



香港中文大學
The Chinese University of Hong Kong



研究及知識轉移服務處
Office of Research and
Knowledge Transfer Services

RESEARCH &
INNOVATION

COMMUNITY
ENGAGEMENT

IMPACT
CREATION

Recurrent Funding for Knowledge Transfer

Annual Report 2020/21

Submitted to University Grants Committee

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1 EXECUTIVE SUMMARY

CUHK announced the Strategic Plan 2021–2025 ('CUHK 2025') with the theme of 'Excellence with Purpose and Responsibility' which draws the roadmap of our aims and direction over the next five years. With a dual focus on cultivating the fundamentals and leading positive change, we will strengthen research, innovation and enterprise so as to enable the translation of research into tangible benefits and the delivery of innovation to the global community. This report summarises the development, activities and achievements of knowledge transfer in the reporting year 2020-21.

CUHK is recognized as a leading innovative university in the city and the region. CUHK ranked among the top 100 worldwide universities granted U.S. utility patents in 2020. In 2020-21, we filed a total of 386 patent applications worldwide, and had 226 patents granted around the world. Eighty intellectual property (IP) licenses have also been granted to companies of diverse backgrounds including multinational corporations and local startups, representing an increase of 50% over the previous year. To encourage more inventors to take part in the innovation and IP development process, a new funding scheme, the "Fast-track Provisional Patent Fund" has been launched this year to speed up the patent filing process.

Turning to entrepreneurship development, we received 35% more applications for our pre-incubation programme (PI programme) than in the previous year. Eighty-one teams applied and 20 were supported this year. Under the Technology Start-up Support Scheme for Universities (TSSSU), we received 37 applications, and 22 technology startups were funded. In addition to these programmes, we have launched the Youth Entrepreneurship Assistance Scheme under the Youth Development Fund to support youth entrepreneurship in Hong Kong and the Greater Bay Area (GBA) markets. Forty-three applications have been received and 13 teams of various business natures (technology, social and cultural) were selected to join this 9-month funding scheme.

In the area of social innovation, our Knowledge Transfer Project Fund (KPF) provides support for knowledge transfer activities into the community. Together with the recurrent HK\$3 million Social Innovation and Entrepreneurship Development Fund (SIE Fund) of the HKSAR, we were able to support 17 social innovation projects this year. We also supported 4 new social enterprises with our Sustainable Knowledge Transfer Project Fund (S-KPF) to encourage social entrepreneurship in academia.

We continue to engage the knowledge transfer and entrepreneurship community on campus. More than 270 events, including Entrepreneurial Talk series, FinTech conference, STEM seminar, entrepreneurial workshops, and a Sustainable Development Goals (SDG) competition were held over the year at InnoPort (our focal hub for innovation and entrepreneurship), so as to create an environment conducive to knowledge transfer endeavours.

2 FACILITATING KNOWLEDGE TRANSFER AND COMMERCIALISATION

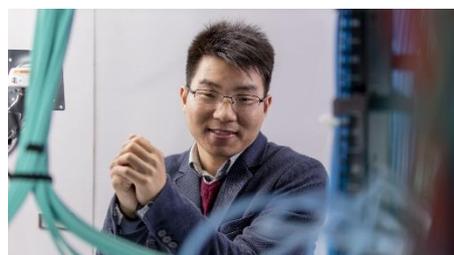
2.1 Intellectual Properties (IP) Management

2.1.1 Highlights of Intellectual Properties (IP) Management Outputs and Achievements

This year we have continued to expand our IP portfolio by securing patent applications worldwide. During the current reporting year we filed a total of 386 patent applications worldwide, and had 226 patents granted. Eighty IP licenses have also been granted to companies of diverse background including multinational corporations and local startups.

Our efforts have been widely recognised by international organisations. CUHK ranked among the top 100 worldwide universities granted U.S. utility patents in 2020, according to a report released on 15 June by the National Academy of Inventors (NAI) and the Intellectual Property Owners Association (IPO). The report stated that, with 37 U.S. utility patents issued in 2020, CUHK ranked 79 out of 100, and is one of the two local institutions on the list. In 2020/21, 226 patents were granted to CUHK in all jurisdictions worldwide. In the three years from 2017/18, CUHK has had more patents granted than any other university in Hong Kong. CUHK's U.S. utility patents issued in 2020/21 cover various technologies including diagnostics, therapeutics, medical devices, stem cell research, telecommunication, and mechanical engineering.

This year, Professor Peiyong JIANG, a bioinformatician and Assistant Professor from the Faculty of Medicine's Department of Chemical Pathology, was elected a senior member of the National Academy of Inventors (NAI), in recognition of his inventive work in producing technologies that have the potential to make a real impact on the welfare of society. Professor Jiang is the first scholar from a Hong Kong institution to receive this senior membership. He is a co-inventor in more than 60 granted patents, including a new class of prenatal and cancer diagnostic markers that are based on DNA methylation. Taking advantage of the methylation patterns of plasma DNA, Professor Jiang's team has developed a novel bioinformatics platform for non-invasive screening of multiple types of cancer (e.g. liver cancer and nasopharyngeal cancer).



Professor Peiyong Jiang, Department of Chemical Pathology (Photo from Information Services Office, CUHK)

2.1.2 Fast-track Provisional Patent Fund

To enhance CUHK researchers' awareness of IP protection and to help the researchers to secure IP rights before publication, a new funding scheme, the "Fast-track Provisional Patent Fund" was launched this year. By significantly speeding up the timeline of filing from 1-2 months to 1 week, the new funding will encourage more inventors to take part in the innovation and IP development process. All CUHK research staff filing patent applications for the first time at CUHK will be eligible to apply. The funding will allow CUHK researchers, particularly those who are new to patent filing, to gain valuable hands-on experience in patent filing and IP protection.

2.2 Innovation and Impact Creation Support

As a responsible public institution, CUHK is committed to addressing society's major challenges and contributing to the well-being of the society, through the integration of teaching, research and engagement. Over the years, significant efforts and investments have also been made to facilitate knowledge transfer and exchange that would create positive impacts for the society, as well as to engage the wider community in such activities.

The key areas of CUHK's efforts in innovation and impact creation are as follows:

- Empowering academics to translate their researches into impactful community projects, ventures or policy advice
- Enabling students and young people to co-create solutions addressing social issues through entrepreneurship
- Engaging the community to exchange knowledge and create an ecosystem to foster innovation

2.2.1 Empowering the Academics

To help CUHK academics to translate their research into tangible impacts in the community, a series of capacity building workshops, bespoke webinars and coaching programme have been offered by the Office of Research and Knowledge Transfer Services (ORKTS).

From Research to Market

CUHK strives to create a vibrant, supportive and motivating environment conducive to world-leading research that delivers an impact beyond academia. The webinar “From Research to Market” was held on 4 June 2021 with over 80 participants from different faculties. The Pro-Vice-Chancellor (Research) Professor Mai-har Sham and Director of ORKTS Professor Benny Zee introduced services in research funding, intellectual property (IP), social innovations, and entrepreneurship that support researchers in bringing their research results to the market.

Impact Acceleration through Bespoke Webinars & Coaching Programme

In order to facilitate the translation process to maximise potential social impact, a series of webinars for individual faculties have been planned. The first of the series, a bespoke webinar for the Faculty of Arts, was held in June 2021 featuring sharing on social innovation concepts and examples to inspire the academics, followed by one-on-one coaching to help interested professors to brainstorm impact project ideas.

CUHK and CUHK (Shenzhen) Joint Research Seminar Series

The CUHK and CUHK (Shenzhen) joint research seminar series is a monthly event for researchers of CUHK (Hong Kong) and CUHK (Shenzhen) to share their latest research results. It provides a platform for discussion on new ideas for interdisciplinary research and possible further collaboration opportunities between researchers of the two campuses. The first webinar was held on 21 May 2021 hosted by CUHK (Hong Kong). Professor Hon Ming LAM presented the latest progress made in soybean research by the State Key Laboratory of Agrobiotechnology. The second webinar was held on 15 July 2021 hosted by CUHK (Shenzhen). Professor Tom LUO, Vice President of CUHK (Shenzhen) delivered a talk on applied mathematics and communication network technology.

2.2.2 Engaging the Community

CUHK believes that innovation involves co-creation and collaboration among different stakeholders. We took initiatives to foster collaboration between CUHK’s stakeholders with corporate, NGO partners as well as the community to facilitate knowledge exchange.

Cubic Zine

One way to engage the public is through promoting CUHK’s efforts in social innovation, with the aim of sparking interest and inspiring follow-up dialogue. One such vehicles is CUHK’s own publicity platform, **Cubic Zine**. During the reporting period, the house publication Cubic Zine attracted more than 13,000 readers per issue, and 8 issues were published. As the world is constantly changing, we continually seek new and better ways to analyse and address new problems. *Cubic Zine* shares CUHK social innovators’ journey and



their projects, insights from global cases of social innovation, book recommendations and event updates, to infuse new transformation and innovation into our vision.

Act together against COVID-19

Since the outbreak of COVID-19 early last year, CUHK acted quickly to launch a new portal “**Act together against COVID-19**” (<https://againstcovid19.cuhk.edu.hk/>) which offers the latest epidemic information and e-learning resources, including cutting-edge research and innovation, medical knowledge, health tips and news to the public.



CUHK in Touch

CUHK in Touch is a quarterly published newsletter which features the latest research and innovation achievements of CUHK. Six issues have been published since 2020.



(Top) “Act together against COVID-19” website;
(Bottom) “CUHK in Touch” newsletter

Interviews in Media

Other publicity ventures include in-depth stories published in different media. For example, CUHK professors have regularly been invited as guests on the popular RTHK One program “*New Thinking in Management*”, to talk about how their research can help to create positive change and to meet complex challenges in a rapidly changing world.



(Left) Prof Kelvin Tsoi, The Jockey Club School of Public Health and Primary Care ; (Middle) Prof Benny Zee, ORKTS; (Right) Prof Catherine So, Department of Educational Psychology (Photo from RTHK)

2.3 Funding and Business Resources Support

2.3.1 Knowledge Transfer Funds

In support of Knowledge Application in the Community: Knowledge Transfer Project Funds

CUHK was the first university to establish a regular source of funding to drive social innovation by academics. The Knowledge Transfer Project Fund (KPF) was launched in 2009 and has supported 226 projects since its inception. Many of these projects were multidisciplinary ventures, which have created positive social change in areas such as public health, education, culture and heritage, sustainable cities and social cohesion.

CUHK was the first local university to collaborate with the HKSAR Government’s Social Innovation Entrepreneurship Development (SIE) Fund, which seeks to promote social innovation and entrepreneurship in the territory. The collaboration started in 2017, resulting in the support of 32 projects, benefiting more than

50,000 people. This partnership model set an example to encourage stronger partnership between SIE Fund and higher education institutions in Hong Kong in the areas of social impact-driven knowledge transfer. This year, there were 10 new projects supported by the KPF, and 7 by the SIE Fund.

In support of technology commercialisation: Technology and Business Development Fund

The Technology and Business Development Fund (TBF) was established to help academic staff at CUHK to explore the commercial potential of new technologies and intellectual property (IP) developed from their research. This year, 6 new projects were supported. Since 2009, Technology and Business Development Fund (TBF) has supported 86 projects, many of which have resulted in new patents and the establishment of startup companies.

2.3.2 Knowledge Transfer Promotion

2.3.2.1 International Exhibitions

International exhibitions have always been a great way for universities to connect with potential industry partners. Through the years, we have actively participated in various international summits and forums to expand the industry networks and enhance the technology transfer capabilities of CUHK to meet the demands of the industry. Due to the COVID-19 pandemic, physical exhibitions in 2020/21 were either postponed or cancelled. However, we continued to promote CUHK innovations by participating in virtual events and implementing new initiatives. This year's **ChinaBio Forum, KoNECT International Conference** and **BIO International Convention - BIO Digital 2021** provided great opportunities for the CUHK delegation to learn the latest news in the industry and gain valuable experience in cooperation with international biotechnology/ pharmaceutical companies and investors. We promoted CUHK's latest biomedical technologies, research and clinical expertise to professionals from different sectors in the field of biotechnology, international biotech companies and related service providers while conducting over 20 one-on-one partnering meetings with large and mid-cap biotechnology/ pharmaceutical companies and investors.

International Exhibition of Inventions of Geneva

In March 2021, scientific innovations developed by CUHK received recognition for their outstanding performance in the **International Exhibition of Inventions of Geneva 2021**, which was held virtually this year because of the COVID-19 pandemic. The Exhibition is regarded as one of the largest and most important global exhibitions of innovations supported by the World Intellectual Property Organisation and the Swiss Federal Government. The international exhibition devoted to inventions showcased about 600 inventions from 24 countries and regions. Despite the COVID-19 pandemic situation, CUHK delegates made stout efforts in translating



CUHK delegates attend the CE's Reception on 17 May 2021.

research into impactful innovations and applications and promoted their research outputs to overseas academics, investors, business and public visitors alike.

This year, our delegation achieved impressive results with all participating teams received awards, including one Gold with Congratulations of the Jury Medal, three Gold Medals, two Silver and three Bronze Medals. The projects covered a wide range of areas, including health technology, automation engineering, renewable energy and artificial intelligence. In particular, Dr. Patrick Ming Kuen TANG and Professor Huiyao LAN, the Gold Medal (with Congratulations of the Jury) winners, invented *A Novel Virus-Free Anticancer Gene Therapy* that can regulate gene transcription without using a virus. This is a revolutionary technology which takes an important step towards a safe targeted gene therapy clinically. On 17 May 2021, the Chief Executive, Mrs. Carrie LAM

officiated at the CE's Reception for Awardees at Hong Kong Science and Technology Parks (HKSTP) recognizing awardees for their efforts in the areas of research, innovation and technology developments.

2.3.2.2 Local Technology Exhibitions

In addition to international exposure, CUHK also continues to strengthen our connection with local stakeholders. We coordinated 20 project teams to join the **"Virtual InnoCarnival"** organized by Innovation and Technology Commission on 23-31 December 2020. Our innovative projects and online quiz competition attracted more than 1,600 visitors to the CUHK virtual booth, making it one of the five most popular booths in the exhibition. Moreover, from May 2020 to April 2021, we supported 5 project teams to promote their technologies through the virtual exhibition, technical seminars and the **"E&M InnoPortal"** hosted by the Electrical and Mechanical Services Department, so that they can explore collaboration opportunities with government departments and the industries.

To further promote CUHK research achievements online, the **"CUHK CINTEC Exhibition"** Instagram and Facebook pages have been created with interesting posts featuring some exhibited projects to engage a broader audience. We also cooperated with InnoPort to design the navigation interface and multimedia content for the interactive kiosks. Visitors can learn about 11 innovations of CUHK, of which 9 received awards at the International Exhibition of Inventions of Geneva 2021.

Adapting to the "new normal", we recently started to rebuild the CINTEC Exhibition website and will create a new landing page to support the hybrid mode of future physical and virtual exhibitions. The website will feature the coming "International ICT Expo", "Hong Kong International Medical and Healthcare Fair", "Hong Kong Electronics Fair" and "InnoCarnival".

3 FOSTERING INNOVATION AND ENTREPRENEURSHIP AT CUHK

Innovation and Entrepreneurship (I&E) plays a significant role in the process of knowledge transfer. The various I&E stakeholders at CUHK strive to embrace and cultivate I&E culture on and beyond campus, and to provide comprehensive support and opportunities for CUHK innovation endeavours.

3.1 InnoPort - Innovation and Entrepreneurship Hub of CUHK

InnoPort is the newly renovated iconic infrastructure designated for nurturing I&E at CUHK. Conveniently located next to University MTR Station, its five floors have been designed as a unique place where innovation can take place. It functions as the gateway for knowledge transfer at CUHK.

InnoPort provides a shared space for CUHK innovators and entrepreneurs, where they can gather, collaborate and work together in a communal setting. It also provides a physical gathering “hub” for engaging alumni, academics, students, researchers, industry partners and the public. This year, a total of 273 events organised by different I&E stakeholders at CUHK, ranging from Happy Hour Entrepreneurial Talk series, FinTech conference, STEM seminar, entrepreneurial workshops, Sustainable Development Goals (SDG) competition etc. were held at InnoPort.

Many of the activities were online or hybrid, with a limited number of live audiences, reducing physical gathering in this new normal situation. A variety of digital equipment was supplemented to facilitate this trend, such as a conferencing system to facilitate hybrid zoom meeting and presentation. It is expected that more varied activities and partners will be engaged as the visibility and publicity of the facility grows over time.



Regular publicity is emphasized at InnoPort, for nurturing I&E culture for the long run.



Cafe inno330 is opened to all visitors and becomes one of the gathering point for our entrepreneurial community.

3.2 Interdisciplinary Entrepreneurship Education

To promote an entrepreneurial culture and mindset for the entire University community, the pioneering Entrepreneurship and Innovation (EPIN) minor programme was launched in 2017. The EPIN programme adopts an interdisciplinary approach and is open to all undergraduate students from CUHK’s eight faculties. It aims to cultivate entrepreneurship among students with events that enrich their understanding of entrepreneurship and challenge their creativity and perseverance.

Since 2017, over 600 undergraduate students across Faculties have been admitted to the programme. The program offers courses on Mindset & Values, Knowledge & Skills as well as practical courses to facilitate hands-on experience for students. Over 30 guest lectures have been delivered under the EPIN programme, featuring over 20 prominent figures and seasoned entrepreneurs from different industries, who shared their real-life stories and experiences regarding creativity, innovation, problem-solving and entrepreneurship. Most of the guest lectures were video-recorded and edited to create a series of eLearning course on the KEEP platform (<https://keep.edu.hk/>; a CUHK-initiated massive open online courses platform) to keep abreast of the growing trend of eLearning across higher



Students actively participated in a virtual class.

education institutions worldwide. In response to the COVID-19 pandemic, EPIN has also joined the APRU Virtual Student Exchange Programme, led by CUHK, to make international education accessible by allowing students to take academic courses without having to leave home. Four students from the South America enrolled in *EPIN1010 Anatomy of an Entrepreneur*. EPIN has adopted technology to enhance the learning experience for students. Teachers use different software (e.g. Google team, Miro, Slack and Zoom) to build interactive components for fully online and hybrid teaching.



Teacher created a discussion zone on Miro to facilitate students to present their ideas interactively.

Internship Programme

In collaboration with Hong Kong Cyberport Management Company Ltd., Hong Kong Science and Technology Parks Corporation (HKSTP) and CUHK Alumni Entrepreneurs Association (CUAEA), EPIN introduced the EPIN Internship Programme in 2018-19 to offer internship for EPIN students to work in startups or venturing firms with innovative elements. Students who have completed qualified internship are eligible to enrol into an EPIN internship course and obtain course credits that count towards the fulfilment of the EPIN Minor Program. Other collaboration partners include Alibaba Internship Programme, Global Entrepreneur of AIESEC and Global Internship Programme (GIP) of Office of Student Affairs etc. Over 50 ventures have joined our Internship Programme.

3.3 Entrepreneurship Mentorship and Support

3.3.1 Pre-Incubation Programme

The CUHK Pre-Incubation Centre (PI Centre) is a university-wide initiative to stimulate creativity and entrepreneurship by offering up to one year of working space, facilities, training, startup funding and mentoring services to teams of students starting companies to commercialise technologies and implement innovative business models both for profit and for the benefit of society. Through the PI Centre, CUHK aims to increase the number and impact of sustainable, socially responsible enterprises that integrate theoretical knowledge, enthusiasm and market discipline to create value, with the goal of unleashing creative potential across the campus.

Since 2014, we have conducted a series of workshops, seminars, networking sessions, bootcamps and hackathons to foster entrepreneurship among students from different disciplines, staff, alumni and the public; and to incubate and mentor undergraduate and postgraduate student-initiated startup projects. This year, the PI Centre admitted a total of 20 teams, in two batches, out of 81 applicant teams. These Pre-Incubation teams (PI Teams) were selected by a vetting panel of both internal and external professional assessors. The PI Centre has organised over 40 activities in the past year, both as a standalone unit and as a co-organiser. Internal and external units we have collaborated with include the Center for Entrepreneurship, Cyberport, HKSTP, LinkedIn, Alibaba Entrepreneurs Fund, the Hong Kong and Shanghai Banking Corporation Ltd. (HSBC), Taiwan Startup Stadium and Thailand RISE. Over the years, we have gradually gained a reputation in the community and have been steadily contributing to the startup ecosystem in Hong Kong.

3.3.2 Innovation and Entrepreneurship Competitions

CUHK believes that competitions could offer opportunities for students to learn and channel their energy into a creative idea, as well as to inspire one another through the journey. We provide not only the opportunities, but also equip the students with critical skills to compete in local and international competitions. Through these competitions and training, we are then able to identify outstanding teams, direct more resources to support and nurture them with our entrepreneurship programmes, such as Pre-Incubation and TSSSU.

The Vice-Chancellor's Cup of Student Entrepreneurship (VCCE)

Held on 14 Nov 2020, the VCCE bootcamp attracted over 30 teams which submitted their business ideas. The participants demonstrated how their innovative ideas would give their product or service an edge over competitors, while also providing attractive and sustainable returns to investors. All the winning teams were PI Teams incubated by PI Centre.

This year's winning team was **Flying Milk Tea**, a Chinese online platform which integrates creative work submission, social media, and online merchandise store for both physical and digital goods. It is the world's first Chinese creations submission website with a social media section and the first website in the world which utilizes "Adversarial Neural Cryptography" to protect creators' copyrights.

Just a Moment was the first runner-up. This is a platform which aims to encourage help-seeking behaviour from people who have mood disturbances and to enhance public awareness and knowledge towards their mental status. Through revolutionizing conventional psychological services with the integration of cutting-edge technology, they have created a holistic and effective mental health services platform. The second runner-up was **Gelpro**, a wearable and accessible protective device which protects children's developing brain in sports and recreational activities, avoiding potential psychological repercussions later in life.



VCCE winning teams: (Top) "Flying Milk Tea", (Middle) "Just a moment", (Bottom) "Gelpro"

Professor Charles K. Kao Student Creativity Award

Formerly the Vice Chancellor's Cup of Student Innovation, PCKKSCA is a biennial competition supported by the Charles K. Kao Scholarship Endowment Fund to promote innovation and entrepreneurship on campus and to encourage cross-disciplinary collaboration. PCKKSCA aims to foster innovativeness, creativity and entrepreneurship among students, while also accelerating the knowledge transfer of academic research into innovative applications. This competition provides a great platform for all students to promote CUHK's innovation both locally, nationally, and internationally. For example, PCKKSCA awardees will represent CUHK in the national competition "Challenge Cup".

PCKKSCA is open to all CUHK undergraduate and postgraduate students. Participants can submit innovative projects on an individual or group basis. The projects collected fall into 4 categories, including "Life Science", "Energy, Environmental and Chemical Engineering", "Information Technology", and "Mathematics and Physics / Mechanics and Control Systems". In 2020/21, PCKKSCA received a record-breaking number of entries. There were 71 entries in total, of which 21 were shortlisted for the final presentation. The judging panel selected 14 awarded entries, of which 4 also won special awards. The prize presentation ceremony, officiated by Vice-Chancellor, Professor Rocky TUAN, was held on 28 May 2021.

Of the two winners in the Postgraduate Individual category, MITOEX submitted a project entitled "Extracting functional mitochondrial using microfluidics device", featuring a device which increases the efficiency of extracting functional mitochondria using microfluidics. The other winner was from the Department of Biochemistry, with the project "Ultrafast Laser Stimulation in Stem-cells and Its Potential for Cell Differentiation Induction".

The champion of the Postgraduate Group was a team of students from the Department of Surgery and the Department of Biomedical Engineering, whose winning project was entitled "Electromagnetically Actuated Soft-Tethered (EAST) Colonoscope".

The 7th Hong Kong University Student Innovation and Entrepreneurship Competition

This territory-wide competition received over 600 projects in the Entrepreneurship category and 400 projects in the Innovation category this year, vying to represent Hong Kong at the biennial "Challenge Cup" National College

Students' Extracurricular Academic Science and Technology Contest, the China College Students' "Internet Plus" Innovation and Entrepreneurship Competition and the Beijing-Hong Kong Youth Innovation and Entrepreneurship Cup. CUHK is proud to have taken home a total of 15 awards. In the Innovation category, CUHK students won 2 first-class awards, 2 second-class awards, 5 third-class awards, and 3 merit awards. In the Entrepreneurship category, CUHK students received 1 third-class award and 2 merit awards.

Students from the Department of Mechanical and Automation Engineering won the Innovation First-class Award under Mathematics and Physics / Mechanics and Control Systems with their project "Miniaturized robotic steerable surgical drill for confined space bone work", while a team of students from the Department of Anatomical and Cellular Pathology won the Innovation First-class Award in the Life Sciences category with their project "A Novel Neutrophil-based Anticancer Immunotherapy: S3KO-TAN". PI team Look4kol also won the Entrepreneurship Merit Award under the Startup category.

The 12th National Challenge Cup China University Student Innovation and Entrepreneurship Competition 第十二屆「挑戰盃」全國大學生創業計劃競賽

The China University Student Innovation and Entrepreneurship Competition (previously known as "Chuang Qing Chun") and "Challenge Cup" National Competitions have a fine reputation for nurturing students' ability during the past 20 years. This year's competition was held during December 2020, and received over 150,000 applications. Among the 369 teams of finalist in all categories, only 20 teams achieved gold in social entrepreneurship. CUHK teams won the following awards in the competition:

Award	Name of Projects	Project Team
Gold Award	LaSense Ultra-sensitive Gas Sensing and Control System 痕量級鐳射光譜氣體在線傳感系統	陳思捷、許可、熊茜、劉恆言、侯曉慧
Bronze Award	Modularized ROV 模組化潛水機械人	郭俊強

Qianhai Guangdong-Hong Kong-Macao-Taiwan Youth Innovation and Entrepreneurship Competition

This competition was held by the Qianhai Cooperation Zone Authority, the Shenzhen Municipal Science and Technology Innovation Commission, the Hong Kong and Macao Affairs Offices of the Shenzhen Municipal Government and other government agencies in Shenzhen, Hong Kong and Macao. PI Team Han-Peng Assisted Reproductive Technology participated in this competition and won a Gold Award in the Hong Kong region of the competition. Their product is a cloud service platform which can assist *in vitro* fertilisation (IVF) doctors and embryologists in selecting high developmental potential embryos via zygote morphokinetic parameters segmentation algorithm and an early blastocyst formation prediction model.



UniQ team was awarded the merit award.

Participating teams from the Hong Kong Division joined the semi-finals and finals held in the Qianhai Shenzhen-Hong Kong Youth Innovation and Entrepreneur Hub. UniQ (CUHK) won the merit award and was eligible to join Qianhai Shenzhen-Hong Kong Youth Innovation and Entrepreneur Hub.

Singapore Management University Lee Kuan Yew Global Business Plan Competition (LKYGBPC) local roadshow with CUHK in Shenzhen

The 10th LKYGBPC for Asian startups was held this year and CUHK was honoured to be Singapore Management University's regional partner. The LKYGBPC local roadshow was held in the CUHK Shenzhen Research Institute (SZRI) in October 2019. The competition was titled as "Reimagine Smart, Sustainable and Resilient Cities", and focused on sustainable urban innovations. The roadshow attracted more than 100 participants, and over 850 submissions of competitive creative ideas were made from across the globe. Due to COVID-19, the final competition was postponed, and was held from 27 September to 1 October 2020 in Singapore. The Center for

Entrepreneurship (CfE) was invited to join the international Judging Panel, and was represented on the panel by Mr Edward Wong. Seven teams signed up for LKYGBPC with CUHK.

3.4 Entrepreneurship Funding Programmes

In order to promote a wide array of entrepreneurship activities, different funding schemes have been launched to support entrepreneurial-minded academics, students and local youth to commercialise their ideas to create potential societal impacts.

3.4.1 Technology Start-up Support Scheme for Universities (TSSSU)

With a total of HK\$8 million funding support from the Innovation and Technology Commission, 22 CUHK technology startups were awarded this year. The startups were in different areas, including Advanced Manufacturing/Process Development, Biotechnology, Electronics, Energy, Environmental Protection, ICT, Medical Robotics, and Nanotechnology and Materials Science. To date, seventeen companies (including PI & TSSSU) have been awarded term sheets with a total amount of approximately HK\$700 million.

3.4.2 HKSTP Science and Technology Entrepreneur Programme (STEP)/ HKSTP Incubation Program/ Cyberport Creative Micro Fund (CCMF)/ Cyberport Incubation Program

To help our PI and TSSSU Teams secure further support and funding, we have actively encouraged them to apply to pre-incubation and incubation programmes in HKSTP and Cyberport. These programmes offer financial aids and further startup support such as mentoring services, investment opportunities, partnership opportunities and a startup network. This year, our teams were admitted to the following programmes:

Startup Stage	Programme	Financial Aid (HKD)	Duration	No. of Teams admitted
Pre-Incubation	HKSTP STEP	\$100,000	1 year	4
	Cyberport CCMF	\$100,000	6 months	5
Incubation	HKSTP Incu-Bio	\$16,000,000 (for TSSSU teams)	4 years	3
	HKSTP Incu-Tech	\$1,290,000 (for PI teams) \$3,060,000 (for TSSSU teams)	3 years	4
	HKSTP Incu-APP	\$800,000	2 years	2
	Cyberport CIP	\$500,000	2 years	2

3.4.3 Sustainable Knowledge Transfer Project Fund

Sustainable Knowledge Transfer Project Fund (S-KPF) provides seed funding and incubation support for academics to help them transform social innovation ideas into social enterprises which would eventually be supported by self-generated income, external investment or other funding sources. It is the first such scheme to encourage social entrepreneurship among academia. The scheme includes a pre-application information session, individual consultations, and pitching rehearsal and coaching sessions. A preliminary meeting featuring training on Theory of Change and Lean Canvas was conducted to equip the teams with essential concepts and skills in operating social businesses to drive impact.

S-KPF Supported Social Enterprise

Professor Mo Kar Him (School of Architecture) Prof Mo's research interest is the relationship between the built environment and social well-being, particularly in ageing society. He has been conducting research, consultancy studies and policy reviews to bring together academics and architecture and urban design professionals to promote the development of healthy and equitable cities. Hong Kong's ageing population and the related challenges call for innovative solutions. With support from S-KPF funding, Prof Mo set up the Happy Ageing Lab Company Limited in 2021, to link users and professionals and remove barriers to addressing the pressing needs of our ageing population. Happy Ageing Lab believes that a progressive redesign of the built environment is imperative to achieve healthy and happy ageing.



Due to the lack of platforms for participation by the elderly, design professionals are often deprived of direct engagement with the elderly and other user groups. As a result, the actual needs of the potential users are often neglected. Through user- and community engagements, Happy Ageing Lab helps clients to understand the Silver Market by analysing its needs, aspirations, and challenges. Older adults are trained as assessors to conduct user-oriented place/design audits and identify areas of improvement for existing services, products or places. The Lab co-creates integrated solutions to address the shortcomings identified, improve existing provision, and develop strategies, plans and design principles for clients. The team aims to induce change in practice, promote design innovation and ultimately influence policy-making for this emerging market.

3.4.4 Social Enterprise Startup Scheme (for CUHK Students & Alumni)

The Social Enterprise Startup Scheme is managed by the I-CARE Centre for Whole Person Development. It aims to support CUHK students and young alumni to develop meaningful social startups. The program offers a mentorship program on formulating business plans and practical skills of running an enterprise. It also offers seed money from the CUSE Fund to encourage students to engage in social entrepreneurship that can create positive social change and improve people's quality of life.

3.4.5 Hong Kong Social Enterprise Challenge (HKSEC)

Since its launch in 2007, the Hong Kong Social Enterprise Challenge (HKSEC) has become the leading social enterprise startup platform for tertiary students and fresh graduates among the universities and community colleges in Hong Kong. It is also one of the world's oldest competitions of its kind. Through a structured competition model, HKSEC encourages students and young people to employ a creative entrepreneurial approach to solve practical social issues. This initiative supported by the HKSAR Government's Home Affairs Bureau.

HKSEC 2020-21 attracted 632 participants who formed 195 teams and put forward 144 social venture ideas. Of the 158 participants from CUHK, 18 members made it to the semi-final, with one-third of them winning the Startup Award receiving up to HK\$300,000 per team. The ideas put forward have become increasingly varied over the years. Business ideas included medical technology, food waste upcycling, urban farming, support services for different disadvantaged groups such as visually impaired, elderly and students with special learning needs. While maintaining a major partnership with the United Nations Development Program (UNDP), HKSEC continues to reach out to local communities to engage different key stakeholders such as NGO leaders and philanthropists to facilitate knowledge exchange and mutual learning.

HKSEC offers comprehensive training and incubation services to support the development of young local social entrepreneurs, by providing a series of education events to all participants, as well as seed money, business consultations and publicity support for the awarded teams. Through our ever-expanding network, many HKSEC awarded teams also received acceleration support through our referral arrangement with partners such as the Impact Incubator funded by the Social Innovation and Entrepreneurship Development Fund (SIE Fund).

Achievements of Teams with CUHK members in HKSEC



SeniorDeli

- HKSEC 2020-21 Champion
- Youth Co:Lab HKSAR Winners
- 14th round of CUHK PI Centre incubate
- Enactus Hong Kong Regional Competition 2021-Project of the Year



King's Phase Technologies

- HKSEC 2020-21 Grand Final
- Social Ambassador IP Award
- 10th round of CUHK PI Centre incubatee



ScreenMat:

- HKSEC 2020-21 1st Runner up
- Most Innovative Award
- Social Ambassador IP Award

3.5 Entrepreneurship Support in the Greater Bay Area and Asia

The vibrant markets of mainland China and Asia present great opportunities for entrepreneurship development and expansion. CUHK has been actively partnering with various organisations to provide a series of support to ambitious teams to expand into these regions.

3.5.1 Guangdong-Hong Kong-Macao Greater Bay Area (GBA) and SZRI Innohub activities

The national strategy for developing the Greater Bay Area (GBA) provides great opportunities for startups in Hong Kong to receive policy support and funding in the GBA. We continue to collaborate with different partners in the region offering services to PI/TSSSU teams, including Zhuhai International Health Port (Jinwan District), Hong Kong and Macau Science and Technology Achievement Transformation Base in Zhuhai High-tech Zone, Gungho Space in Foshan and the CUHK Shenzhen Research Institute in Shenzhen. Due to COVID-19, we have not been able to hold fieldtrips and bootcamps for startups to visit these partners in person. We have instead held regular talks on GBA Strategy for CUHK startups to enhance their understanding of GBA policy and business opportunities in the GBA. Currently, we have 8 PI/ TSSSU teams which have received support from Gungho Space or/ and SZRI to enter the mainland market.

3.5.2 The Youth Entrepreneurship Assistance Scheme - Make A Dash – Youth Entrepreneurship in the Greater Bay Area

The **Youth Entrepreneurship Assistance Scheme** under the Youth Development Fund is a new initiative introduced by the Home Affairs Bureau (HAB) to support youth entrepreneurship in Hong Kong and the Greater Bay Area (GBA) markets. The national strategy of the GBA development provides attractive opportunities for startups to receive policy support and funding in the GBA. In 2020-2021, together with dedicated funding from the HAB and funding contribution from CUHK, CUHK received around HK\$8 million covering the startup capital funds for the qualified teams and scheme operation costs.



MAKE a DASH – CUHK’s new funding scheme for young entrepreneurship in the Great Bay Area.

On 26 February 2021, Professor Mai Har SHAM, CUHK Pro-Vice-Chancellor and Vice President and Choh-Ming Li Professor of Biomedical Sciences, received a certificate from the Chief Executive Mrs. Carrie LAM Cheng Yuet-ngor, in recognition of the University’s commitment to pledge its entrepreneurial support to CUHK members across and beyond the campus.



Prof. Sham Mai Har received a certificate from the Chief Executive Mrs. Carrie Lam Cheng Yuet-ngor in recognition of the University’s commitment to fostering youth entrepreneurship across and beyond the campus.

The startup capital fund provides up to HK\$0.6 million per team to undergraduate and postgraduate students (full-time and part-time) and CUHK alumni aged between 18 and 40. A total of 43 applications were received and 13 teams of various business natures (technology, social and cultural) were selected in June 2021 to join this 9-month funding scheme. Benefiting from the entrepreneurial support and incubation services from SZRI and Gung Ho Space, teams could start their businesses in Hong Kong and Mainland GBA cities and further strengthen their corporate governance, adaptability and digital competence, enabling them to realize their startup dreams and take their ventures a step further.



Speakers: (From left to right) Dr. Lin Huangquan, Dr. Ken Yeung and Mr. Kenny Leung

On 23 April 2021, Dr. Ken YEUNG, Associate Director of the Office of Research and Knowledge Transfer Services was invited to deliver the opening speech. In the sharing sessions, Dr. LIN Huangquan, Executive Director of SZRI and Director of the Office for Greater Bay Area Developments, Mr. Andy YIP, Co-founder and CEO of Gung Ho Space and Mr. Kenny LEUNG, CEO of IOT Solution Limited gave us valuable insights into key industries in Shenzhen, Foshan and Zhongshan.

3.5.3 Potential Business Development Opportunities in the Asian market

We have been exploring collaborations with incubators and accelerators across Asia, for PI/TSSSU teams that are interested in expanding their business into the Asian market. We are currently discussing potential collaborations with RISE Thailand, exploring ways in which they can support our teams.

3.6 Expanding CUHK Entrepreneurship Community and Networking

3.6.1 CUHK Entrepreneurs Alliance (CUEA)

Initiated by the CUHK Alumni Torch Fund, the Alumni Affairs Office (AAO) joined with the following parties to form **CUHK Entrepreneurs Alliance (CUEA)**: CUHK Convocation, Center for Entrepreneurship (CfE), Centre for Innovation and Technology (CINTEC), CUHK Shenzhen Research Institute (SZRI), Entrepreneurship and Innovation Hub (InnoHub). Entrepreneurship and Innovation Minor Programme (EPIN), I-CARE Centre for Whole-person Development, Pre-Incubation (PI) Centre, and Office of Research and Knowledge Transfer Services

(ORKTS). This alliance aims to create a synergy in driving the growth and development of entrepreneurship in CUHK in 2020.

3.6.2 CUHK Entrepreneur Day

CUHK Entrepreneur Day (CUHK E-Day) is the annual flagship entrepreneurship event initiated by the CUHK Alumni Torch Fund. Due to the COVID-19 pandemic, Entrepreneurship Day 2020 was held on 25-26 September 2020 and moved online for the first time. The online platform showcased nearly 70 CUHK startup projects and featured a series of talks and workshops by alumni, and the CUHK Entrepreneurship Competition. A total of 14 PI teams and 8 TSSSU teams exhibited at the event. Flying Milk Tea, one of our PI Teams, was the second runner up in the CUHK Entrepreneurship Competition. The event provided a one-stop information and exchange platform for CUHK students and graduates, experienced entrepreneurs from the circle of CUHK alumni, and the general public.

3.6.3 Happy Hour Entrepreneurial Talk

“CUEA Happy Hour Entrepreneurial Talks” have been given regularly at InnoPort on Fridays at 5 pm since 2020. This talk series aims to promote entrepreneurship on CUHK’s campus, and each member of CUEA takes turns to organise the talks. CUHK alumni were invited to share their entrepreneurship experience with the CUHK community. Topics covered in the talks included creative education, paytech, tech transfer, business financing, commercializing AI, social innovation, entrepreneurial mindset, Greater Bay Area opportunities, women entrepreneurs and academic-turned-entrepreneurs. The talks attracted a large and varied audience.



Happy Hour Entrepreneurial Talk

4 IMPACT ON SOCIETY

In line with the University's mission to create a positive impact on society, CUHK researchers actively develop innovative and actionable research which addresses the 17 Sustainable Development Goals (SDGs) adopted by the United Nations.

4.1 Pioneering Network Coding Technologies Change the Landscape of Network Communications

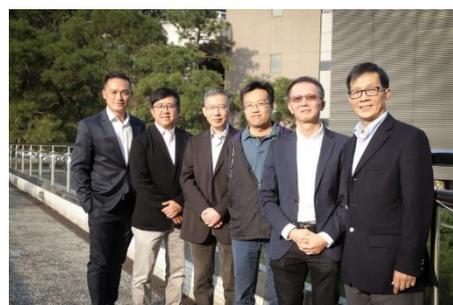
Fulfilled SDG: No. 9 Industry, Innovation and Infrastructure

4.1.1 BATS codes

Professor Raymond YEUNG of the Department of Information Engineering and his postdoc Shenghao YANG invented BATched Sparse Codes (BATS codes), a network coding technology that solves the longstanding problem of packet loss in wireless multi-hop communication. Professor YEUNG founded a startup company, N-hop Technologies Limited in 2018 to commercialise his invention. The technology has been successfully deployed in smart lampposts in various locations in Hong Kong. Recently, his team has worked with the Sustainable Lantau Office of the Civil Engineering and Development Department to apply the technology in a pilot trial to provide a Wi-Fi service for hikers along a section of hiking trail in Lantau which is not well covered by the cellular network. Other potential applications of the BATS code include 5G, V2X, satellite networks, and underwater acoustic communication. This year, Professor YEUNG received the "IEEE 2021 Richard W. Hamming Medal" for his exceptional contribution to network communication and pioneering development of the BATS code. He is the first Asian researcher to receive this award since its establishment in 1988.

4.1.2 nCloud and nEdge solutions

nCloud is a network coding-based multi-cloud storage system which can significantly enhance data storage security by distributing data among cloud storage providers, thereby lowering operating costs and streamlining access. The nCloud, together with nEdge solutions are developed based on the network coding technology founded by Professor Patrick Pak Ching LEE of the Department of Computer Science and Engineering, and successfully commercialised by CU Coding Limited, a startup company founded in 2018 by a group of CUHK professors and alumni. By connecting Internet of Things (IoT) end-points, nEdge has become a key technology for boosting 5G communications and Smart City development in Hong Kong. The company won the Golden Award for exhibiting the 5G nEdge technology in the 1st Greater Bay Area 5G Application and Innovation Challenge in November 2020. On 10 May 2021 the team announced the market launch of its patented technology nEdge and nCloud solutions with the provision of one-stop managed telecom and Information and Communication Technology (ICT) services by HGC Global Communications Limited (HGC). The partnership is helping the team to advance its platform, improve the data security capabilities across multi-cloud for enterprises, and boost Smart City Development in Hong Kong.



Co-Founders of CU Coding Limited: (From left) Mr Aldous Ng, Mr Joseph Wong, Prof Raymond Yeung, Prof Patrick Lee, Prof Soung Liew, and Prof Pak Chung Ching.

4.2 Probiotic Composition for Immunity Enhancement

Fulfilled SDG: No. 3 Good Health and Well-being

The intestinal microbiota of the human being possesses various types of bacteria with complex composition. Probiotics is a type of bacteria in the gut microbiota considered beneficial to the immune function. The formulation of probiotics to enhance immunity may therefore help with the prevention and treatment of diseases. Through years of research on the gut microbiota, especially probiotics, Professor Siew Chien NG of the Department of Medicine and Therapeutics and her research team have identified the ideal bacterial species for pathogenic infections, and developed a probiotic composition to effectively enhance immunity and help prevent and treat pathogenic infections, including respiratory pathogen infections such as epidemic influenza

and respiratory syncytial virus. Professor NG and her team founded GenieBiome Limited in 2019 to develop the innovation into a marketable product. The product was successfully launched in 2020.

In view of the COVID-19 pandemic last year, the team continued to study and develop their product, which can be taken on a regular basis and is expected to provide a viable and effective add-on option to the general public in boosting their immunity. They also investigated the impact of the modulation of gut microbiota in reducing vaccine-related adverse reactions and improving the efficacy of COVID-19 vaccines.



The research team: (From left) Dr Joyce Mak, Prof Francis Chan, and Prof Siew Chien Ng.

4.3 Clean Air for Hong Kong

Fulfilled SDG: No. 11 Sustainable Cities and Communities

The Hong Kong Government issued the Clean Air Plan for Hong Kong 2035 on 29 June 2021, with the aim to attain carbon neutrality before 2050. To achieve this, technological innovations in air monitoring are essential to gather more detailed and accurate data so as to understand the sources, formation mechanism and transportation pathways of air pollutants.

4.3.1 Air pollutants measurement mobile app

To protect citizens' health, readily available information is needed so that individuals know help to reduce their exposure to pollutants in their daily activities. Professor Bo HUANG of the Department of Geography and Resource Management has developed PhotoAir, a mobile app, which allows a smartphone user to take a photo to measure PM_{2.5} concentrations, indoors or outdoors, day or night, in real time and in any weather conditions. Grounded in physical optics and empowered by deep neural networks, the app provides unprecedented levels of accuracy and efficiency in measurements and is far more flexible than traditional instruments. One of the advantages of the app is that it does not require the construction of numerous monitoring stations in a given region. PhotoAir offers a convenient tool for real-time monitoring of PM_{2.5} concentrations ubiquitously, thereby helping citizens avoid heavily polluted areas, reduce their exposure to air pollution and make informed choices towards a healthy lifestyle. The project was awarded a gold medal in the International Exhibition of Inventions of Geneva 2021.

4.3.2 Transboundary air pollution monitoring system

Air pollution from Mainland China, which is often blown into Hong Kong by southerly winds, is an even bigger threat to Hong Kong's air quality than locally-generated air pollution. 3D air quality monitoring with light detection and ranging (LiDAR) technology is one of the action items in the Clean Air Plan for Hong Kong 2035. Professor Steve YIM Hung Lam of the Department of Geography and Resource Management focuses on interactions between air quality and climate change, and the impacts on human health and planetary health. His team has developed a Doppler Light Detection and Ranging (LiDAR) network system called 3DREAMS, one of the few long-term LiDAR system networks worldwide and the first to be established in Asia. The system comprehensively monitors and analyses the effects of weather on ground surface and upper-level particulate matters (PM), in particular the characteristics of transboundary air pollution. Professor YIM was recently invited to serve as an advisor on the World Health Organization (WHO)'s Global Air Pollution and Health – Technical Advisory Group (GAPH-TAG). The GAPH-TAG, which consists of around 20 experts and scholars, provides technical guidance and input to support the WHO's efforts and work on air pollution and health issues, by reviewing and analysing the current health impact assessment methods and input data (including Sustainable Development Goals (SDG) indicators reporting) and proposing interventions and policies to address the health impact of air pollution.



Prof Yim and one of the instruments of 3DREAMS was located at CUHK campus.

4.4 Improving the Social Conditions of Deaf People and Sign Language through Sign Linguistics

Fulfilled SDG: No. 10 Reduced Inequalities

Research on Hong Kong Sign Languages (HKSL) and deaf children's language development by Professor Gladys TANG and her teammate Professor Felix SZE of the Department of Linguistics and Modern Languages has dispelled the misconception that acquiring sign language would impede their spoken language development. Based on these findings, they launched Asia's first deaf education qua research programme - Sign Bilingualism and Co-enrolment Education (SLCO) for deaf and hearing students in mainstream education. Further research shows positive results in the language development of deaf young people and social integration between normal hearing and deaf communities resulting from the programme.



Prof Gladys Tang (second from right) and her team.

In Asia generally and Hong Kong in particular, the lack of research in Sign Linguistics has led to sign language being misconceived as a gesture and obstructive to deaf people's development. The deaf are barred from information accessibility through sign language, which affects their education and upward mobility. Sign Linguistics research at CUHK is triggering changes in social attitudes. Findings that sign language reflect linguistic properties and is acquirable by deaf children are gradually changing society's attitudes towards sign language and deaf people, affirming the utility of bimodal bilingual education in nurturing social inclusiveness, and supporting the efforts of governments and universities to develop public services and education programmes involving sign language.

The programme has been welcomed by the relevant departments of the HKSAR Government (the Department of Health and the Labour and Welfare Department), local and international educators (from countries such as Cambodia and Indonesia) and graduates of the programme for its impact on transforming the education sector and empowering individual beneficiaries. The programme's experience has been shared with international partners and has been replicated in Indonesia, Sri Lanka, The Philippines, Vietnam, Japan, Fiji, Cambodia and Myanmar. The SLCO programme won the Zero Project –Innovative Practice Award on Education in 2020.

5 LOOKING FORWARD

Despite the disruption caused by the COVID-19 pandemic during the report period, we have made significant progress in our knowledge transfer efforts by adopting the necessary social distancing measures. These were achieved through the continuous enhancement and expansion of our existing knowledge transfer services, especially via online platforms to reach a wide range of stakeholders. For instance, a webinar series on knowledge transfer covering the topics of intellectual properties, commercialisation, social innovation, and entrepreneurship will be organised throughout the year to help CUHK members to understand the importance of knowledge transfer as well as the services and support offered by the University to support their journey.

We are also delighted that around 75% CUHK's research was recognised as being of "world leading / internationally excellent" standard in the Research Assessment Exercise (RAE) 2020. Furthermore, 85% of the impact cases submitted were judged as "world leading / internationally excellent". To further promote our research excellence and innovation, we will launch a new annual event "Innovation Day" in September 2021. This event will be an iconic event to showcase CUHK's technologies and innovations, and engage external industry and community partners to establish translational research for the benefits of economic prosperity and society.

In order to strengthen the connection between applied research and the unmet needs of the local community, a new KPF Vetting Committee has been formed to select and evaluate incoming KPF applications for the 2021 cohort and beyond. The Committee consists of both sector practitioners and an interdisciplinary team of academics. Combining the experience of experts such as senior executives of welfare and social enterprise sector, with that of academics from different disciplines with a strong track record of knowledge transfer, the Committee is well-positioned to help CUHK identify applied research projects that would potentially create the most impact for the local community.

CUHK will be leveraging on the new opportunities in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) to foster the academic entrepreneurship of CUHK researchers and promote its strategic development in GBA. Through the InnoHub in Shenzhen Research Institute (SZRI), the University will provide more platforms and incubation services for CUHK members who are looking for opportunities in the GBA. To this end, several projects will be initiated, including i) building up an infrastructure for translational medicine like GMP cell facility to accelerate regenerative biomedicine research; ii) establishing a unique Centre of Excellence for healthcare research as a platform for cross-disciplinary collaboration; and iii) promoting private and public partnerships in sectors such as material science, green technology and marine science. We will actively participate in promotion events in the GBA such as the SmartHK 2021 organised by Hong Kong Trade Development Council (HKTDC) in December 2021.

In the CUHK Strategic Plan 2021-2025, we have set very clear targets and goals for research excellence with purpose and responsibility. As a comprehensive research university, CUHK will continue to support and encourage researchers to carry out cutting-edge research, and to apply the research outcomes to benefit society through knowledge transfer endeavours.



Professor Sham Mai-har
Pro-Vice-Chancellor

Annex 2 - Updates on Table 4.1 of Initial Statement

(1 July 2020 – 30 June 2021)

UGC Performance Indicators		2019-20	2020-21
1	Number of patents filed in the year (with breakdown by country and type ^[Annex 4])	386	386
2	Number of patents granted in the year (with breakdown by country and type ^[Annex 5])	257	226
3	Number of licences granted (with breakdown by type ^[Annex 6])	52	80
4	Income (on cash basis) generated from intellectual property rights	\$57,028,289	\$62,799,091
5	Expenditure involved in generating income from intellectual property rights	\$7,516,869	\$8,040,059
6	Number of economically active spin-off companies (with breakdown by type ^[Annex 11])	10	10
7	Net income generated (or net loss arising) from spin-off companies	Loss of \$8,363,384 ^{(a)(b)}	Profit of \$10,458,218 ^{(a)(b)}
8	Number of collaborative research projects, and income thereby generated	264 cases \$123,942,073 ^(a)	267 cases \$ 141,637,288 ^(a)
9	Number of contract research projects (other than those included in “collaborative research projects” above), and income thereby generated	78 cases \$75,278,899 ^(a)	102 cases \$ 80,965,669 ^(a)
10	Number of consultancies, and income thereby generated	299 cases \$141,080,199 ^(a)	266 cases \$ 220,560,471 ^(a)
Subtotal Income Item (4)+(7)+(8)+(9)+(10)		\$388,966,076	\$516,420,737
11	Income received from Continuing Professional Development (CPD) courses	\$1,233,278,356 ^{(a)(c)}	\$1,179,879,184 ^{(a)(c)}
Total Income Item (4)+(7)+(8)+(9)+(10)+(11)		\$1,622,244,432	\$1,696,299,922
12	Number of student contact hours in short courses or e-learning programmes specially tailored to meet business or CPD needs	5,966,385 hours (2,282 courses with 52,624 students)	6,725,455 hours (2,490 courses with 136,515 students)
13	Number of public lectures / symposiums and speeches to a community audience	698	932
14	Number of performances and exhibitions of creative works by staff or students	50	49
15	Number of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies	1294 ^{(d)(e)}	1318 ^(e)

Footnote:

(a) Subject to year-end adjustments.

(b) Only wholly-owned subsidiaries or controlling companies are included.

(c) Including income from non-award bearing programmes offered by the School of Continuing and Professional Studies and the Asia-Pacific Institute of Business.

(d) Updated figure.

(e) Honorary, visiting and inactive staff are not included

Annex 3 - Updates on Table 4.2 of Initial Statement

(1 July 2020 – 30 June 2021)

Other Performance Indicators		2019-20	2020-21
1	Knowledge Transfer Project Fund (KPF): Projects supported by the UGC KT Fund ^[Annex 8]	2019-20: 10 Total: 183	2020-21: 10 Total: 193
2	Sustainable Knowledge Transfer Project Fund (S-KPF) ^[Annex 9]	3	4
3	Technology and Business Development Fund (TBF) ^[Annex 10]	7	6
4	Number of other KT projects and activities not funded by the UGC KT Fund	332	337
5	Number of websites on KT activities at Faculties / Departments / Centres	9	180 ^(a)
6	Number of publicity or media features related to KT, including print, online and electronic media	2,362	3,145 ^(b)

Footnote:

(a) Including websites, mobile applications, social media channels and video-sharing platforms

(b) Including appearance on social media channels and video-sharing platforms

Annex 8 - Knowledge Transfer Project Fund (KPF)

Project List

KPF - Completed projects		
No.	Project Code	Project Title
1	KPF18CHF04	Realizing children's potential in language development: input and intervention
2	KPF18SCF01	Promote Psychological and Behavioural Well-beings of Preschool Children with Autism Spectrum Disorders by Implementing a TCM Paediatric Massage Program
3	KPF18HLF17	Online parenting programme for families of children born preterm
4	KPF18HLF22	An evidence-based knowledge transfer program promoting HPV vaccination among men who have sex with men in Hong Kong
5	KPF18HLF34	Improving Access to Psychological Interventions: Developing and Disseminating an E- Mental Health Portal in Hong Kong
6	KPF19HLF09	Early Identification of Hearing Loss in Aging Community through Hearing Screening App
7	KPF19HLF26	AI Based Colour Blindness Correction App
8	KPF19HLF32	Virtual Reality Simulation of Real-World Activities to Identify Glaucoma Patients with Visual Disability for Visual Rehabilitation and Patient Education
9	KPF19SCF12	Promotion of a strength-based approach in understanding and helping children with Attention Deficit Hyperactivity Disorders (ADHD)
10	KPF19CHF20	Using Virtual Reality (VR) Technology to Enhance Students' Understanding of Colonial Architecture in Hong Kong
11	KPF19HLF14	Prevention of Imminent Fragility Fractures: A Call to Action in Hong Kong
12	KPF19HLF15	Happy muscle happy knees
13	KPF19SCF17	Evaluating the effectiveness of a psychoeducation programme for asylum seekers and refugees in Hong Kong
14	KPF20SCP11	Sustainable communities lab for people's multifaceted well-being

KPF - Projects in progress		
No.	Project Code	Project Title
1	KPF18HLF27	An Oral Exercise Training Software for Elders in Hong Kong
2	KPF19CHF05	Telling stories: A digital humanities approach to documenting linguistic diversity in Hong Kong
3	KPF19HLF27	A Concept Musical Drama on End-of-life Care and Death Attitudes in Hong Kong
4	KPF19SEF25	"Our Everyday. Our Borders." A study of universal accessibility in our built environment in Hong Kong
5	KPF19HLF16	Implementing a chargeable full cost-recovery HIV self-testing service model for men who have sex with men in Hong Kong
6	KPF19HLF23	Drawing Patterns Tracking with E-Pen
7	KPF19HLF33	Smartphone-based Culturally Adapted Lifestyle Medicine for Improving Mental Health
8	KPF190TF21	STEM education in Physics for Secondary Schools
9	KPF19SCF07	Born to See: Living the Life of a Deaf Person
10	KPF20GWP02	"Strong Shoulders For Elderly" Campaign
11	KPF20GWP05	Reaching Out to the Unreached Community: Delivering Mental Health Outside the Box through Whole-of-Community Campaigns
12	KPF20GWP16	Hip Protectors to Prevent Hip Fracture of Older Adults in Hospitals and Nursing Homes
13	KPF20GWP22	Enhancing Mental Health of the Deaf Community in Hong Kong
14	KPF20QEP12	Decoding the concealed emotions of children with special educational needs

KPF - Projects in progress

15	KPF20QEP26	Personalised Child Story Channel
16	KPF20CHP21	Living Heritage: Transforming Hong Kong's Abandoned Villages into Cultural Destinations
17	KPF20GWP01	CURe Pain: Relieve pain, Restore function, Renew hope
18	KPF20GWP08	Combating Sarcopenia in Fragility Fracture Patients in Hong Kong
19	KPF20GWP10	Youth AI Health Ambassador Training and Outreach Program for Brain Health
20	KPF20GWP18	WHO-2025 Target to Reduce Children and Youth Physical Inactivity: Impact of Training Workshops and Evidence-based Electronic Portal for Educators (TWEET)
21	KPF20GWP23	Self-management Blood Pressure for Happier Digital Life
22	KPF20GWP27	Health is wealth, Stay active, Eat healthy
23	KPF20QEP09	Sleep to remember: Promoting early language development by making best use of sleep
24	KPF20QEP15	Virtual Trainer for Improving Health & Fitness of Middle-aged adults
25	KPF20SCP07	Visualizing the past, connecting to the present: Revitalization and sustainability of Shek-O community after natural disaster
26	KPF21CHP09	Hong Kong as an Outdoor Museum: EduVenture supports Non-Chinese Speaking Students in Learning Chinese Culture
27	KPF21GWP13	A Phone Reassurance Elderly Project (PREP) for Connecting Elders and Youth: Training, Communication, Health Knowledge Transfer
28	KPF21GWP15	Communication Rehabilitation for Older Adults with Hearing Loss
29	KPF21GWP17	IntergenerationABILITY: enhancement of Physical Literacy of Students with Disabilities and Older Baby Boomers in Hong Kong
30	KPF21GWP20	Intervention for promoting old-age preparation in the community
31	KPF21GWP36	Express Heart Check at Elderly Community Centres across 18 Districts of Hong Kong
32	KPF21QEP01	Music Playgroup to Enhance Language Development in Infants and Toddlers: A Pilot Community Program
33	KPF21GWP02	Healthy Ageing x Ageing in Place
34	KPF21GWP07	Assessing and health coaching for cardiometabolic risk in middle-aged group
35	KPF21GWP14	The Production of Hong Kong Cantonese Language Assessment test for Preschool Children
36	KPF21GWP21	Sleep Innovation and Technology: Improving Community Access to Evidence-based, Real-time, Adaptive Intervention using Commercial Smartwatches to Improve Sleep Quality
37	KPF21GWP26	Risk screening for prodromal Parkinson's disease in elderly using smartphone
38	KPF21GWP29	Improve bowel and urinary function at home during COVID-19
39	KPF21GWP33	Augmented Reality in Orthopaedic Trauma – A New Era of Surgical Training
40	KPF21GWP34	One Size Does Not Fit All, Choice-Based Programs to Enhance Mobility in Older Adults
41	KPF21OTH08	Implicit design generation and additive manufacturing of novel personalised hip protectors in elderly care to prevent pelvis fracture
42	KPF21QEP25	An online-platform for tracking students' learning engagement and wellbeing for online and mixed-mode teaching with immediate improvement feedback

Annex 9 - Sustainable Knowledge Transfer Project Fund (S-KPF)

Social Enterprise List

S-KPF graduates			
No.	Project Code	Project Title	Website
1	SKPF20MED07	DeepHealth Limited	https://www.deephealth.com.hk/
2	SKPF20SSC05	Cayan Educational Design Limited	
3	SKPF20SSC06	StoryTaler Hong Kong Co Limited	https://www.storytalerhk.org/

S-KPF teams in second funding year			
No.	Project Code	Project Title	Website
1	SKPF21QEF10	Science and Technology for Autism Remediation (STAR) Limited	https://star-autism.com/ /
2	SKPF21GWF11	Wellness Travellers Psychological Services Limited	https://www.wellnesstravellers.hk/
3	SKPF21CHF12	One Month One Art Limited	https://www.1m1a.org

S-KPF newly-funded social enterprises (2021-22)			
No.	Project Code	Project Title	
1	SKPF21GHW01	HerBChain Limited (TBC) <i>Prof SHAW Pang Chui, School of Life Sciences</i>	<p>HerBChain aims at providing a blockchain-based informative platform for the quality assurance and quality control of herbal material for the herbal industry and the public. It is a non-profit information platform for recording the manufacturing process of herbal products. By duly recording the parameters and data essential for product quality in manufacturing and supply chain, the traceability and reliability of the products can be ensured. A unique QR code corresponding to a particular batch product will be automatically generated from the system in a fast and simple manner. HerBChain is a digital platform which raises industry standard and customer confidence in raw materials used in traditional Chinese medicine.</p>
2	SKPF21GHW02	Speech and Hearing Social Enterprise Limited <i>Prof LEE Yuet Sheung Kathy, Department of Otorhinolaryngology, Head and Neck Surgery</i>	<p>Speech and Hearing Social Enterprise Limited is formed by members from the Division of Speech Therapy, Department of Otorhinolaryngology, Head and Neck Surgery. With validated assessment tools, evidence-based treatment resources, consultancy services and training to frontline staff, the company aims to enhance the professional standard and capacity in speech therapy and audiology, so as to improve people's wellbeing and quality of life. Together with the provision of quality services to low income families and those from culturally and linguistically diverse backgrounds, the products and services will promote and foster social integration with core values of accommodation, understanding and acceptance.</p>

S-KPF newly-funded social enterprises (2021-22)

No.	Project Code	Project Title
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3	SKPF21GHW05	Happy Ageing Lab Company Limited <i>Prof MO Kar Him, School of Architecture</i>
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To offer consultancy services on the design and management of the built environment for promoting a supportive, inclusive, and attractive living environment for healthy ageing. Through the user- and community engagements, Happy Ageing Lab helps to understand the Silver Market by analysing the needs, aspirations, and challenges of the prospective customers. Older adults will be trained as the assessors to conduct user-oriented place or design audit. They will identify area of improvement for existing services, products or places and co-create integrated solutions with trained older adults to address the shortcoming identified, and develop strategies and plans for clients.

4	SKPF21SSC06	Condition_Lab Limited <i>Prof Peter FERRETTO, School of Architecture</i>
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Condition_Lab is a non-profit business based in Hong Kong that focuses on improving people's well-being, preserving culture and heritage, and educating the public through design. The company seeks to promote culture and heritage in rural communities by developing architectural typologies, explorer workshops, and craft products. Its missions are to preserve local cultural heritage, foster financial self-sufficiency, and provide Hong Kong youths with real-life experience of rural lives where we can reimagine the condition of our living space.

Annex 12 - Knowledge Transfer Events

No.	Date	Title	Speaker(s)	No. of Participants	Mode (Online/Hybrid)
1	2020-07-02	Launching your Business	Ms. Ada Lam	32	Online
2	2020-07-03	Happy Hour "Entrepreneurship & Friends" Talk : 科研為誰而「造」, 創業為誰而幹	Prof. Benny Zee	78	Online
3	2020-07-30	Strategic Communication for Startups	Ms. Leona Wong	71	Online
4	2020-08-18	How Startup Teams can Collaborate for Success	Mr. Kelvin Cheung	52	Online
5	2020-08-27	創業你問我答: 創投基金 X 旅遊初創	Mr. Jeffery Cheng & Ms. Kimberly Chan	49	Online
6	2020-09-01	大灣區創業攻略	Ms. Yvonne Wong	51	Online
7	2020-09-18	Happy Hour Series - 創業甘苦談: 創業路與資金	Dr. Allen Yu	52	Online
8	2020-09-24	Fireside chat with HKSTP Ventures	Mr. Sammi Wong	53	Online
9	2020-09-29	PI Centre Information Session [Fall 2020]	PI Centre	57	Online
10	2020-10-07	Tips on Getting Venture Capital Funding with Alibaba Entrepreneurs Fund	Mr. Teddy Lui & Mr. Tony Tung	42	Online
11	2020-10-13	Pitch Your Idea	Mr. Frank Liu	38	Online
12	2020-10-30	Legal Series: Essential Tips on Contracts for Start-up Business	New Ventures Legal Team	44	Online
13	2020-11-02	14th round PI Team Briefing*	PI Centre	40	Online
14	2020-11-03	Information Session for KPF	Dr. Elsie Tsui	50	Hybrid
15	2020-11-05	Cyberport Entrepreneurship Programme Briefing Session	Mr. Steve Lam	24	Online
16	2020-11-10	Shareholding Issues Founders Need to Know	Ms. Carrie Hui	105	Online
17	2020-11-17	From Bootstrapping to VC: Building an Investable Startup from Scratch in Dormitory	Miss Christie Leung, Mr. Tim Chan & Ms. Nat Lertplakorn	30	Online
18	2020-11-17	Information Session for S-KPF	Dr. Elsie Tsui & Prof Catherine So	25	Online
19	2020-11-26	Legal Series: Company Practice	New Ventures Legal Team	43	Online
20	2020-12-04	E-Corner: Rice Robotics	Mr. Victor Lee	21	Online
21	2020-12-18	Happy Hour Series -融資前哨戰: 公司、創辦人、CEO 之角色	Mr. Jonathan Chee	120	Online
22	2021-01-02	Hong Kong Techathon 2021 (2-9 Jan 2021)	Mr. Philip Lam, Mr. Raymond Chan, Mr. Shek Kin-Shing, Ms. Marina Chan, Mr. Taurus Yip, Mr. Nicholas Ooi, Dr. Alfred Tan, Ms. Kiki Wang & Mr. Heatherm Huang	937	Hybrid
23	2021-01-15	Influencer Marketing	Ms. Meggy Cheng	89	Online
24	2021-01-21	Entrepreneur Corner: Spread-it	Mr. Timothy Ng	37	Online
25	2021-02-09	Extend HK business in Taiwan: Startup Ecosystem in Taiwan	Mr. Peter Liang	41	Online
26	2021-02-19	LinkedIn for Startups	Mr. Zed Kua & Mr. Chapman Ho	59	Online
27	2021-02-22	Legal Series: Introduction to Employment Law and Labour Contracts	New Ventures Legal Team	39	Online
28	2021-03-04	AI Technology and Career Opportunities	Mr. Timothy Leung, Mr. San Wong & Mr. Davis Cheng	67	Online
29	2021-03-05	PI Centre Information Session [Spring 2021]	PI Centre	23	Online
30	2021-03-12	Entrepreneur Corner: Expanding HK based Business to Taiwan	Mr. Alan Chan, Mr. Danny Chong & Mr. Keith Chan	36	Online
31	2021-03-12	Pitching Session With Mr. Vincent Chan*	Mr. Vincent Chan	10	Physical
32	2021-03-17	Pitch Your Idea Workshop	Mr. Frank Liu	35	Online
33	2021-03-19	Happy Hour Series - 創業故事: 角色營銷之潮流與營造	Mr. Keith Chan	86	Hybrid
34	2021-03-22	City I&T Grand Challenge Info Session	Ms. Grace Wong	17	Online
35	2021-03-24	Legal Series: Protecting your Business through Intellectual Property	New Ventures Legal Team	34	Online
36	2021-04-08	Alibaba Entrepreneurs Fund Venture Hours for CUHK: 1-on-1 Pitching Session*	Mr. Tony Tung, Mr. Danny Chong & Ms. Scarlett Ho	13	Online
37	2021-04-13	Hong Kong Startups Career Day	Ms. Erica Yuen, Mr. David Siu, Uncle Siu	80	Hybrid
38	2021-04-15	Video Production: Basics & Useful Tools	Mr. Sam Or	43	Physical

No.	Date	Title	Speaker(s)	No. of Participants	Mode (Online/Hybrid)
39	2021-04-21	How to win in marketing with low budget? Content Marketing Strategies for Startups	Ms. Rem Chiu	85	Online
40	2021-04-23	WeVenture - Make a Dash Launch Event 青年發展基金「粵港澳大灣區青年創業資助計劃」	Dr. Ken Yeung, Dr. Lin, Mr. Andy Yip and Mr. Kenny Leung	72	Hybrid
41	2021-04-23	15th round PI Team Briefing*	PI Centre	21	Physical
42	2021-05-12	Dilution and the Effect Workshop	Ms. Carrie Hui	67	Online
43	2021-05-20	Beyond Team Building: Enhancing Team Capacity to Overcome Challenges*	Mr. Kelvin Cheung	15	Physical
44	2021-05-27	Legal Series: Taxation and Revenue Law	New Ventures Legal Team	36	Online
45	2021-06-04	ORKTS Webinar: From Research to Market – How ORKTS could support your journey	Prof. Mai Har Sham, Pro-Vice-Chancellor (Research) & Prof. Benny Zee, Director of ORKTS		Online
46	2021-06-10	WeVenture - Make a Dash Funding Programme Team Interview 青年發展基金「粵港澳大灣區青年創業資助計劃」青年創業者的遴選面試	Mr. Tsoi Ming To Mingles, Mr. Pun Chi Ho Steven, Mr. Chee Swee Fu Jonathan, Prof. Lee Yiu-Bun Jack, Dr. Ng Wing-fung Frank	42	Online
47	2021-06-11	Startup Opportunities in Thailand	Mr. Nattapat Thanesvorakul (Kun)	36	Online
48	2021-06-11	CB360 Workshop 1 - Setup & Governance of SE	Dr. Teresa Chu	60	Hybrid
49	2021-06-18	Itinni Travel's Journey with HKSTP	Mr. Anson Leung and Mr. Jason Wan	4	Physical
50	2021-06-22	CB360 Workshop 2 - Social Mission	Mr. Timothy Ma	56	Hybrid
51	2021-06-24	Early Stage Investors Series: Mr. Tytus Michalski	Mr. Tytus Michalski	50	Online
52	2021-06-29	CB360 Workshop 3 - Social Impact	Mrs. Helina Yuk	49	Hybrid
53	2021-06-30	Startups Marketing Strategies in the Digital Age Series: Importance of Marketing Research for Startups	Ms. Sarah Ng	57	Online

*Private events