCIPLINARY KNOWLEDGE EXCHANGE (KE) PROJECT FUND 2016

Faculties	Co-Project Coordinators	Project Title	Summary Description
Dentistry Education	Professor Chun Hung Chu Clinical Professor in Family Dentistry, Faculty of Dentistry Dr Anita M. Y. Wong Associate Professor, Faculty of Education (Division of Speech and Hearing Sciences)	Promoting oral health and speech-language development for kindergarten children: An interdisciplinary approach	Early primary tooth loss can affect the speech sound production of children. The project aims to improve children's oral health and identify children at risk for language delay or disorder. Oral examination and fluoride treatment will be provided by dentists, while the speech therapist will screen children at risk for speech-language impairment at schools. Workshops on oral health and ways to facilitate language development will also be provided to kindergarten teachers and parents.
Science Engineering	Dr Vengatesen Thiyagarajan Associate Professor, School of Biological Sciences Professor Tong Zhang Professor, Department of Civil Engineering	How growers can find out whether Hong Kong oyster is safe to eat?	A simplified and internationally accepted testing protocol is developed at HKU and optimized to monitor bacterial contamination in seafood. The project aims to transfer this protocol to oyster growers in Hong Kong through the established collaboration with the Agriculture, Fisheries and Conservation Department and oyster growers association for a feasible solution to monitor bacterial contamination in local oyster aquaculture farms and for the food safety of locally produced oysters.
Social Sciences Medicine	Dr Celia Hoi Yan Chan Assistant Professor, Department of Social Work and Social Administration Dr Julie Yun Chen Assistant Professor, Department of Family Medicine and Primary Care	Cultivating Compassion for Adolescents through Meaning-focused Experiential Learning Practices	The project aims to cultivate compassion with positive skillsets and mindsets among adolescents through a series of meaning-focused experiential learning practices include mind-quieting, labyrinth walking and contemplative dialogue. This is to engage adolescents in compassionate communion and connection in human interaction and give them opportunities to envision their life path with altruism. A self-help booklet on compassion will be developed.
Social Sciences Architecture	Dr Denise Tse-Shang Tang Assistant Professor, Department of Sociology Ms Vincci W. S. Mak Senior Lecturer, Department of Architecture	Everyday Space and Memory at Wah Fu Estate: Recording and Envisioning the Daily Life of Public Estate Residents in Hong Kong	The project aims to record the daily life of Wah Fu Estate residents and explore how the current use of space can influence the future planning and redevelopment of Wah Fu Estate. There will be an exhibition, a digital archive of the residents' oral history, and a book to raise public awareness on the changing needs of public housing in Hong Kong. A resource kit will also be developed and shared online to serve as a template for similar projects in other public housing estates.
Social Sciences Science	Dr Tommy H. L. Tse Assistant Professor, Department of Sociology Dr Benoit S. Guénard Assistant Professor, School of Biological Sciences	Size does matter: Reflecting our attitudes and knowledge about non-human animals in urban Hong Kong	The project aims to introduce the species diversity of the fauna surrounding humans in urban settings to primary and secondary school students, and to raise the awareness of the status of non-human animals and their rights of co-existence in urban society through workshops and field observations. Animated videos, editorial features and booklets will be developed and distributed through the collaborating animal welfare groups and media organizations.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Architecture	Mr Mathew PRYOR	Assistant Professor, Department of Architecture	Urban Rooftop Farming Network	Approximately 50 rooftop farming communities have recently emerged in Hong Kong but they operate largely in isolation. The project aims to establish a network connecting these rooftop farming communities to facilitate the sharing of best practices, to advocate support from the government, and to promote rooftop farming to building owners as part of a healthy urban development.
Architecture	Professor Weijen WANG	Professor, Department of Architecture	Community Design and Construction of Traditional Nepalese Temple Architecture	By collaborating with Nepalese carpenters, the project aims to complete the design and construction of a timber-framed tiered temple initially installed on the site of World Wood Day Symposium in Kathmandu, making it a permanent exhibition on demonstration of wood culture and the age-old timber building techniques, as well as providing a community site for the locals.
Architecture	Professor Weijen WANG	Professor, Department of Architecture	Shaping Public Space and Landscape Improvement for Tsoi Yuen Ecological Village	The project aims to improve the built environment of Tsoi Yuen Village after its relocation by formulating strategies on the design of landscape and public space of the Village in collaboration with the villagers and constructing public pavilions, plazas and walkways in the Village.
Arts	Professor Stephen Y. W. CHU	Professor, School of Modern Languages and Cultures (Hong Kong Studies)	Hong Kong Keywords: Reproducing Hong Kong Cultures	The project aims to motivate secondary school students to rethink about Hong Kong cultural characteristics and their resonances through keywords production. There will be workshops where students will explore the cultural and historical bases of Hong Kong daily life and cultures, and a competition on Hong Kong cultural keywords creation by means of writing, photography or video.
Arts	Dr Peter CROSTHWAITE	Assistant Professor, Centre for Applied English Studies	Big Language Data for Beginners: HKU CorpusMate	The project aims to develop a website and a mobile app that host a bilingual (English and Cantonese) corpus query training package titled CorpusMate. It will include a small private online course (SPOC) accompanying a corpus query tool to encourage the Hong Kong English-using community to use language corpora as a viable reference source alongside traditional dictionaries or translation websites.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Arts	Dr Cynthia F. K. LEE	Associate Professor, Centre for Applied English Studies	Automated Content Feedback and English Essay Writing	The project aims to promote the use of computer technology for English essay writing through the Essay Critiquing System (ECS) to the community, especially secondary 3 to 6 students, and to inform the English language profession, such as the English teachers in Hong Kong, of the latest research and pedagogy on computer-assisted second language writing. Writing workshops will be conducted in local schools.
Arts	Dr Li CHONG	Lecturer, School of Modern Languages and Cultures	German with Fun - Language and Cultural Project for Secondary School Students	The project aims to enhance the interest of the general public in learning German language and in understanding its culture. Outreach programmes for local secondary school students will be initiated through organizing language and cultural workshops. A “German Fun Day” will be organized at HKU to provide a platform for students of the participating schools to share their learning experience and communicate in German.
Arts	Dr Lisa LIM	Associate Professor, School of English	LinguisticMinorities.HK: Bigger picture, broader issues	The project aims to develop materials in and from the website, LinguisticMinorities.HK (http://linguisticminorities.hk/), which comprises a one-stop resource on the linguistic situations of ethnic minorities in Hong Kong, with broader issues relevant to today's world including migration, education, health, social justice, development and sustainability. Talks and activities will be conducted in schools to inspire the youth in Hong Kong to respond to these issues.
Arts	Dr Eva N. S. NG	Assistant Professor, School of Chinese	Resources for Interpreting – Developing a Mobile App Version	The project aims to further develop and enhance the website, Resources for Interpreting (http://www.interpreting.hku.hk/), by enriching it with new information about interpreting and the latest Chinese/English bilingual terms from the news, and by developing a mobile app alongside with the web version for it to reach out to a variety of users with different needs.
Arts	Dr Olga ZAYTS and Mr Joseph H. K. POON	Assistant Professor, School of English // Associate Professor, School of Chinese	Mind HK: Developing a Web-based Information Resource on Mental Health in Hong Kong	The project aims to develop a one-stop bilingual web-based information resource about mental health, the rights of individuals facing mental health problems, and medical and social sources of support available to them in Hong Kong. The information resource will take a 'patient-to-patient' approach to deliver accessible yet comprehensive and good quality reliable information to several main target group of beneficiaries.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Business & Economics	Mr David BISHOP	Principal Lecturer, School of Business (Accountancy)	Business Ethics, Social Innovation, and Corporate Social Responsibility in Asia	The project aims to educate the business community, especially the next generation of business leaders, concerning business ethics, social innovation and corporate social responsibility through seminars, a dynamic website, short articles (both print and social media), and other educational media so that meaningful change can be brought to businesses in Asia.
Dentistry	Professor Chun Hung CHU	Clinical Professor in Family Dentistry	Assessing the impact and potential for scale-up of the HKU preschool oral health program on kindergartens, preschool children and parents	The project aims to evaluate the impact of the 'HKU Preschool Oral Health Program', which was a large-scale KE project established in 2010 to improve oral health education and to slow the progression of tooth decay in Hong Kong preschool children. The result will inform the planning and execution of dental health promotion or similar community health projects and may ultimately influence the guidelines, services, and policies related to oral health of preschoolers in Hong Kong.
Dentistry	Dr Dominic K. L. HO	Clinical Assistant Professor in Periodontology	Expanding impact and strengthening networking with a non-governmental organization to improve oral health of Hong Kong citizens	The project aims to empower the dental care team of the mobile dental clinic of Project Concern Hong Kong, a non-governmental organization, to provide primary oral health care in four different districts, and to strengthen the collaboration with Project Concern by jointly organizing public events to promote oral health and to encourage the assistance of District Councilors and their teams to reach the disadvantaged populations in Hong Kong.
Dentistry	Professor Han Sung JUNG	Professor in Oral Biosciences	Empowering a local non-governmental organization to prevent oral cancer amongst people at risk in Sri Lanka	Sri Lanka is one of the countries where people have the highest incidence of oral cancer, especially among the tea estate workers as they are large users of betel nuts. The project aims to enhance the knowledge of oral cancer etiology and prevention among tea estate workers in Sri Lanka by providing professional training to local healthcare staff and continuous oral health education and oral cancer detection services to the workers.
Dentistry	Dr Katherine C. M. LEUNG	Clinical Associate Professor in Prosthodontics	Delivering oral care knowledge to ethnic minority in Hong Kong	The project aims to deliver oral health knowledge and raise the dental awareness of South Asian elders living in Hong Kong and thereby to improve their dental health and prevent dental diseases, by conducting free oral and dental examination, and providing free primary preventive dental care service as well as giving information on common geriatric dental diseases and training on self-care through healthcare talks, counselling and exhibitions.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Dentistry	Dr Katherine C. M. LEUNG	Clinical Associate Professor in Prosthodontics	Empowering a non-governmental non-profit organization to deliver oral home care and promote awareness of dementia in elderly care centers	The project aims to empower the non-governmental organization, Hong Kong Alzheimer's Disease Association (HKADA), to promote awareness of dementia and deliver oral home care in elderly care centers by providing training programmes on dementia and Alzheimer's disease-specific oral hygiene care to the center staff and caregivers, and holding oral health promotion events with HKADA.
Dentistry	Dr James K. H. TSOI	Assistant Professor in Dental Materials Science	"Professional Dental Product Review" for Hong Kong dentists	The project aims to subjectively evaluate and test the existing dental products on the market, so as to provide Hong Kong dentists user-friendly, unbiased, justified, clinically relevant and scientifically sound professional and expert opinions on different dental products. Professional periodicals and a website will be produced and disseminated to Hong Kong registered dentists.
Education	Dr Karen M. K. CHAN	Assistant Professor, Division of Speech and Hearing Sciences	Keep On Talking and Eating (KOTE)	The project aims to improve the communication and swallowing safety in the frail elderly by providing direct therapy and workshops on promoting the knowledge and skills of the patients and carers in managing swallowing and communication impairments through collaboration with Sik Sik Yuen. A KOTE mobile app will be made available to the public and at-risk groups.
Education	Dr Samuel K. W. CHU	Associate Professor, Division of Information and Technology Studies	Educating Parents in Hong Kong, Mainland China and the World on Developing Children's Reading Habit and Ability through an Online Community	The project aims to educate parents in Hong Kong, Mainland China and the world how they can effectively help children develop reading interest and reading ability through various channels such as a Facebook Page, a YouTube channel, a book, a potential newspaper column and a proposed TV series.
Education	Dr Peng LIU	Assistant Professor, Division of Policy, Administration and Social Sciences Education	Evaluating the impact of expert teacher workshops on teacher professional development in Chinese turnaround schools	The project aims to assist principals of turnaround schools in Chongqing, China to establish expert teacher workshops for teacher professional development, and to evaluate the impact of the workshops on the professional capacity of the teachers and the leadership capacity of the schools.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Education	Dr Estella P. M. MA	Associate Professor, Division of Speech and Hearing Sciences	Green Voice for School: Promoting knowledge of healthy voice use in primary school students	The project aims to raise awareness of vocal health and improve vocal hygiene knowledge among Hong Kong primary school students, their parents and teachers; and provide educational training for parents and teachers on how to implement vocal hygiene with their children and students, by organizing a range of school-based activities, workshops and seminars.
Education	Dr Ida A. C. MOK	Associate Professor, Division of Mathematics and Science Education	Rich Task (Junior Secondary Mathematics)	The project aims to promote the pedagogical model of rich tasks and collaborative learning to enhance the teaching and learning of mathematics in local junior secondary mathematics classrooms by hosting training workshops to secondary teachers on training and dissemination of the teaching strategy of rich tasks.
Engineering	Dr Wilton W. T. FOK	Principal Lecturer, Department of Electrical and Electronic Engineering	Knowledge Exchange on Robotic and programming for STEM education	The project aims to disseminate the knowledge on mathematics, computer, programming and robotic to local students. Around 100 underprivileged students will be invited to attend training workshops to learn and gain hands-on experience on new technology using the e-learning course materials developed by the e-Learning Development Laboratory.
Engineering	Professor Francis C. M. LAU	Professor, Department of Computer Science	Earthquake in Hong Kong?	By organizing an “Earthquake Detector Design Competition” with associated talks, workshops and visits, the project aims to enhance the knowledge in earthquake science of local primary and secondary school students and teachers, and the general public, as well as to arouse their interest in engineering and meteorological / oceanographic instrumentation, and to increase public awareness and preparedness towards natural disasters.
Law	Mr Benny Y. T. TAI	Associate Professor, Department of Law	Post-exam Rule of Law Seminars in Secondary Schools	The project aims to enhance the knowledge of the rule of law of our new generation by teaching concepts concerning the rule of law to secondary students. There will be seminars in 10 to 12 secondary schools for at least 2000 students conducted by the HKU law students.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Law	Ms Amanda WHITFORT	Associate Professor, Department of Professional Legal Education	Wildlife Crime: Knowledge Transfer for Informed Sentencing	The project aims to assist informed sentencing for wildlife offences in Hong Kong by providing prosecutors with reliable data, for use at trial, assessing the ecological and conservation impact of offences on target species, both locally and internationally.
Medicine	Dr Michael C. W. CHAN	Assistant Professor, School of Public Health	Little Dr Flu	The project aims to increase students' knowledge towards the human respiratory tract, allow them to be familiar with how influenza virus is transmitted, heighten their interest in biomedical science and encourage good personal hygiene habits, through a programme called Little Dr Flu, which is a two-hour educational program targeting students in Primary 5 to 6.
Medicine	Dr Pui Hing CHAU	Assistant Professor, School of Nursing	Promotion of reduction of dietary sodium intake among the elderly Hong Kong population	The project aims to raise the awareness and knowledge of reduction of dietary sodium intake among the elderly population in Hong Kong by organizing health talks with interactive component.
Medicine	Dr Ching-Lung CHEUNG	Assistant Professor, Department of Pharmacology and Pharmacy	Genomic Medicine II: Precision medicine	The project aims to raise the awareness, understanding and interest on precision medicine of pharmacists and the public through a smart phone application, a website and a series of public lectures and train-the-trainer workshops for pharmacists.
Medicine	Dr Joanna W. Y. HO	Lecturer, School of Biomedical Sciences	Through the Looking Glass – Discover the fun and the realities in the wonderland of biomedical sciences	The project aims to lead students from the less privileged secondary schools to discover the fun of scientific discovery and realize the amazingly close connections of the seemingly distant biomedical sciences to our society and to inspire them with wider global perspectives of the science education, by organizing a one week summer camp.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Medicine	Dr Dennis K. M. IP	Clinical Assistant Professor, School of Public Health	Preventing infectious diseases in young children – A health promotion programme for enhancing hygiene practice	The project aims to extend the current health promotion programme to enhance preventive health concept and hygiene practice against common infectious diseases among early school-aged children in kindergartens (K3, aged 5-6) and primary schools (P1-2, aged 6-8) in Hong Kong by distributing health promotion video clips on various e-platforms.
Medicine	Dr Ava KWONG	Clinical Associate Professor, Department of Surgery	The First Breast Cancer Journey Smartphone Application in Hong Kong	The project aims to develop the first breast cancer journey smartphone application in Hong Kong, which outlines the breast cancer treatment timeline to patients and their caretakers. This can reduce the treatment-related stress and increase patients' treatment and surveillance compliance.
Medicine	Dr Lei LI	Associate Professor, School of Chinese Medicine	Acupressure Workshop-Acupressure Rehabilitation for Hemiplegic Stroke Patients	The project aims to enhance the care and service capacities of the caretakers of hemiplegic stroke patients by offering free acupressure rehabilitation workshops in collaboration with a local non-profit organization.
Medicine	Professor Patrick C. Y. WOO	Clinical Professor, Department of Microbiology	Coronavirus discovery in Hong Kong	The project aims to introduce to secondary school students methods of coronavirus discovery and arouse their interests on scientific research through presentations, guided laboratory tours and highly interactive researcher-student discussions.
Science	Dr Timothy C. BONEBRAKE	Assistant Professor, School of Biological Sciences	An integrated approach to conservation forensics: reducing wildlife trade globally through technology, analytics and education	The project aims to corroborate and synthesize several past, on-going and emerging efforts at HKU which are leading the way in providing for capacity in conservation forensics and establishing a means to impact society through the reduction of wildlife trade. An online portal will be built.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Science	Professor Aleksandra B. DJURIŠIĆ	Professor, Department of Physics	Building Impact Cases in the Department of Physics	The project aims to build strong impact case studies within the Department of Physics of HKU by collecting evidence of impact arising from our research accomplishments.
Science	Dr Jason C. S. PUN	Principal Lecturer, Department of Physics	Public roadshows to promote light pollution education in the community	The project aims to educate the public about the impacts of light pollution to the environment through the organization of roadshows in public venues and participation in the annual HK SciFest organized by the Hong Kong Science Museum; to promote good lighting practice by piloting an online public directory of good and poor lighting installment in the communities; and to expand our international knowledge exchange effort through the Globe at Night – Sky Brightness Monitoring Network project.
Social Sciences	Professor Cecilia CHENG	Professor, Department of Psychology	Serious Play Effective Work: An Evidence-Based Experiential Program to Enhance Decision-Making and Team Work Effectiveness among Employees in Hong Kong and Mainland China	The project aims to strengthen the effectiveness in team work and decision-making processes of the employees in small and medium-sized enterprises in Hong Kong and Mainland China by delivering an evidence-based workshop that engages the employees in creative and positive thinking as well as team building, training SME trainers to deliver "in-house" workshops, and establishing best practice guidelines for other Chinese mental health professionals and trainers to follow.
Social Sciences	Dr Amy Y. M. CHOW	Associate Professor, Department of Social Work and Social Administration	Reweaving Grief: Innovative Bereavement Care	The project aims to promote an innovative and artistic way, which includes the participation of persons with disabilities, in helping bereaved persons, and to enhance the understanding and appreciation of the general public on different ways of grieving through training workshops, an art exhibition, a public talk and dissemination of a booklet.
Social Sciences	Dr Ernest W. T. CHUI	Associate Professor, Department of Social Work and Social Administration	Enhancement of professional practice competence of social work practitioners in China – a collaborative project between The University of Hong Kong and Sun Yat Sen University of Guangzhou, China	The project aims to promote professional competence of social work practitioners in China using the newly developed professional social work competence scale through providing training to them.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Social Sciences	Dr Julie HAM	Assistant Professor, Department of Sociology	Visualizing the Voices of Migrant Women Workers	The project features participatory media projects conducted with women migrant workers in The Netherlands, Nepal, Taiwan, Indonesia, and Hong Kong, and aims to generate meaningful social and cultural impact for migrant and non-migrant communities in Hong Kong, and local non-governmental organizations dedicated to human rights, migrant rights and women's rights. There will be an exhibition, a public panel and workshops
Social Sciences	Professor Rainbow T. H. HO	Professor, Department of Social Work and Social Administration	Project EMBRACE (Empowering CoMmunity and Building Resilience for Adults Caregivers of the Elderly)	The project aims to equip the caregiving community with the knowledge and evidence-based practice of holistic healthcare by means of training workshops. Upon completion of the workshops, participants will be able to promote the concept of holistic healthcare and to offer healthcare service to elderly within the community.
Social Sciences	Dr Shirley X. LI	Assistant Professor, Department of Psychology	Empowering parents to help children sleep better: Parent-based sleep education for children with autism spectrum disorders	The project aims to support parents of children with autism spectrum disorders (ASD) to manage common sleep and bedtime problems encountered in children with ASD by developing an educational booklet and a website to promote the importance of sleep hygiene as well as to provide essential educational information about evidence-based pediatric sleep practice recommendation.
Social Sciences	Dr Gary P. F. WONG	Lecturer, Department of Sociology	Enabling Sustainable Community Development: Documenting and Sharing Recent Strategies and Practices of HKU's Collaborations in Pokfulam Village	The project aims to consolidate, reflect on and share the community engagement work done by HKU in collaboration with Caritas, other NGOs and the Pokfulam Village community. By creating a database of projects and interviews, a publication and holding a public engagement seminar, the project will act as a resource for students, the community and the general public to learn about the history and living heritage aspects of the Pokfulam Village.
Social Sciences	Professor Paul S. F. YIP	Centre Director, The Hong Kong Jockey Club Centre for Suicide Research and Prevention (CSRP)	CSRP X Initium Media – 1cm Distance from Blue to Blue	The project aims to promote a message of how different stakeholders can show care to someone in blue mood or shows suicide risk and support them. An interactive multi-media webpage will be produced, along with sharing sessions to be held at schools. Key opinion leaders will also be contacted to share the message to more media professionals and netizens.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Centre for the Enhancement of the Teaching and Learning	Dr Cecilia K. Y. CHAN	Associate Professor	Changing Mind, Changing Practice and Shifting Culture in Engineering, Science and Business Education from Leading Research Intensive Universities	The project aims to build and strengthen a community of practice in engineering, science and business education globally by sharing examples of excellence in pedagogies and assessment with schools, industries, academics and accreditation bodies and to create a platform for members to share and discuss their ideas and experience around the world.
Communications and Public Affairs Office	Ms Katherine MA	Director of Communications	Measurement of positive media impact related to HKU Knowledge Exchange	The project aims to maintain the online news platform for pooling of daily local news report concerning HKU, as to provide major reference to HKU members of their KE performance.
University Museum and Art Gallery (UMAG)	Dr Florian KNOTHE	Director	Arches Asia Consortium	The Arches Asia Consortium aims to develop as the first regional working group for the Arches heritage database, with a particular focus on expanding the platform to include cultural and natural properties and intangible forms of heritage. This project will be the first major initiative of the official collaboration between UMAG and the Getty Conservation Institute.
University Museum and Art Gallery (UMAG)	Dr Florian KNOTHE	Director	CollectionSpace	The project aims to provide a single web-based location for museum objects, which can be more readily integrated into UMAG's new website, and made available to HKU staff, researchers and the general public. HKU and HK based organizations would likewise benefit from the adoption of CollectionSpace.
Technology Transfer Office	Professor Paul Cheung	Director	Essentials of Research Translation and Impact	The project aims to enhance the understanding of researchers on the essential best practices and challenges in translating scientific research into practical application through collaboration with industry in the technology transfer process, with the ultimate aim of achieving real impact and benefit for society.

KNOWLEDGE EXCHANGE FUNDING EXERCISE 2016/17: SUMMARY OF IMPACT PROJECTS

Faculty / Unit	Project Co-ordinator	Post Title, Department	Project Title	Summary Description
Development and Alumni Office	Ms Monica Wong	Assistant Director (Alumni Affairs)	HKU DreamCatchers 2017 Forum Series	The project aims to continue to build HKU's image of creativity and entrepreneurship, contributing to the University's Vision of "Innovation, Interdisciplinary, Internationalisation – Impact" by organizing a large-scale forum under the HKU DreamCatchers 2017 Series.

Annex IV

Quantitative Indicators

Table 1

Performance Indicators Laid Down by UGC	2016/17
Number of patents filed in the year (with breakdown by country and type) Note 1	144 Note 2
Number of patents granted in the year (with breakdown by country and type) Note 1	64 Note 3
Number of licenses granted (with breakdown by type)	102
Income (on cash basis) generated from intellectual property rights Note 4	$6.31M
Expenditure involved in generating income from intellectual property rights Note 5	$7.17M
Number of economically active spin-off companies (with breakdown by type) Note 6	15
Net income generated (or net loss arising) from spin-off companies Note 7	($5.23M)
Number of collaborative researches, and income thereby generated Note 8 - no. of projects - income generated	 26 $44.25M
Number of contract researches (other than those included in "collaborative researches" above), and income thereby generated Note 9 - no. of projects - income generated	 912 $353.91M
Number of consultancies, and income thereby generated Note 10 - no. of projects - income generated	 1,032 $48.66M
Total of collaborative researches, contract researches and consultancies Note 11 - no. of projects - income generated	 1,970 $446.82M
Number of student contact hours in short courses or e-learning programmes specially tailored to meet business or continuing professional development (CPD) needs Note 12	102,039
Income received from CPD courses Note 13	$7.3M

Performance Indicators Laid Down by UGC	2016/17
Number of equipment and facilities service agreements, and income thereby generated - no. of agreements - income generated	 18 $0.5M
Number of public lectures/symposiums and speeches to a community audience Note 14	1,640
Number of performances and exhibitions of creative works by staff or students Note 14	142
Number of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies	593

(Data as of early July)

Notes:

1. The number of patents granted is unrelated to the number of applications in a particular year.
2. The number of inventions involved is 108.
3. The number of inventions involved is 36.
4. Versitech, HKU's wholly owned technology transfer company, uses accrual basis for income generated from intellectual property rights (IPR) in audited accounts. The income reported in the table above is on cash basis in accordance with the UGC's definition.
5. The costs incurred in protecting all IPR in the reporting year are reported, without limiting only to those patents that were successful in generating income.
6. For commercialization, the University through Versitech takes a dual approach of spin-off and licensing. In addition to spin-off companies, start-ups that are commercialising HKU technologies and funded by the Technology Start-up Support Scheme for Universities at HKU (TSSSU@HKU) have been included.
7. Versitech is a minority shareholder in the spin-off companies. It is difficult to predict the companies' sales/turnover due to the volatile business environment. Only the net income (or net loss) of those companies with equity held by Versitech was reported because being the equity holder Versitech could obtain the financial information from those companies.
8. ITF projects with industrial sponsorship and other collaborative projects with at least two partners (one of which being a government or public body) were included.
9. Contract research projects commissioned by external organizations, and projects supported by funding schemes that allow non-higher education institutions to apply, including ITF projects without industrial sponsorship, Public Policy Research projects, and projects funded by the Food and Health Bureau, the SK Yee Foundation, Construction Industry Council, and Standing Committee on Language Education and Research (SCOLAR), were included. NIH projects have been classified as Contract Research since 2016/17.
10. Consultancy and service projects for KE commissioned by external organizations to the University or Versitech were included.
11. It is considered more appropriate to group collaborative researches, contract researches and consultancies together because it is sometimes not easy to classify projects into these categories.
12. Taught postgraduate programmes were not included.
13. Expenditures including overheads were deducted. Net income from taught postgraduate programmes was not included.
14. Community, cultural and KE-related events organized by the University and those delivered by academic staff at the invitation of external organizations were included.

Table 2

Other Performance Indicators of HKU	2016/17
Number of external advisory bodies membership held by HKU staff	2,826
Number of knowledge transfer websites [Note 1]	223
Number of postgraduate theses on open access [Note 1]	25,389
Download count of postgraduate theses to addresses outside HKU [Note 1]	1,210,514
Number of publications on open access [Note 1]	23,959
Download count of publications to addresses outside HKU [Note 1]	1,985,202
View count of HKU Researcher Pages from outside HKU [Note 1]	4,761,374
View count of HKU Research Postgraduate Student Pages from outside HKU [Note 1]	19,212
Number of staff available for media contact	670
Number of positive media impact related to knowledge transfer coverage, including print, on-line and electronic media [Note 2]	18,221
Number of placement/internships [Note 3]	3,884
Number of mentors from outside HKU for HKU students [Note 3]	1,127
Number of appointments of external members to HKU advisory boards, committees or panels [Note 3]	430
Number of students (headcount) in non-UGC-funded taught postgraduate programmes [Note 4]	7,500

(Data as of early July)

Notes:
1. These seven indicators refer to the University's efforts in making knowledge accessible to society.
2. The number was obtained through the media impact project using an online news platform covering mainly local newspapers and magazines, and some multimedia outlets and websites to pool daily news reports concerning HKU that are KE-related.
3. As HKU sees KE as a two-way process, these three indicators refer to the University's efforts to learn from the community.
4. The non-UGC-funded TPg programmes generally respond to community needs for broadening/upgrading skills or life-long learning.

July 28, 2017