The University of Hong Kong
Technology Transfer Office

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Success Story
Digital health is now PERfECT-ly plausible
(Developed by Dr. Shiming ZHANG)
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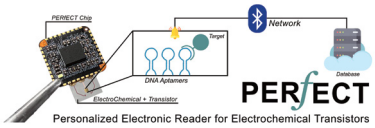
HKU Technology Transfer Office
HKUTechnologyTransferOffice
HKUTTO

SUCCESS STORY

Digital health is now PERfECT-ly plausible

The invention of tiny biosensing wearables powered by a flexible lightweight semiconductor has the potential to transform healthcare.

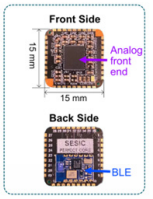
Dr. Shiming ZHANG
Assistant Professor
Department of Electrical and Electronic Engineering
Faculty of Engineering

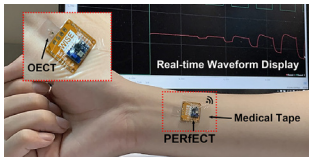


Finding out exactly what is happening inside our bodies has long been a goal of healthcare as it has the potential to revolutionize healthcare and wellbeing. If healthcare workers can continuously monitor what's going on inside our bodies, they can evaluate patient health more quickly and offer more precise solutions and remedies.

With the invention of tiny wearable biosensors, that objective has become a reality. It is now possible to envisage a major leap towards achieving advanced healthcare that is personalized and preventative.

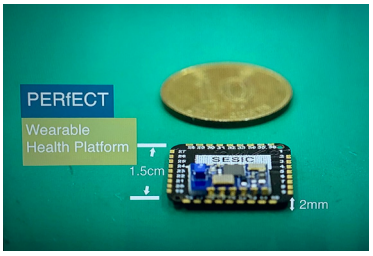
The new series of wearable devices are called PERfECT Wearables. They are powered by a minute chip called PERfECT, an acronym for Personalized Electronic Reader for Electrochemical Transistors. PERfECT is a semiconductor transducer analyser that is as small as a fingertip or a HK$1 coin, with a diameter of only 15 millimeters and weighing just 0.4 grams. As the devices are flexible, wireless and extremely light, they can be attached to the skin or put inside a smart watch. From there, they can monitor biomarkers, such as heart rate or blood pressure, and relay this information using human machine interface (HMI).





The HKU engineering team behind the invention believes PERfECT wearables can be used for cardiovascular health management, muscle training and rehabilitation, diabetes control and mental healthcare. With diabetes, for example, glucose levels can be monitored using a microneedle patch and a disposable glucose sensor can continuously measure glucose levels.

"Our wearable system is tiny, soft and imperceptible to wearers, and it can do continuous monitoring of our body condition. These features mean it has the potential to revolutionize healthcare technology," says Dr Shiming Zhang of the Department of Electrical and Electronic Engineering, who leads the HKU WISE (wearable, intelligent and soft electronics) Research Group that developed the system. The group's vision is to promote the transition from hospital centric to human-centric healthcare by developing next generation technologies, he explains.



The devices have other advantages too. Their performance is as good as that of the much bulkier devices that are currently available, but they cost only about one-tenth of the price of existing devices.

The WISE group has won several awards for wearable healthtech, including the Hong Kong Academy of Engineering Sciences 2021-22 University Pitch Competition on Global Grand Challenges, the Materials Research Society Best Presentation Award (2021), and they were also the winners of the InnoShow Awards three times in a row (Nov 2021, May 2022, Nov 2022). The group has now formed a start-up company named SESIC to make the technology behind their invention available.

The Technology Transfer Office helped the team by assisting with their patent application and arranging for their participation in the InnoCarnival 2022.

LATEST PATENTS FILINGS
1 Oct 2022 – 30 Oct 2022

IP01115 Photoresponsive Nanomedicine Co-assembled by Photocleavable Prodrug and Dye Molecules | Dr WANG Weiping
PCT/CN2022/124524 filed on 11 Oct 2022

IP01122 Aerosolized Vitamin A for Management of Covid–19-Related Olfactory Dysfunction | Prof YUEN Kwok Yung (Microbiology)
PCT/CN2022/124652 filed on 11 Oct 2022

IP01121 一种用于预涂覆钢板的热冲压成形方法 | Prof HUANG Mingxin (ME)
PCT/CN2022/124636 filed on 11 Oct 2022

IP01169 A Luminescence Method for The In-Line Detection of Atomic Scale Defects During Fabrication of 4h-Sic Diodes | Prof. Francis Ling (Physics)
USP 63/415,516 filed on 12 Oct 2022

IP00901 A System for Three-Way Combinatorial Crispr Screens for Analysing Target Interactions and Methods Thereof | Dr WONG, Siu Lun
USR 17/996,165 filed on13 Oct 2022
CN filed on 14 Oct 2022

IP00947 Identification of nsp1 gene as the target of real-time RT-PCR using nanopore whole genome sequencing | Prof. YUEN Kwok Yung
USR 17/996,287 filed on 14 Oct 2022

IP01215 A passive method for improving sensitivity of bioassay with segregative phase separation | Prof. Anderson Shum
USP 63/379,954 filed on 18 Oct 2022

IP00956 Antifungal compound and uses thereof | Dr. NEELAKANTAN, Prasanna
PCT/IN2022/050932 filed on 19 Oct 2022

IP00900 Nanocarriers Self-Assembled from Photoresponsive Three-Legged Molecules for Controlled Drug Release | Dr WANG Weiping
CN filed on 19 Oct 2022

IP01137 Disinfection Robots | Prof. Xi Ning
CN filed on20 Oct 2022
USR 17/969,850 filed on 20 Oct 2022

IP00912 Compact, Lightweight Hydraulic Manipulation System for Underwater Applications | Dr. Wang Zheng
USR 17/920,814 filed on 24 Oct 2022

IP00911 Smart Soft Actuation Unit for Underwater Applications | Dr Wang Zheng
USR 17/920,813 filed on 24 Oct 2022

IP01107 Nano robotic system for high throughput single cell DNA sequencing | Prof. XI Ning
USR 17/975,030 filed on 27 Oct 2022

IP01246 Laser induced Pt less/single atom catalyst materials | ZHU Haoyu
USP 63/414,658 filed on 10 Oct 2022

IP01235 3-dimensional printing of metal-embedded medical implants and appliances | Dr. Cho Kiho(Dentistry)
USP 63/381,626 filed on 31 Oct 2022

IP00911 SMART SOFT ACTUATION UNIT FOR UNDERWATER APPLICATIONS | Dr Wang Zheng
CN-PCT filed on 31 Oct 2022

IP00912 Compact, Lightweight Hydraulic Manipulation System for Underwater Applications | Dr Wang Zheng
CN-PCT filed on 31 Oct 2022

EVENT HIGHLIGHTS

TTO Open House

The TTO's latest open house on November 16 at Centennial Campus was a great success, with many researchers able to get technology transfer information and advice in person.

Asia Summit on Global Health

10 HKU health-related start-ups were showcased at the summit's InnoHealth exhibition held on November 10-11, where they were able to connect with major companies and investors from around the world to explore business and partnership opportunities.

Bio Tech Online Roadshow via Tencent meeting

At this event, organised with HKU Beijing Centre, TTO Deputy Directory Dr Shawn Zhao and BD manager Dr Katherine Gan explained TTO's role in supporting technology commercialisation and shared examples of how TTO has helped HKU researchers in their successful technology transfers.

PROGRESS UPDATES

In October, the Legal Team handled 66 new cases and completed 27 cases.
The IPM Team handled 58 office action matters in October, almost double the 30 handled in the same month a year ago. They filed 21 USP/PCT national applications, up from 12 last year, and presented 20 cases in committee meetings, up from 12 last year.
The BD Team handled 115 cases in October, a large increase on the 74 handled in the same month in 2021. They provided entrepreneurship and start-up support to 30 companies, up from 7 a year ago.

TECHNOLOGY COMMERCIALISATION

List of technologies Licensed in October 2022

Title	IP Types	PI	Faculty
Method for Peritoneal Metastatic Cell Detection and Isolation Thereof	EP Application No. 20802367.1 US Application No. 17/607,669 PRC Application No. 202080033058.X	Prof. Alice Wong	Science

Top 3 revenue-booked IP in October 2022

Title	IP Types	PI	Faculty
Application Development of Virtual Asset Analytical Project	Contract research/ Consultancy	Dr. SM Yiu	Computer Science
Anti-SARS-CoV2 compounds	Contract research/ Consultancy	Dr. Shuofeng Yuan	Medicine
Research study related to glycodelin-A	Contract research/ Consultancy	Dr. Philip Chiu	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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SHARE YOUR SUCCESS STORY

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