



The University of Hong Kong
Technology Transfer Office



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TTO NEWSLETTER

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SUCCESS STORY

Enabling Drones to take a Rest

EVENT HIGHLIGHTS

Upcoming Event: TSSSU@HKU 2022-2023

Webinar Playback: HKU TTO Entrepreneurship Talk – MIT's Best Practices in
Cultivating Entrepreneurship

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SUCCESS STORY

Enabling Drones to take a Rest

ABSTRACT

As robotics and drones become more useful and complex, advances are being made to increase their mission time by enabling them to save energy and adapt more quickly and efficiently to a variety of environmental scenarios. These advances will improve the safety and life of drones without impeding their mission, and will allow robotic technology to be used with increased efficiency and better outcomes in a range of areas.

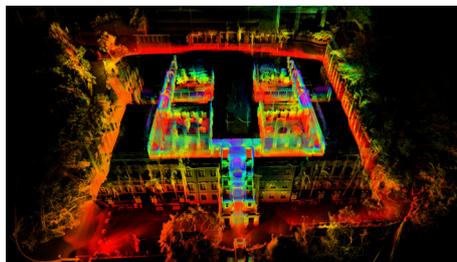


(Dr Zhang's latest projects: Left: energy saving UAVs; Right: efficient and accurate 3D reconstruction based on LiDARs.

When birds undertake long journeys, they need to rest occasionally to conserve their energy, or to avoid strong winds and other difficult weather conditions. They do that by perching – alighting or resting on something for a period of time. Since drones joined birds in the sky, their missions have become longer and more complex, and so they too need occasional respite and rest. Taking inspiration from birds, a team of scientists led by Dr Fu Zhang in the Mechatronics and Robotic Systems (MaRS) Laboratory of the Department of Mechanical Engineering has found a way to allow drones to take a rest.

Now drones—also known as unmanned aerial vehicles (UAVs)—can rest without the need for adding extra parts or making mechanical changes, making the system easy to adopt. This kind of perching, known as resting, helps UAVs save some of their battery power so they can stay in the air for longer.

The UAVs are particularly suited to Hong Kong's high-rise building environment and makes best use of their potential for acting as landing pads. This allows the UAVs to be used to gather useful data for monitoring the maintenance of high-rise buildings and bridges, for example. While perching, the drones use less energy, offer increased stability and can provide a wider field of vision.



(Real-time 3D reconstruction of the HKU main building)

The Gemini is a small but efficient novel bi-copter UAV that can perform a similar range of movement as quadrotor UAVs while offering higher levels of compactness and efficiency. Its small size enables it to fly easily through narrow spaces.

The Quadrotor Tail-Sitter VTOL UAV Hong

Hu can fly for 30 minutes while performing impressive movements in the air. To increase its stability and mobility, the design combines a rotary wing and fixed wing in one platform. This design enables the Hong Hu to achieve enhanced energy efficiency and smooth take-offs and landings. It can provide high-precision mappings of large areas, such as waterworks or university campuses.

Dr Zhang's team has also succeeded in constructing accurate digital 3D models of different living environments. The project is called FAST-LIO, or Fast LiDAR-Inertial Odometry. Odometry uses data from motion sensors to measure movement or changes in position relative to a fixed position. The system can interpret data in real time using new light detection and lidar sensors combined with a complex software system. The resulting system is light, strong and easy to use. It can also be integrated for use with different kinds of robotic technology including drones, self-driving vehicles and robotic dogs.

The TTO office provided a range of support to Dr Zhang and his team, including IP support and assistance with marketing and business development. This included arranging media interviews about the team's inventions and technologies and providing an opportunity for Dr Zhang, as a representative of HKU, to showcase his technologies and inventions at the forthcoming InnoCarnival 2021 exhibition.



(Dr Fu Zhang)

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LATEST PATENTS FILINGS

28 July 2021 - 26 Aug 2021

IP00826 Dr. CUI Xiaodong; Physics (US regular filed on 29 Jul 2021)
Energy-Resolved X-Ray Imaging Apparatus and Method

IP00826 Dr. CUI Xiaodong; Physics (EP application filed on 29 Jul 2021)
Energy-Resolved X-Ray Imaging Apparatus and Method

SIRI00040 Dr. Aleksandra DJURIŠIĆ; Physics (CN application filed 2 Aug 2021)
Encapsulation architecture for perovskite solar cell

IP00840 Prof. NGAN Hing Wan Alfonso; ME (EP application filed on 5 Aug 2021)
Metal Hydroxides Based Actuator with Polymeric Supporting Film

IP01084 Dr. SINGH Gill Harinder Harry; Medicine (US provisional filed on 5 Aug 2021)
Fast, multiplexed screening and monitoring of NPM1 mutations by real-time PCR, nanoplate based digital PCR (dPCR) or digital droplet PCR (ddPCR) using locked nucleic acid (LNA) probes

IP01089 Dr. WANG Weiping; Dr. Li Dak-Sum Research Centre (Medical) (US provisional filed on 28 Jul 2021)
A photoresponsive prodrug CBMS-1 for targeted immunotherapy

IP01091 Dr. WANG Weiping; Dr. Li Dak-Sum Research Centre (Medical) (US provisional filed on 27 Jul 2021)
Photoactivatable prodrug nanoparticles for combined anti-angiogenesis and photodynamic therapy

IP00666 Dr. WANG Zheng; ME (CN application filed on 30 Jul 2021)
pact Dental Robotic System Using Soft Bracing Technique

IP01021 Prof. SUN Ren; School of Biomedical Sciences (US provisional filed on 12 Aug 2021)
A technology to comprehensively define adaptive immune responses at single epitope resolution and at genomic scale

IP01099 Prof. CHU Chun Hung; Dentistry (US provisional filed on 13 Aug 2021)
Silver complex fluoride {bis(1,3,5-triaza-7-phosphaadamantane) silver fluoride} – a new therapeutic agent for caries management

IP00958 Dr. CHIU, Kin; Ophthalmology (PCT filed on 16 Aug 2021)
Methods for automated cloud-based quantitative assessment of retinal microvasculature using optical coherence tomography angiography images

IP01055 Dr. Qi Weichen; Orthopaedic and Traumatology (US provisional filed on 16 Aug 2021)
Non-contact, non-radiation device that accurately locates multiple implants in a patient's body

IP00963 Prof. CHE, Chi Ming; Chemistry (PCT filed on 18 Aug 2021)
Spiro-cyclometalated iridium emitters for OLED applications

IP00840 Prof. NGAN Hing Wan Alfonso; ME (CN application filed on 19 Aug 2021)
Metal Hydroxides Based Actuator with Polymeric Supporting Film

IP00849 Prof. TANG Chuyang; Civil Engineering (CN application filed on 19 Aug 2021)
Nanostructured Membrane Filter System for Rapid Purification of Water

IP00849 Prof. TANG Chuyang; Civil Engineering (US regular filed on 19 Aug 2021)
Nanostructured Membrane Filter System for Rapid Purification of Water

IP01101 Dr. LUO Ping; CS (CN application filed on 23 Aug 2021)
一种基于端到端训练测试的动作检测算法

IP01080 Prof. LI Xuechen; chemistry (US provisional filed on 23 Aug 2021)
Synthetic pseudaminic acid-based antibacterial vaccines

IP01098 Dr. PAN Jia; CS (US provisional filed on 24 Aug 2021)
A camera exposure control method based on event-based irradiance estimation

IP00993 Prof. CHEN Zhiwei; Microbiology (PCT filed on 24 Aug 2021)
Neutralizing antibodies against Covid-19 and methods of use thereof

IP01093 Prof. CHE Chi-Ming; Chemistry (US provisional filed on 23 Aug 2021)
Iron-catalyzed intramolecular amination of C(sp³)-H bonds with alkyl azides

IP01039 Dr. BAKER David; School of Biological Sciences (CN UM filed on 26 Aug 2021)
3D Printed Reef Tiles

EVENT HIGHLIGHTS

TSSSU@HKU 2022-2023

TSSSU@HKU 2022-2023

Total annual funding of **HK\$8M** for all the awardees. A successful awardee may receive **HK\$100K - HK\$1.5M** a year.

Brave Your Entrepreneurial Journey with TSSSU@HKU Technology Startup Support Scheme for Universities at HKU is an award scheme for promoting entrepreneurship at HKU. It provides funding support to technology start-up companies formed by HKU members. Companies awarded under the scheme will receive a maximum amount of HK\$1.5M per year for at most 3 years. Convert your new ideas and research achievements into commercially viable products and services! Bring real impact to the society! ACT NOW!

Eligibility

- Current faculty member of HKU
- Current student of HKU
- Graduate of HKU for no more than 5 years

Application Deadline: 26 Nov 2021 (FRI) | 5PM (HKT)

Briefing Session: 30 SEP 1PM-2PM (Zoom)

Briefing Session (Repeat): 29 OCT 1PM-2PM (Zoom)

Showing Session with InterLitho and ReUbird: 8 OCT 1PM-2PM (Zoom)

Technology Transfer Office | Tel 2299 0111 | Email info@tto.hku.hk

Are you a HKU faculty member, a current student or a graduate from less than five years ago? Then you are eligible to apply for a TSSSU@HKU funding award to kickstart your entrepreneurial journey. You could receive up to HK\$1.5 million per year for three years!

The application deadline is Friday, November 26, 2021 at 5pm. Don't miss out on this great opportunity! Call 2299 0111 or visit www.tto.hku.hk/public/tsssu/index.html for more details.

HKU TTO Entrepreneurship Talk – MIT's Best Practices in Cultivating Entrepreneurship

Our latest webinar proved extremely popular, with almost 200 attendees comprising mainly HKU researchers from various faculties joining the online session, where they also had a chance to ask questions.

HKU TTO ENTREPRENEURSHIP TALK

MIT's Best Practices in Cultivating Entrepreneurship

The HKU TTO Entrepreneurship Talk will discuss the MIT's best practices in cultivating entrepreneurship by inviting HKU academics/entrepreneurs to interact with Ms. Lita Nelsen. Her mission aims to stimulate the academic's interest in translating their preliminary innovations into applications.

Ms Lita Nelsen
Former Director of MIT Technology Licensing Office

Dr Shawn Zhao
Deputy Director of HKU TTO

27 August (Fri) | **Zoom Webinar**

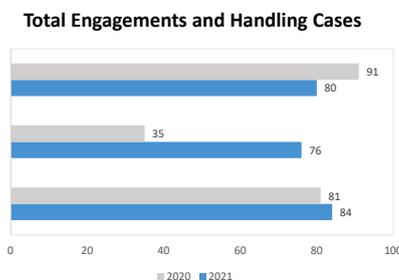
09:30 - 10:30 am (HKT)

Technology Transfer Office | Tel 2299 0111 | Email info@tto.hku.hk

(Playback is now available: <https://www.youtube.com/watch?v=86eLCyOCTJ0&t=997s>)

PROGRESS UPDATES

The TTO teams continued their high level of activity this month. The number of cases completed by the legal team in 2021 increased by 117% compared to the same period in 2020. The IP team almost doubled the number of USP/PCT and national application filings compared to last year, while the BD team's support for entrepreneurship and start-up companies saw a huge increase in activity with 14 cases currently being handled, more than double the number from the same period in 2020.



TECHNOLOGY COMMERCIALISATION

Top 3 revenue-booked IPs in Aug 2021

Item	IP Type	PI	Faculty
Advanced Materials	Contract Research/Consultancy	Professor CM Che	Chemistry
Statistical Analysis & Modeling	Contract Research/Consultancy	Dr Eddy Lam	Science
Kamei Chicken	Copyright/Know-how	-	Science

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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