The University of Hong Kong
Technology Transfer Office

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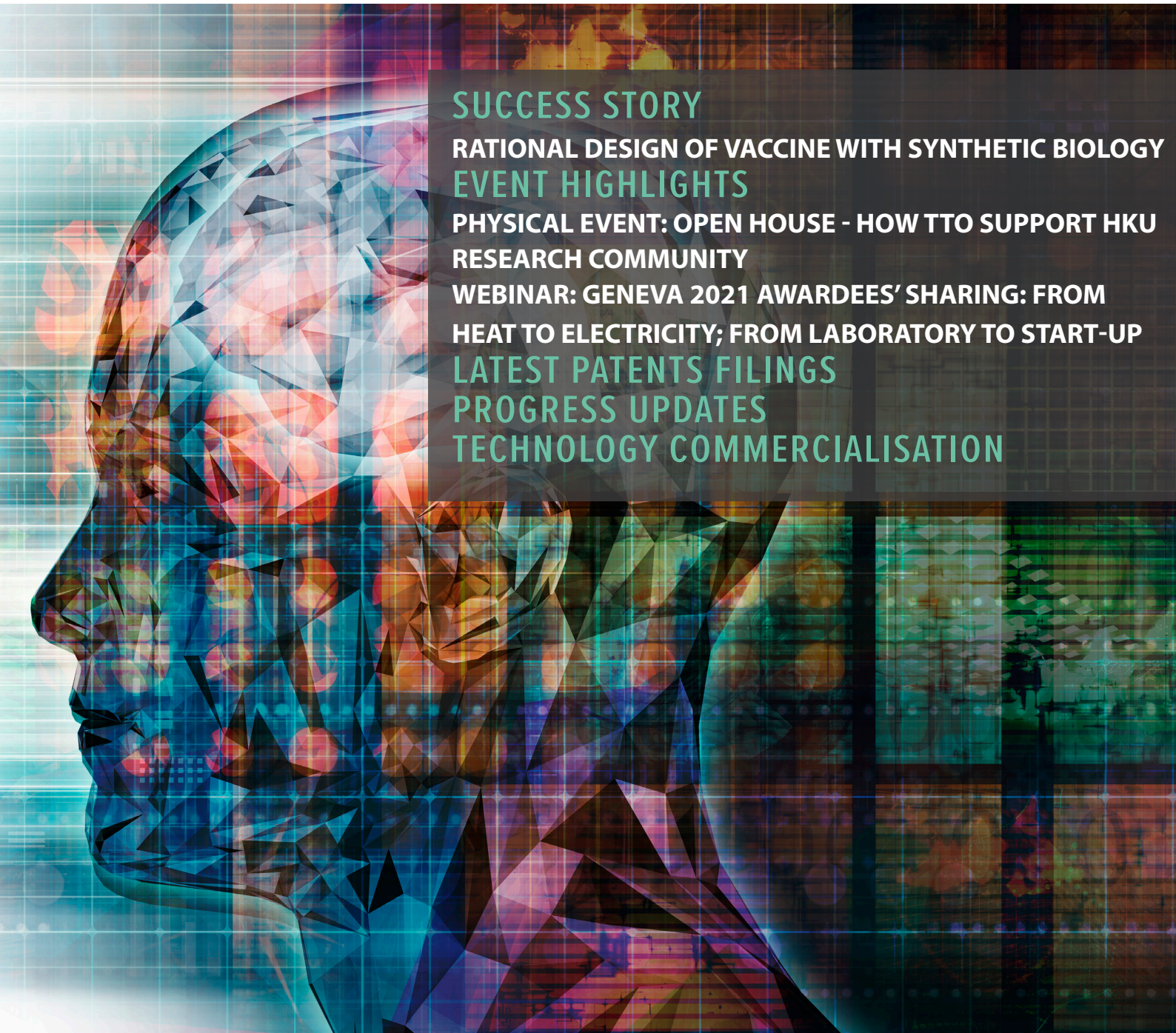


SUCCESS STORY

RATIONAL DESIGN OF VACCINE WITH SYNTHETIC BIOLOGY

EVENT HIGHLIGHTS

PHYSICAL EVENT: OPEN HOUSE - HOW TTO SUPPORT HKU RESEARCH COMMUNITY

WEBINAR: GENEVA 2021 AWARDEES' SHARING: FROM HEAT TO ELECTRICITY; FROM LABORATORY TO START-UP

LATEST PATENTS FILINGS

PROGRESS UPDATES

TECHNOLOGY COMMERCIALISATION

SUCCESS STORY

RATIONAL DESIGN OF VACCINE WITH SYNTHETIC BIOLOGY

Synthetic Biology Approaches for Vaccine Development

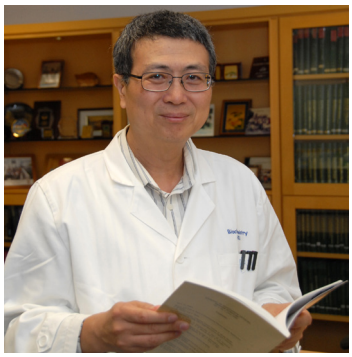
Traditional approaches to develop a vaccine against methicillin-resistant Staphylococcus aureus (MRSA) infection have so far failed, as no vaccine candidate has proven effective in clinical trials. Professor HUANG Jiandong, Chair Professor of Synthetic Biology and L&T Charitable Foundation Professor in Biomedical Sciences at the School of Biomedical Sciences, LKS Faculty of Medicine, and his team have developed a novel approach based on an established concept of live-attenuated bacteria combined with the latest developments in synthetic biology. The synthetic biology and antigen discovery platforms enable rational design and programming of bacteria into more safe and effective vaccines. These vaccines are initially targeted at fighting anti-microbial resistance (AMR), including resistant bacteria such as MRSA.

Technology Transfer

Professor HUANG's team worked on deepening their research in the field of synthetic biology while at the same time focusing on technology transfer. Through the commercialisation process to mature into commercial product and services, The HKU TTO assisted Professor HUANG's team by providing support with intellectual property protection and technology licencing. In 2020, a biotechnology start-up, Delonix Bioworks Ltd. (Delonix) was established in Shanghai, China. Delonix is a synthetic biology and vaccine technology-focused company founded by LIN Qiubin, a former PhD student of Professor HUANG. The company offers a further opportunity for commercialisation of Professor HUANG's platforms to advance the field of next generation vaccines for AMR infections and develop innovative therapies for patients. "We are passionate about how synthetic biology could transform the way we develop medicines", said Dr. Qiubin Lin, CEO of Delonix.

ABSTRACT

Synthetic biology is the next generation of genomics, bringing a more engineered, design-driven approach to the development of therapeutics and diagnostics. Delonix Bioworks Ltd. (Delonix) , a vaccine technology-based company offers a further opportunity for commercialisation of Professor HUANG's platforms to advance the field of next generation vaccines for AMR infections and develop innovative therapies for patients.



Professor HUANG Jiandong

Awards & Recognition

This year, Delonix completed a $14 million Series Seed financing deal led by Boehringer Ingelheim Venture Fund (BIVF) and IDG Capital, with participation from ZhenFund and an undisclosed investor. The financing will be used to accelerate the building of synthetic biology vaccine platforms and advance pipelines of synthetic vaccines to clinical trials.

In 2020, Delonix won BI's Innovation Prize for developing innovative vaccines with synthetic biology approaches. Boehringer Ingelheim first noticed Professor HUANG's invention in 2017 following a referral from HKU TTO's business development team.

LATEST PATENTS FILINGS

28 June 2021 - 27 July 2021

SIRI00035 Prof DJURISIC Aleksandra B; Physics (CN application filed on 29 Jun 2021)
Mesoporous silica nanoparticles based desiccant and oxygen scavenger

IP01066 Dr WANG Weiping; Dr. Li Dak-Sum Research Centre (Medical) (US provisional filed on 28 Jun 2021)
Optochemical control of mTOR signaling and mTOR-dependent autophagy

IP01087 Dr. CHEUNG Jason PY; Orthopaedics and Traumatology (US provisional filed on 30 Jun 2021)
A system and device for lumbar spine anatomical annotation, pathology diagnosis and progression prediction using artificial intelligence on magnetic resonance images

IP01045 Dr. CHU Zhiqin; EEE (US provisional filed on 2 Jul 2021)
Methods and apparatus for label-free monitoring physiological activities of living cells

IP01028 US; Prof YUEN, Kwok Yung; Microbiology (CN application filed on 6 Jul 2021)
Compositions and Methods for Enhancing Immune Response to Vaccination and Improving Vaccine Production

IP00933 Dr CHAN Kwok Leung; ME (PCT filed on 7 Jul 2021)
Utilizing monolayer molecular crystals to improve contact properties of organic field-effect transistors

IP01069 Dr CAO Wenming; Diannostic Radiology (US provisional filed on 7 Jul 2021)
ulti-Scale 3D Convolutional Classification Model for Cross-Sectional Volumetic Image Recognition

IP00964 Prof. CHOY Chik Ho; EEE (PCT filed on 9 Jul 2021)
A non-immersive dry sintering strategy for realizing decent metal based top electrodes

IP00840 Prof NGAN Hing Wan Alfonso; ME (US regular filed on 14 Jul 2021)
Metal Hydroxides Based Actuator with Polymeric Supporting Film

IP01075 Dr WANG Weiping; Dr. Li Dak-Sum Research Centre (Medical) (US provisional filed on 13 Jul 2021)
Development of ROS-responsive captopril-cinnamaldehyde prodrug

IP00923 Dr KWOK Ka Wai; ME (PCT filed on 20 Jul 2021)
Fluid-Driven Robotic Needle Positioner for MRI-guided Percutaneous Interventions

IP00824 Prof YAM Wing-Wah, Vivian; Chemistry (Korean application filed on 21 Jul 2021)
Luminescent Tetradentate Ligand-Containing Gold(III) Compounds for Organic Light-EmittingDevices and Their Preparation

IP01070 Dr CAO Wenming; Diannostic Radiology (US provisional filed on 20 Jul 2021)
Generative adversarial network-based lossless image compression model for cross-sectional imaging

IP01072 Prof. CHE Chi-Ming; Chemistry (US provisional filed on 19 Jul 2021)
Binuclear gold(I) compounds for photocatalysis application

IP00808 Prof. NGAN Sau-Wai Elly; Surgery (US regular filed on 22 Jul 2021)
Innervated Organoid Compositions and Methods of Making Same

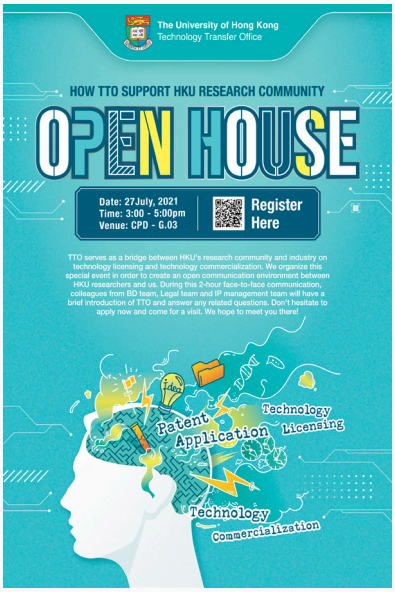
IP00826 Dr CUI Xiaodong; Physics (CN application filed on 26 Jul 2021)
Energy-Resolved X-Ray Imaging Apparatus and Method

IP00970 TANG, Chuyang; Civil Engineering (PCT filed on 26 Jul 2021)
Reusable nanocomposite porous filter for highly efficient air filtration

IP00914 Dr LI Xiang David; Chemistry (PCT filed on 27 Jul 2021)
Genetically Encoded YEATS Domain Inhibitor

EVENT HIGHLIGHTS

Physical Event - HKU TTO Open House



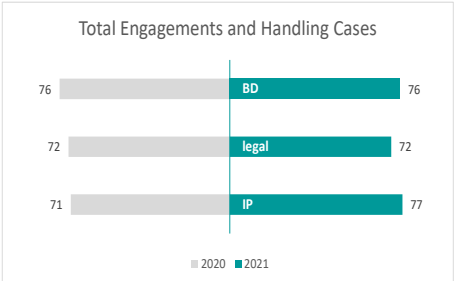
TTO held its first open house event in July to explain how TTO supports the HKU research community. TTO team members introduced basic technology transfer information and answered questions from participating HKU researchers on topics ranging from legal issues and business development to the procedures for patent application.

Webinar - Geneva 2021 Awardees' Sharing

TTO also held a webinar in July with the theme of "Geneva 2021 Awardees' Sharing". Dr. Tony Feng,

Associate Professor of Mechanical Engineering and gold medal winner at the Geneva awards, introduced his direct thermal charging cell technology and shared his experience of transferring research output into entrepreneurial opportunities.

PROGRESS UPDATES



As of July 2021, the total number of engagements and cases handled by the three core teams – business development (BD), intellectual property management (IPM) and legal – was on par or higher than last year. The IP team handled a total of 77 tasks, up from 71 a year earlier, while the legal team completed 36 cases and the BD team held 76 engagements. The TTO teams have won wide acclaim from our research community for their excellent performance.

TECHNOLOGY COMMERCIALISATION

Top 3 revenue-booked IPs in June and July 2021

Item	IP Type	PI	Faculty
Method and Compositions for Treating Cancer Using Probiotics	US Patent No. 10,016,468 CN Patent No. ZL201480045332.X EP Application No.14836942.4	Dr. Hani El-NEZAMY	Science
Sewage surveillance for COVID-19: testing methods, classification scheme, data interpretation and use	US Provisional Application No. 63/135,262 HK Application No. 32021024316.0 PCT Application No. PCT/CN2021/074675 CN Application No. 202110495376.4	Prof. Tong ZHANG	Engineering
Vacuolin-1 as an Inhibitor of Autophagy and Endosomal Trafficking and the Use Thereof for Inhibiting Tumor Progression	US Patent No. 9,717,737 EP Patent No. EP 3107543 CN Application No. 201580009459.0	Dr. Jianbo Yue	Medicine

TRANSFERRING YOUR NEW TECHNOLOGIES INTO BUSINESS OPPORTUNITIES

POLICY STIPULATION

The latest policy stipulates that the net receipts arising from the exploitation of an Invention are shared among the University, the relevant faculty/department and the inventor(s) in the ratio of 1/3 : 1/3 : 1/3. It aims to encourage the researchers at HKU not only to excel in academic performance but also to apply their technology for the benefits of mankind with an impressive reward.

HOW TO APPLY:

4 PHASES FOR RESEARCH PROJECTS

Phase 1: Initial project negotiation

1. PI will negotiate with their collaborator(s) and confirm a project proposal which includes the scope, budget and duration of the project.
2. PI will negotiate with their collaborator(s) and prepare a draft agreement (Agreement templates are available at the website of the Research Services (RS): http://www.rss.hku.hk/contracts/contractresearch/templates).

Phase 2: Endorsement from department/ faculty

3. PI will submit the project proposal, the draft agreement, and the information form/ grant application form to their department/ faculty to seek an approval (The information form for research/consultancy agreements is available at: http://intraweb.hku.hk/local/rss/tto/researchor-consultancy-agreements-form.doc).
4. After obtaining the approval, PI will submit the project proposal, the draft agreement, and the information form/grant application form to the Research Service (RS).

Phase 3: Financial legal/IP review

5. The RS will distribute the project proposal and the draft agreement to the Finance and Enterprises Office (FEO) for financial review and to the Technology Transfer Office (TTO) for legal review.
6. If there is any financial/legal issue, the FEO/TTO will inform PI through the RS. PI will negotiate with their collaborator(s) on the financial/legal issue until it is settled.

Phase 4: Signature and document archiving

7. After consolidating the settled project proposal and the agreement, the RS will proceed to the signature process.
8. After duly performing the signature process, the RS will assign the RCGAS number(s) for opening the project account(s)

ABOUT US

About HKUTTO
The Technology Transfer Office (TTO) is committed to maximising the impact of research through technology transfer at both the institutional and industrial levels. TTO works closely with researchers at HKU to commercialise their inventions through professional consultation on business development, legal advice and assistance, as well as patent application filings. Your inventions will not benefit society unless they are mass produced.

About Versitech
Versitech Limited is the commercial arm of HKU. Versitech negotiates, executes and manages commercial business contracts and agreements on behalf of the University.

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