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Success Story

Non-contact, non-radiation device for implant detection

(Developed by Dr Jason Pui Yin Cheung, Dr Teng Grace Zhang
and Dr Weichen Qi, School of Clinical Medicine of HKU)

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SUCCESS STORY

Non-contact, non-radiation device for implant detection

A new, contactless radiation-free mobile device for accurately detecting multiple implants inside the body will improve scoliosis correction



(Left to right) Professor Jason Pui Yin Cheung, Dr Teng Grace Zhang and Dr Weichen Qi
Department of Orthopaedics & Traumatology, School of Clinical Medicine of HKU

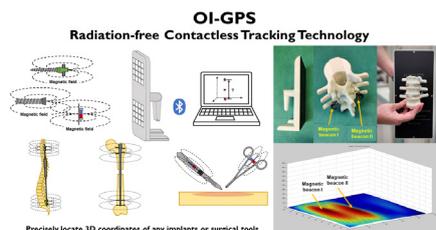


Cases of adolescent idiopathic scoliosis (AIS) are on the rise in China, with studies showing that it is now the third biggest threat to children's health, after obesity and myopia.

Severe scoliosis can have serious consequences, which include cosmetic deformations, restricted heart and lung function, and early death. In such cases, surgical correction is required. In young patients, growing rods are required to correct the deformity while guiding spinal growth.

Before and during surgery, detailed assessment and decision-making

is required to ensure safe, accurate and effective treatment for growing children. This is typically conducted by radiographic examinations. However, radiographic machines have several disadvantages, particularly when dealing with children. The machines are large and cumbersome, and expose children to radiation. For growing implants, once treatment starts, radiographs are incapable of quantitatively assessing spatial changes of the surgical implants in 3D as children grow. These shortcomings make it difficult for surgeons to evaluate treatment outcomes.



A new, handheld device has now been invented that resolves these problems. The OI-GPS is a contactless, radiation-free multi-targets magnetic sensing technology that precisely locates the spatial coordinates of orthopaedic surgical implants in the patient's body. It generates a 3D imaging model to allow a fast and accurate update of the condition of the spinal instrumentation, progress for correction and implant lengthening, and timely warnings of any mechanical faults.

During surgery, the surgeon places magnetic positioning beacons at the

head of each screw. When assessing changes in the patient's condition, the surgeon uses the handheld probe to easily visualise the 3D location of the implants on the spine using these magnetic beacons with millimeter level accuracy. During each assessment, the surgeon can quickly compare the 3D model with previous models during each treatment session, allowing the doctor to update the treatment plan without delay, leading to improved outcomes for patients.

The system also improves safety by providing timely warning of any mechanical problems, such as crooked rods, slippage or screw loosening.

The technology can also be used to evaluate the effectiveness of limb-lengthening surgery and to assist with positioning tracking of surgical instruments during procedures.

The new technology was developed by the research team of Dr Jason Pui Yin Cheung, Dr Teng Grace Zhang and Dr Weichen Qi from the Department of Orthopaedics & Traumatology, School of Clinical Medicine of HKU.

The invention won a silver medal at the Geneva International Exhibition of Inventions 2022 awards.

The TTO helped the team with the patent application for the invention. The TTO also chose this project for submission to the Geneva 2022 exhibition, and selected the invention for showcasing at the upcoming Innocarnival exhibition.

IP00906 CN national phase filed on 5 Jul 2022
App. No. 201980103428.X

Prof CHEUNG Kenneth Man-Chee; Devices and Methods for Orienting a Surgical Device

IP01075 PCT App. No. PCT/CN2022/104160 filed on 6 Jul 2022

Dr WANG Weiping; Ros-Responsive Captopril-Cinnamaldehyde Prodrugs And Compositions And Methods Thereof

IP01069 PCT App. No. PCT/CN2022/104159 filed on 6 Jul 2022

Dr SETO Wai Kay Walter; Multi-Scale 3d Convolutional Classification Model For Cross-Sectional Volumetric Image Recognition

IP01234 USP App. No. 63/358,795 filed on 6 Jul 2022
Dr. ZHOU Jie; Human Nasal Organoids And Methods Of Making And Methods Of Use Thereof

IP00889 CN national phase filed on 11 Jul 2022
Prof POON Lit Man (Public Health); Recombinant Viruses Expressing Alpha-1,3-Galactosyltransferase and Uses Thereof

IP00889 US national phase filed on 8 Jul 2022
Prof POON Lit Man (Public Health); Recombinant Viruses Expressing Alpha-1,3-Galactosyltransferase and Uses Thereof

IP01202 CN filed on 15 Jul 2022
Dr. CHU Zhiqi; 基于金刚石微粒的物理不可克隆功能材料及其制备方法 and 应

IP01208 USP filed on 15 Jul 2022
Dr. YU Ollie Yi Ru; Novel anticaries material for dental use

IP01070 PCT application filed on 18 Jul 2022
Dr SETO Wai Kay Walter; Generative adversarial network-based lossless image compression model for cross-sectional imaging

IP01211 USP Appl. No. 63/389,693 filed on 15 Jul 2022
Prof. KY Yuen; Compositions Of Caspase Inhibitors And Methods Of Use Thereof

IP01072 EP regional phase Appl. No. EP22185441.7 filed on 18 Jul 2022
Prof CHE Chi Ming; Binuclear gold(I) compounds for photocatalysis application

P01072 CN national phase application filed on 19 Jul 2022
Prof CHE Chi Ming; Binuclear gold(I) compounds for photocatalysis application

IP01072 US national phase Appl. No. 17/868,214 filed on 19 Jul 2022
Prof CHE Chi Ming; Binuclear gold(I) compounds for photocatalysis application

IP01207 USP Appl. No. 63/390,453 filed on 19 Jul 2022
Prof NG LUI Oi Lin, Irene; Compositions And Methods Targeting S100a10 For The Treatment And Diagnosis Of Liver Cancer

IP01091 PCT Appl. No. PCT/CN2022/107621 filed on 25 Jul 2022
Dr WANG Weiping; Photoactivatable prodrug nanoparticles for combined anti-angiogenesis and photodynamic therapy

IP01039 UAE UM Appl. No. P60Of36312022 filed on 19 Jul 2022
Dr. BAKER David; 3D Printed Reef Tiles

IP01055 PCT Appl. No. PCT/CN2022/108627 filed on 28 Jul 2022
Dr. Weichen Qi; Non-Contact, Non-Radiation Device That Accurately Locates Multiple Implants In A Patient's Body

IP01178 USP Appl. No. 63/393,021 filed on 28 Jul 2022
Prof. Chi-Ming CHE; Dinuclear platinum complexes for OLED applications

IP01224 CND Appl. No. 202230489549.7 filed on 29 Jul 2022
Smart Water Meter Analyser

EVENT HIGHLIGHTS



Prof ZJ Max Shen, HKU's Vice-President and Pro-Vice-Chancellor (Research), Prof Ho Cheung (Anderson) Shum, Associate Vice-President (Research and Innovation), and Dr Shawn Zhao, Deputy Director of HKUTTO, attended the Launch Ceremony of the Innovation Hub@HK Website on 18 Aug. Prof Shen illustrated the research achievements of HKU, and introduced one invention "a photoresponsive nano drug delivery system" developed by Dr Weiping Wang and his research team.



Our next webinar is entitled "Old Drug, New Use: A Patent Infringement of Pharmaceutical Use Claims." Expert speaker, Hsu Min Chung (Partner, HGF Limited), specialises in patents in chemistry, material science and pharmaceuticals. She will present an overview of case law and share advice for companies operating in this area. Wednesday, September 7, 4pm-5pm on Zoom. Click [here](#) to register.

TECHNOLOGY COMMERCIALISATION

List of technologies Licensed in July 2022

Item	IP Type	PI	Faculty
Compounds and uses thereof for treating inflammation and modulating immune responses	US, AU, CA, CN and JP granted patents	Prof. Allen Lau	Medicine
Method for isolating cimracemate A	US, EP, AU, CA, CN, HK and JP granted patents		
Novel therapeutic methods for treating inflammation and immune system disorders	US, EP and HK granted patents		
Materials and methods for prevention and treatment of viral infections	AU, CN, EP, JP, CA, HK granted patents		
Uses of cimracemate A and related compounds for treating inflammation and modulating immune responses	CN and HK granted patents		
Coriolus versicolor extracts, methods of preparation and uses thereof	US, AU, JP, EP, CA, HK and CN granted patents		
Compounds and uses thereof for treating inflammation and modulating immune responses	US, CN, TW, CA, EP and HK granted patents		
Coriolus versicolor extracts, methods of isolating biologically-active compounds, and uses thereof	US, AU, JP and TW granted patents		
Materials and methods for prevention and treatment of viral infections	US, AU and JP granted patents		

Top 3 revenue-booked IPs in July 2022

Item	IP Type	PI	Faculty
Construction and real estate policy analysis	Contract Research/ Consultancy	Prof. KW Chau	Architecture
Longevity risk evaluation model development	Contract Research/ Consultancy	Dr. Kwok Fai Lam	Statistic & Actuarial Science
Anti-SARS-CoV-2 compounds	Contract Research/ Consultancy	Dr. Shuofeng Yuan	Medicine

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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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