



The University of Hong Kong  
Technology Transfer Office



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The University Technology Transfer Company

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## TTO NEWSLETTER

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### SUCCESS STORY

Using 3D Printing to Save Marine Life

### EVENT HIGHLIGHTS

Technology Transfer Office OPEN HOUSE Session 2 (In-person)

Asia Summit on Global Health (24 Nov. 2021 | In-person and Online)

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## SUCCESS STORY

# Using 3D Printing to Save Marine Life

### ABSTRACT

A combination of 3D printing technology, AI, IoT and marine biology expertise is being used to create new underwater habitats for critical marine life.



Photo 1: the world's first artificial reef structure – 3D-printed in terracotta, invented and designed by The University of Hong Kong

The impact of climate change is apparent in many parts of the world as storms, fires and rising seas become more common. The living world that exists under our seas is also in turmoil, with coral reefs dying, often unseen by human eyes. Coral reefs are a critical part of our living environment. They cover less than 1 percent of the sea floor, but are home to more than 25 percent of all marine life. Healthy coral reefs protect coastlines from flooding and hurricanes, and are an important source of food and medicine, as well as providing livelihoods for many people. However, coral reefs in all parts

of the world are under severe threat, with 90 percent of them expected to have disappeared by 2050. Now, newly developed technology offers a viable way to help these marine ecosystems survive and thrive.

archiREEF combines expertise in marine biology, AI and IoT to create new, artificial habitats that provide a home for marine life. The tech start-up uses 3D printing and its own algorithms to print reef tiles made from environmentally friendly terracotta. The tiles are made using a robot arm with a 3D clay-extruder attached to it. To minimize cracking and deformation of the tiles, the company developed a method of balancing the tile's design with a 3D printing strategy for clay. The tiles are hexagon-shaped, which allows them to be easily added to and expanded, and easily assembled underwater. The design can be adapted to suit different environments anywhere suffering from limited suitable marine substrate in the world.

The company was co-founded by marine biologist Vriko Yu, who has been working on ways to rebuild coral reefs since 2015. "Our product has to be able to withstand extreme environments, such as unstable sea waves and corrosion, and at the same time successfully grow the coral without harming the ocean," she explains.

archiREEF was named by TSSSU@HKU as one of its best practices awardees.

The company won the Green Tech and Construction Tech award as well as the "My Favourite Pitcher" award at the recent EPiC (Elevator Pitch Competition) 2021 awards organised by Hong Kong Science & Technology Parks Corporation, (HKSTP), which incubated the company. archiREEF received detailed assistance from the HKU TTO office during each stage of the admissions process.



Photo 2: archiREEF beat other finalists to be crowned champion, winner of Green Tech & Construction Tech Category, as well as "My Favourite Pitcher" award, taking away a cash prize of over US\$100,000.

TSSSU@HKU is now open for applications for the year 2022-23. This is your chance to get funding support of up to HK\$1.5 million per year for up to three years. Applications are welcome from tech start-ups founded by HKU faculty, students or graduates from the last five years. Don't miss the deadline: Friday, November 26 2021 at 5pm (Hong Kong time). You can find all the details at: <https://www.tto.hku.hk/public/tsssu/index.html>

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IP00833 Dr LI Xuechen; Chemistry (CN application filed on 27 Sep 2021)  
Cyclic Compounds and Methods of Making and Using

IP00978 Kwan Lawrence YEUNG; EEE (US regular filed on 27 Sep 2021)  
Method for Decoding Chord Information from Brain Activity

IP01125 Prof. SHEN Jiangang; Chinese Medicine (US provisional filed on 28 Sep 2021)  
23-O-Acetylalisol B As Novel Therapeutic Agent for Coronavirus Induced Severe Acute Respiratory Syndrome Through Broadly Inhibiting Coronavirus and Immunomodulation

IP00836 Prof LIU Pengtao; School of Biomedical Sciences (EP application filed on 28 Sep 2021)  
In vitro production of expanded potential stem cells

IP00832 Dr TANNER Julian Alexander; School of Biomedical Sciences (EP application filed on 28 Sep 2021)  
Nucleic Acid Mazzocchio and Methods of Making and Use Thereof

IP00836 Prof LIU Pengtao; School of Biomedical Sciences (JP application filed on 1 Oct 2021)  
In vitro production of expanded potential stem cells

IP00828 Prof HUI Shu Yuen, Ron; EEE (EP application filed on 5 Oct 2021)  
AC-to-DC and DC-to-AC Power Conversion

IP00833 Dr LI Xuechen; Chemistry (US regular filed on 1 Oct 2021)  
Cyclic Compounds and Methods of Making and Using

IP00832 Dr TANNER Julian Alexander; School of Biomedical Sciences (CN application filed on 9 Oct 2021)  
Nucleic Acid Mazzocchio and Methods of Making and Use Thereof

IP00832 Dr TANNER Julian Alexander; School of Biomedical Sciences (US regular filed on 8 Oct 2021)  
Nucleic Acid Mazzocchio and Methods of Making and Use Thereof

IP01122 Prof KY Yuen; Microbiology (US provisional filed on 12 Oct 2021)  
Vitamin A aerosolization in the treatment against Covid-19-related olfactory dysfunction and long COVID-related neurological defects

IP00863 Prof WONG Sze Tsai Alice; School of Biological Sciences (EP application filed on 15 Oct 2021)  
A Method for Peritoneal Metastatic Cell Detection and Isolation Thereof

IP01086 Dr KIM Jitae; ME (KR application filed on 12 Oct 2021)  
Microfluidic reactor for controlling chemical reaction and chemical reaction control method using the same

IP01115 Dr WANG Weiping; Pharmacy and Pharmacology (US provisional filed on 20 Oct 2021)  
Photoreponsive Nanomedicine Co-assembled by Photocleavable Prodrug and Dye Molecules

IP01121 Prof. HUANG Mingxin; ME (CN application filed on 21 Oct 2021)  
Hot stamping process for pre-coated steel sheets

IP00984 Dr. CHU Zhiqin; EEE (PCT application filed on 21 Oct 2021)  
An efficient purification method for nanodiamonds

IP00996 Prof. YUEN Kwok-Yung; Microbiology (PCT application filed on 22 Oct 2021)  
Method and mechanism of cross-linking peptides inhibit virus and enhance activity of arbidol against viruses

IP01137 Prof XI Ning; Industrial and Manufacturing Systems Engineering (US provisional filed on 21 Oct 2021)  
Disinfection Robots

## EVENT HIGHLIGHTS

### Technology Transfer Office Open House, Session 2



The TTO hosted an Open House on November 17 as a physical event on the HKU campus to facilitate communication between HKU researchers and the TTO. Staff from TTO teams were on hand to introduce the TTO's work and answer questions.

### Asia Summit on Global Health (In-person | Online)

The HKUTTO will participate in the Asia Summit on Global Health, held as a physical event on November 24 to allow investors, business leaders, international academia and others to meet and explore business opportunities. The TTO team will showcase 10 HKU projects in biotech areas.



## TECHNOLOGY COMMERCIALISATION

### List of technologies Licensed in Oct. 2021

Title	IP Type	PI	Faculty
Compositions Immunogenic Against SARS Coronavirus 2, Methods of Making, and Using Thereof	PCT Application No. PCT/CN2021/075527 US Patent application No. 17/172,300	Prof. Honglin Chen	Medicine
Cold Adapted and Virulence Factor Deleted Live Attenuated Vaccine Suitable for Mucosal Delivery	PCT Application No. PCT/US2017/028170 and subsequent national filings in Europe, Russia, India, China, Australia, Canada, US Taiwanese Application No. 106125136	Prof. Honglin Chen	Medicine
Live Attenuated Influenza B Virus Compositions Methods of Making and Using Thereof	PCT Application No. PCT/CN2018/115938 and subsequent national filings in Europe, China, Australia, Canada, US	Prof. Honglin Chen	Medicine
Compositions Immunogenic Against Influenza And SARS Coronavirus 2, Methods Of Making And Using Thereof	US Provisional Application No. 63/127,062 and 63/131,121	Prof. Honglin Chen	Medicine
Compositions Immunogenic Against SARS Coronavirus 2, Methods of Making, and Using Thereof	PCT Application No. PCT/CN2021/078709	Prof. Honglin Chen	Medicine

### Top 3 revenue-booked IPs in Oct. 2021

Item	IP Type	PI	Faculty
Land Use	Contract Research/Consultancy	Dr Lennon Choy	Architecture
Research on Acoustic Control	Collaboration Research	Lixi Huang	Engineering
Investigative study in rodent model	Service	Prof. Xinyuan Guan	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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