



# POLYU Academy of Interdisciplinary RESEARCH

RIAM · RIAIoT · RiFood  
RI-IWEAR · RILS · PRI · RIQT · RISA  
SCRI · RISE · RISports · RISUD  
RCMI · RCDSE · RCDTT · RCESGA  
MHRC · RCRE · RCSV · RCTFF

香港理工大學高等研究院



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### Vision 願景

To be a world leader in providing interdisciplinary solutions for major social challenges through advanced research and knowledge transfer activities.

### Mission 使命

- To promote, lead and support PolyU's interdisciplinary research to address major societal challenges;
- To create societal impact of the Institute's research through partnership and interaction with business, industry and government; and
- To enhance the visibility and reputation of the University as a world-leader in its strategic focus areas through impactful collaborative activities in research and scholarship.

通過高等的研究和知識轉移活動，成為為社會挑戰提供交叉學科解決方案的世界領導者。

- 推動、領導和支持理大的交叉學科研究，以應對各項社會挑戰；
- 通過與工商界和政府的合作和互動，為社會帶來正面影響；及
- 通過具影響力的研究和學術協作，提升大學於其策略重點領域作為世界先驅的知名度和聲譽。

### Contributions to the World's Sustainable Development

#### 對世界可持續發展的貢獻

PAIR's interdisciplinary research explores and develops impactful, practical research solutions. Our research achievements can help improve human health, environment and sustainability as well as everyday living, and can help achieve many of the goals set out in the United Nations' 2030 Agenda for Sustainable Development.

PAIR 的交叉學科研究致力探索及開發具影響力且實用的解決方案。我們的科研成果能有助改善人類健康、環境及可持續發展，以及大眾生活，並有助實現聯合國《2030年可持續發展議程》中的多項目標。

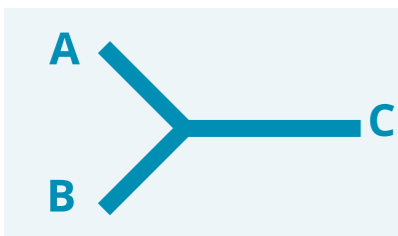


### What is Interdisciplinary Research?

#### 何謂交叉學科

Interdisciplinary research integrates knowledge, data, techniques and theories from two or more disciplines or specialties to enable new perspectives and solutions to problems which are beyond the scope of a single discipline. The interaction between disciplines or specialties may forge a new research field for further exploration. PAIR brings together over 600 researchers from 12 Research Institutes (RI) and 8 Research Centres (RC) to conduct interdisciplinary research on three themes: Advanced Technologies and Manufacturing; Good Health and Well-being; and Smart and Sustainable Cities.

交叉學科研究整合兩個或多個學科或專業的知識、數據、技術和理論，為單一學科無法破解的問題，提供新視角和解決方案。學科或專業之間的互動或會形成一個新的研究領域，供進一步探索。PAIR 匯聚了轄下 12 所研究院 (RI) 和 8 所研究中心 (RC) 共超過 600 名理大研究員，就「先進科技及製造」、「健康與福祉」、「智慧及可持續城市發展」三大範疇，進行交叉學科研究。



Interdisciplinary research: Disciplines or specialties join together to work on a common problem. Interaction may forge a new research field.

交叉學科研究：學科或專業參與解決共同問題，互動後或會形成一個新的研究領域。

### Research Institute 研究院



Research Institute for Advanced Manufacturing  
先進製造研究院



Research Institute for Artificial Intelligence of Things  
人工智能物聯網研究院



Research Institute for Future Food  
未來食品研究院



Research Institute for Intelligent Wearable Systems  
智能可穿戴系統研究院



Research Institute for Land and Space  
土地及空間研究院



Photonics Research Institute  
光子技術研究院



Research Institute for Quantum Technology  
量子技術研究院



Research Institute for Smart Ageing  
智齡研究院



Otto Poon Charitable Foundation Smart Cities Research Institute  
潘樂陶慈善基金智慧城市研究院



Otto Poon Charitable Foundation Research Institute for Smart Energy  
潘樂陶慈善基金智慧能源研究院



Research Institute for Sports Science and Technology  
體育科技研究院



Research Institute for Sustainable Urban Development  
可持續城市發展研究院

### Research Centre 研究中心



Research Centre for Chinese Medicine Innovation  
中醫藥創新研究中心



Mental Health Research Centre  
精神健康研究中心



Research Centre for Deep Space Explorations  
深空探測研究中心



Research Centre for Resources Engineering towards Carbon Neutrality  
碳中和資源工程研究中心



Research Centre for Digital Transformation of Tourism  
旅遊業數字化轉型研究中心



Research Centre for SHARP VISION  
視覺科學研究中心



Research Centre for Environmental, Social, and Governance Advancement  
環境、社會、和治理促進研究中心



Research Centre of Textiles for Future Fashion  
未來服裝紡織科技研究中心



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President  
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滕錦光教授  
香港理工大學校長

The Hong Kong Polytechnic University (PolyU) aspires to be a world-class university excelling in holistic professional education, research and knowledge transfer. To foster interdisciplinary research, the University established the PolyU Academy for Interdisciplinary Research (PAIR). PAIR is committed to driving interdisciplinary innovations and exploring impactful solutions to the global challenges of today. The Academy focuses on research in frontier areas such as artificial intelligence, carbon neutrality, deep space exploration, smart cities, smart energy and more.

I was honoured to be the Founding Director of the Research Institute for Sustainable Urban Development (RISUD), which was established in 2012. The success of RISUD inspired me to create additional interdisciplinary research institutes and centres at PolyU. Currently, twelve Research Institutes (RIs) and eight Research Centres (RCs) have been established under PAIR. The Academy serves as a hub for collaborative research, bringing together academic staff and postgraduate students from various disciplines to actively collaborate on research areas of common interests. PolyU plans to establish more RIs and RCs to elevate our research accomplishment to a higher level.

PAIR is also a hub for international research collaboration. The Academy engages and attracts world-class scholars to PolyU for interdisciplinary research, international collaboration and cross-cultural exchanges, creating a vibrant and diverse research environment.

PolyU has a long tradition of developing breakthrough innovations and technologies, with the goal of fostering sustainability, driving economic prosperity and improving communities' lives. Our mission is to bring benefits to the society and make positive contributions to the development of Hong Kong, the Nation and the world through research achievements and knowledge transfer; and of particular importance, to leverage PolyU's interdisciplinary strengths in supporting the development of Hong Kong into an international innovation and technology hub.

香港理工大學（理大）一直致力在全人專業教育、研究和知識轉移等方面追求卓越，矢志成為全球領先學府。為進一步推動交叉學科研究，大學成立了理大高等研究院（PAIR）。PAIR 以促進交叉學科創新、探索具影響力的方案為己任，藉此回應全球當前面對的各種挑戰。研究院專注於人工智能、碳中和、深空探測、智慧城市、智慧能源等前瞻領域的研究。

理大在 2012 年成立可持續城市發展研究院（RISUD），我有幸擔任創院院長。RISUD 的成功讓我深受啟發，銳意在理大成立更多交叉學科的研究院和研究中心。現時，PAIR 轄下設立十二所研究院和八所研究中心。研究院作為推動科研合作的樞紐，匯聚來自不同學科的學者和研究生，就著彼此感興趣的研究領域，積極合作。理大計劃設立更多研究院和研究中心，務使研究工作更上層樓。

PAIR 亦是國際科研合作的樞紐。研究院吸引世界級學者蒞臨理大，進行交叉學科研究、國際合作和文化交流，締造充滿活力和多元化的研究環境。

理大一直致力於突破性創新及科技，從而促進可持續發展、推動經濟繁榮、改善大眾生活。我們的使命是透過研究卓越和知識轉移，嘉惠社會，為香港、國家以至世界的發展作出積極貢獻；尤其重要的是，發揮理大交叉學科優勢，支持香港發展成為國際創新科技中心。



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PolyU commits to research excellence and addresses global challenges with practical innovations. Through interdisciplinary collaborations, we discover knowledge and transform research outcomes into impactful solutions, with an aim to improve human well-being, boost economic efficiency, and foster a better world.

The PolyU Academy for Interdisciplinary Research (PAIR) is an advanced research platform with constituent research institutes and research centres covering various research areas of strategic importance. We extend the frontiers of knowledge to explore and develop solutions to critical global challenges. Our highly qualified researchers are from all over the world, bringing a wealth of achievements and expertise to our programmes and projects. In addition, our world-class labs and state-of-the-art research facilities, including our state key laboratories, the Chinese National Engineering Research Centres (Hong Kong Branches), and the various excellent research facilities on campus, have all supported our researchers to actively explore and innovate.

PAIR is one of the pillars of PolyU's strategic portfolio in research and innovation. In addition to supporting interdisciplinary research, partnering with world-renowned scholars, and enhancing the visibility and reputation of the University, PAIR collaborates strategically with other pillars of PolyU. For example, PAIR works closely with the Research and Innovation Office to promote research development and enhance research capabilities, and joins forces with the Graduate School to promote excellence in Research Postgraduate education.

PAIR is the largest interdisciplinary research platform in Hong Kong and the Greater Bay Area. Our mission is, through advanced research and knowledge transfer activities, to develop PAIR into a world leader in providing interdisciplinary solutions to major societal challenges, for the benefit of humankind.

理大追求科研卓越，締造各種嶄新發明應對全球挑戰。我們通過交叉學科合作，發掘新知識，並將科研成果轉化成具影響力的方案，從而改善人類福祉、促進經濟效益、推動可持續發展、建設更美好的世界。

理大高等研究院（PAIR）是一個先進的研究平台，轄下設有多個研究院和研究中心，涵蓋多個具重要策略性意義的領域。我們拓展知識前沿，探索及研發用於應對全球關鍵挑戰的方案。我們高水平的研究人員來自世界各地，為科研企劃及項目帶來了豐富的成果和專業經驗。此外，我們世界一流的實驗室和先進研究設施，包括國家重點實驗室、中國國家工程研究中心（香港分部），以及校內其他優良研究設備，支持我們的科研人員積極探索創新，創造發明。

PAIR 是理大研究及創新發展的策略支柱之一。除了支持交叉學科研究、與世界頂尖學者合作，以及提高大學知名度和聲譽之外，PAIR 亦與其他理大內部單位進行戰略合作。例如，PAIR 與研究及創新事務處密切合作，推動科研發展和提高科研能力，以及與研究生院攜手促進研究生教育的卓越發展。

PAIR 是香港和大灣區內最具規模的交叉學科研究平台。我們的使命是透過一流的研究和知識轉移活動，發展 PAIR 成為重大社會挑戰提供交叉學科解決方案的世界領導者，造福人群。



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The world today is facing pressing challenges such as climate change, food safety, ageing population, energy shortage, sustainable development, etc. These grand problems cannot be solved by traditional discipline-specific research at universities. Instead, they require the joint efforts of interdisciplinary and diverse teams to bring about inventions and discoveries so that they can be addressed. At the same time, emerging technologies brought by the Fourth Industrial Revolution, such as Artificial Intelligence (AI), data science, Internet of Things (IoT), robotics, etc., are changing the way we live and work, presenting both challenges and opportunities.

As a university with a strong emphasis on societal impact, The Hong Kong Polytechnic University (PolyU) is inspired to address challenging problems in the world through advancing impactful interdisciplinary research and encouraging innovations. Interdisciplinary research as a mode of inquiry is one of the most productive and inspiring human pursuits to solve profound issues in the society, helping us to create a sustainable environment as well as healthier and more prosperous living. The new discoveries, technologies and innovations from interdisciplinary research can inspire young minds and deepen our understanding of the time and space which humanity is in.

At PolyU, faculty members, researchers, and graduate students are expanding knowledge and solving challenging problems through basic and applied interdisciplinary research. Our research integrates disciplines not only science, technology, engineering and mathematics, but also business, design, social science, humanities, management, etc.

The PolyU Academy for Interdisciplinary Research (PAIR) is a hub to facilitate interdisciplinary research, transfer technologies, inspire innovations, and international research collaborations. We aspire to harness the strengths of PolyU research and world-class scholars, to develop impactful interdisciplinary solutions for the greater good of society.

當今世界正面臨著氣候變化、食品安全、人口老化、能源短缺、可持續發展等迫切挑戰。這些重大問題難以通過大學傳統的單一學科研究來解決。反之，它們是需要交叉學科和多元團隊的共同努力，透過孕育發明和發現，才得以解決的。與此同時，第四次工業革命所帶來的新興技術，如人工智能（AI）、數據科學、物聯網（IoT）、機械人技術等，正在改變我們的生活和工作方式，帶來挑戰和機遇。

作為一所非常重視社會影響的大學，香港理工大學（理大）深受啟發，通過推進具影響力的交叉學科研究和鼓勵創新，解決世界面臨的重大挑戰。交叉學科研究作為一種探索模式，是人類為解決社會深層問題，而進行的最富成效和啟發性的追求之一，助我們創造可持續的環境，以及更健康、更繁榮的生活。交叉學科研究的新發現、技術和創新，可以激發年輕人的思維，加深我們了解人類所處的時空。

在理大，教職員、科研人員和研究生通過進行基礎和應用交叉學科研究，拓展知識，解決具有挑戰性的問題。我們的研究不僅結合了科學、技術、工程和數學，還有商業、設計、社會科學、人文學、管理學等學科。

香港理工大學高等研究院（PAIR）是促進交叉學科研究、知識轉移、激發創新、國際科研合作的樞紐。我們期望運用理大科研和頂尖學者的優勢，開發具影響力的交叉學科方案，嘉惠社會。

Chairman 主席



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土地及空間研究院院長  
測繪及地理資訊學講座教授



Ir Prof. WANG Shengwei  
Director of Otto Poon Charitable Foundation Research Institute for Smart Energy  
Otto Poon Charitable Foundation Professor in Smart Buildings  
Chair Professor of Building Energy and Automation

王盛衛教授、工程師  
潘樂陶慈善基金智慧能源研究院院長  
潘樂陶慈善基金智能建築教授  
建築能源與自動化講座教授



Prof. ZHANG Weixiong  
Associate Director of PolyU Academy for Interdisciplinary Research  
Global STEM Scholar  
Chair Professor of Systems Biology and Artificial Intelligence

章偉雄教授  
香港理工大學高等研究院副院長  
傑出創科學人  
系統生物學與人工智能學講座教授

Director: Prof. George Q. HUANG  
Chair Professor of Smart Manufacturing  
院長：黃國全教授  
智能製造講座教授



To be a hub for world-class manufacturing research and knowledge transfer to contribute to economic growth in a global context.

成為世界領先的先進製造研究和知識轉移中心，為全球經濟增長作出貢獻。



Advanced Processing and Materials Technologies  
先進加工和材料技術



Digital Manufacturing  
數字化製造



Manufacturing Systems and Instrumentation  
製造及檢測系統和設備



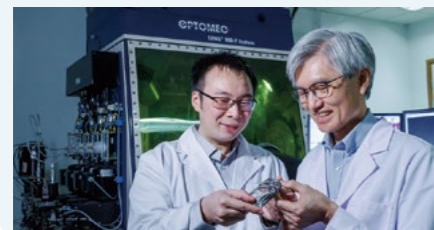
Manufacturing Operations and Logistics  
製造運營和物流



Carbon Neutral Manufacturing  
碳中和製造

**Impact case: High-performance titanium alloys**

The  $\alpha$ - $\beta$  Ti-O-Fe alloy, developed jointly by RIAM and overseas universities, is created using additive manufacturing methods that recycle off-grade titanium sponge into new strong and ductile titanium alloys. Findings have been published in *Nature*.



**成果案例：新型高強度鈦合金**

RIAM、理大及海外大學共同開發的「 $\alpha$ - $\beta$  Ti-O-Fe 合金」，利用增材製造，將劣質「海綿鈦」回收製成高強度、高塑性的新型鈦合金。研究結果已發表於《自然》期刊。



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Associate Dean (Research) of Faculty of Science and  
Chair Professor of Semiconductor Physics  
院長：柴揚教授  
理學院副院長（研究）及半導體物理學講座教授



Be a world-leading institute in the next generation smart IoT empowered by AI, enabling smart connected societies with ground-breaking innovation, and contributing to sustainable urban development with energy-saving, operational efficiency, and improved quality of life.

成為人工智能物聯網的世界領先研究機構，以突破性創新科技改變智能互聯社會，實現更節能、更高效的城市可持續發展，提高生活質素。



AIoT Applications  
智能物聯網應用



Cross-layer Issues  
跨層問題



AIoT Infrastructure  
智能物聯網基礎設施



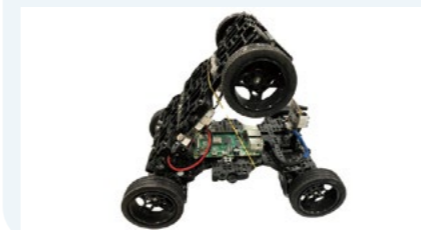
AIoT System Platform  
智能物聯網系統平台



AIoT Analytics  
智能物聯網分析

**Impact case: Robot for autonomous in-pipe inspection**

PolyPi, an edge-AI-empowered robot developed by RIAIoT, enables autonomous in-pipe inspection in challenging environments and various pipe structures. The innovation won a Silver Medal at the 48<sup>th</sup> Geneva Inventions Expo.



**成果案例：管道檢測機械人**

RIAIoT 研發的「PolyPi」邊緣智能機械人系統，可於具挑戰性的環境和各種管道結構中，進行自動管道檢測。此技術獲第 48 屆日內瓦發明展銀獎。

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Professor, Department of Food Science and Nutrition  
院長：黃家興教授  
食品科學及營養學系教授



To be a world-leading Research Institute that advances and transfers knowledge by research, public education and professional service to address the key societal challenges in Food Science and Human Health, for the benefit of mankind.

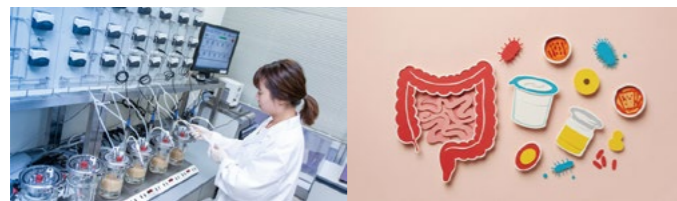
致力成為一所在開拓及轉移知識方面均領先的研究院，透過科研、公共教育和專業服務以解決和應對食品科學和人類健康領域中的關鍵科學問題和挑戰，造福人類。



Food Sustainability  
食物可持續發展



Smart Technology and Functional Food Development  
智能科技及功能性食品研發



Nutrition and Human Health  
營養及人類健康

**Impact case: AkkMore®, a novel fat replacer**

AkkMore®, derived from edible fungi, is the first mushroom-based fat replacer that could reduce the fat percentage up to 80% in some food products. Not only it harbors various benefits such as promoting gut health and alleviation of anxiety, but also extends the shelf-life of food products, providing a novel ESG solution for food industries. The innovation won a Silver Medal at the International Exhibition of Inventions of Geneva — Special Edition 2022 Inventions Geneva Evaluation Days — Virtual Event and a Gold Medal at the 4<sup>th</sup> Asia Exhibition of Innovations and Inventions Hong Kong.

**成果案例：AkkMore®，一種全新的脂肪替代品**

源自食用菌的 AkkMore® 是首個以蘑菇為基礎的脂肪替代品，可取代含黃油的某些食品中脂肪含量降低高達 80%。它不僅具有促進腸道健康和緩解焦慮等多種益處，亦能延長食品的保質期，為食品企業提供一種全新的 ESG（環境、社會和治理）解決方案。這項創新在瑞士日內瓦「國際發明展」網上特別版（Special Edition 2022 Inventions Geneva Evaluation Days — Virtual Event）上榮獲銀獎，並在「第四屆亞洲創新發明展覽會—香港」上榮獲金獎。



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Vincent and Lily Woo Professor in Textile Technology and  
Chair Professor of Textile Technology  
院長：陶肖明教授



吳文政及王月娥紡織科技教授及紡織技術講座教授

To be a leading research institute in intelligent wearable systems via research, global academic and industrial collaboration, knowledge transfer and talent development.

成為領先的智能可穿戴系統研究機構，積極推動研究、全球學術和產業合作、知識轉移及人才培育。



IWEAR System Applications  
智能可穿戴系統應用研究



System Integration and Evaluation  
系統集成與評估



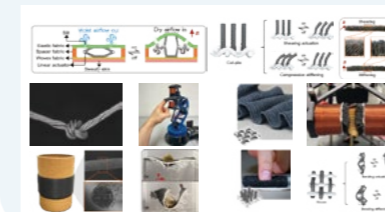
Fibre-based and Flexible Devices  
纖維基柔性器件

**Impact case: Novel safety vector-stimuli-responsive magnetorheological fibres**

The novel magnetorheological textiles developed by RI-IWEAR can achieve flexible deformation and modulate mechanical properties under a human-safe magnetic field, and support programmable control. They also combine lightweight, flexible and breathable textile characteristics, making them widely applicable in smart wearables, soft robotics, virtual reality and metaverse haptic experiences. This research has been published in the international journal *Nature*.

**成果案例：新型安全矢量響應磁流變纖維**

RI-IWEAR 研發的新型磁流變紡織品，可在人體安全磁場下實現靈活變形並調控機械特性，且支持編程控制，並具有輕量、柔韌和透氣的紡織特性，可廣泛應用於智慧穿戴、柔性機器人、虛擬實境和元宇宙虛擬觸感體驗等領域。該研究已發表於國際期刊《Nature》。



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測繪及地理資訊學講座教授



To be a world-class research institute in providing innovative solutions for economical and eco-friendly land and space development.

成為世界級研究院，為經濟、環保土地和空間發展提供創新方案。



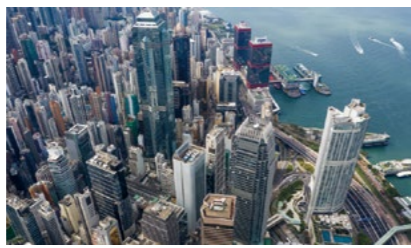
Land Reclamation  
填海



Innovative Land and Space Solutions  
土地和空間發展創新方案



Land Analytics and Management  
土地分析和管埋



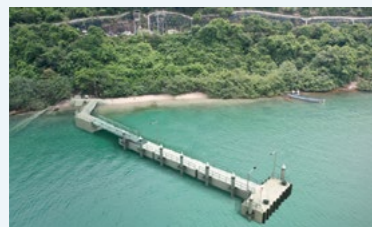
Land Economics and Planning  
土地經濟與規劃



Environmental Treatment and Impacts  
環境處理和影響

**Impact case: Hong Kong's first ultra-high-performance concrete (UHPC) floating walkways**

RILS collaborated with Civil Engineering and Development Department (CEDD) on the design and future construction of the Hong Kong's first ultra-high-performance concrete (UHPC) floating walkways. UHPC offers exceptional strength and durability, meeting the service requirements in marine environment at Yung Shue O — which cannot be achieved by conventional concrete.



**成果案例：香港首個超高性能混凝土（UHPC）浮橋**

RILS 與土木工程拓展署（CEDD）合作，設計並將會建造香港首個超高性能混凝土（UHPC）浮橋。UHPC 具有卓越的強度和耐久性，滿足榕樹澳海事環境的使用要求——這是傳統混凝土無法達到的。



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Chair Professor of Fiber Optics  
院長：呂超教授  
光纖光學講座教授



To be a world-leading institute in advancing the fundamental knowledge of photonics and its applications in various science and engineering disciplines.

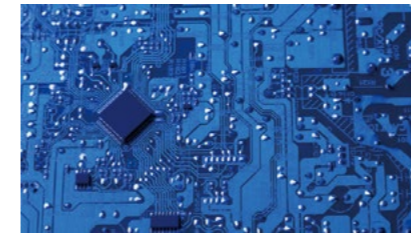
成為推進光子學基本理論研究及其於各種科學及工程領域應用的全球領先機構。



Photonic Sensing  
光子傳感



Photonic Materials and Fundamental Science  
光子材料與基礎科學



Photonic Devices  
光子器件



Photonics and Information Communications Technology  
光子學和信息通訊技術



Laser Spectroscopy  
激光光譜

**Impact case: Nanoscale ferroelectric new materials**

PRI discovered that bilayer stacks of molybdenum disulphide (MoS<sub>2</sub>) and tungsten disulphide (WS<sub>2</sub>) produced at the nanometre scale show an intrinsic ferroelectric property, making them promising materials for electronics manufacturing at low cost and with low energy consumption.



**成果案例：納米級鐵電新材料**

PRI 發現由二硫化鉬（MoS<sub>2</sub>）和二硫化鎢（WS<sub>2</sub>）合組的雙層堆疊，展現其固有的鐵電性。此材料有助於推動電子業的低成本、低耗能製造。

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Chair Professor of Quantum Engineering and Science  
院長：劉愛群教授  
量子工程與科學講座教授



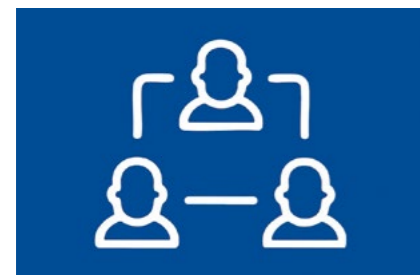
To drive advancements in quantum technology through innovative research and interdisciplinary collaboration. 致力於量子科研創新及交叉學科研究，推動量子技術發展。



Quantum Algorithms  
量子演算法



Quantum Computing  
量子計算



Quantum Communication  
量子通訊



Quantum Machine Learning  
量子機器學習



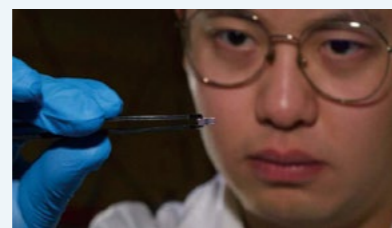
Quantum Metrology and Sensing  
量子技術與感測科學

**Impact case: Hong Kong's first optical fibre quantum network**

A research team led by Prof. LIU Ai-qun, Director of RIQT, has achieved a breakthrough research by successfully conducting a cybersecurity test on the Hong Kong's first optical fibre quantum network, built utilising a quantum chip platform. This milestone marks a stride forward in the commercialisation of quantum communication in the near future and aligns with China's strategic priorities, as outlined in the Nation's "15th Five-Year Plan" where it is identified as one of the top technological areas for the future industry development.

**成果案例：香港首個量子通訊網絡**

由量子技術研究院院長劉愛群教授領導的團隊，在量子通訊取得重要突破，完成了香港首個以量子晶片為平台的光纖量子通訊網絡安全測試，為量子通訊商業化應用，揭開了新的篇章，亦切合國家「十五五」規劃未來產業佈局中，將量子科技排在首位的戰略佈局。



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院長：鄭永平教授、工程師  
梁顯利生物醫學工程教授及生物醫學工程講座教授



Be a leading research institute that advances and transfers knowledge and technologies for smart ageing. 成為推進及轉移智齡知識與科技的領先研究機構。



Smart Health  
智能健康



Smart Intelligence  
智能認知



Smart Society  
智能社會



Smart Environment  
智能環境



Gerontechnology  
智齡科技

**Impact case: Liverscan**

Liverscan, a portable non-invasive system developed by RISA, uses real-time ultrasound imaging to perform liver fibrosis assessment. The technology is being trialled at hospitals and medical examination centres, and a global launch is expected in 2026.

**成果案例：Liverscan**

RISA 研發的 Liverscan 便攜式無創系統，利用實時超聲波影像，進行肝纖維化檢測。此技術已於多家醫院和體檢中心落地試用，預計於 2026 年全球推出。



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院長：史文中教授  
潘樂陶慈善基金城市信息學教授及地理資訊系統及遙感講座教授



Be an international centre of excellence in urban informatics and a living laboratory of smart city development for Hong Kong and the Guangdong-Hong Kong-Macao Greater Bay Area (GBA).

成為城市資訊學領域的國際卓越研究中心，以及香港和粵港澳大灣區智慧城市建設的生活實驗室。



Smart Positioning and Navigation  
智能定位與導航



Connected Environment for Urban Mobility  
城市交通的互聯環境



High-Definition Map for Autonomous Driving  
自動駕駛與高精度地圖



Smart Environment  
智慧環境



Data Science for Smart Cities  
智慧城市與數據科學



Smart Living  
智慧生活



Smart Government  
智慧政府



Smart Economy  
智慧經濟



Ageing Mobility Analytics  
老化出行分析

**Impact case: Advanced real-time prediction and early warning system for the spread of emerging pathogens**

The warning system developed by SCRI successfully tracked different SARS-CoV-2 variants and supported COVID-19 control measures around the world. The innovation won a Gold Medal at the 48<sup>th</sup> Geneva Inventions Expo and was widely reported in global media about a hundred times. The World Health Organization highly commended the research reports based on this system.



**成果案例：新發病原體傳播的先進即時監測及早期預警系統**

SCRI 研發的預警系統，成功追蹤了新型冠狀病毒不同變種的傳播，並支援了全球各地的新型冠狀病毒管控措施。系統獲第 48 屆日內瓦發明展金獎，及全球媒體報導約百次。基於本系統的研究報告獲得世界衛生組織的高度評價。



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Chair Professor of Building Energy and Automation  
院長：王盛衛教授、工程師  
潘樂陶慈善基金智能建築教授及建築能源與自動化講座教授



To be a world-leading energy research institute in developing technologies and solutions for energy innovation, energy sustainability and carbon-neutrality.

成為世界領先的能源研究機構，開發能源創新、能源可持續發展，及碳中和技術和方案。



District Energy Systems and Smart Grid  
區域能源系統和智能電網



Advanced and Renewable Energy Conversion Technologies  
先進及可再生能源轉換技術



Smart Buildings and Smart Energy Systems  
智慧建築和智慧能源系統



Advanced Energy Storage Technologies  
先進儲能技術



Advanced Energy Materials  
先進能源材料

**Impact case: Digital twin, system and control optimization technologies for energy-efficient and energy-flexible buildings**

The novel technologies developed by RISE to enhance building energy efficiency and energy flexibility are fully implemented in the International Gateway Centre (IGC), with projected annual saving of 5.6 GWh in electricity use and a 5.3% reduction in the demand charge.

**成果案例：面向節能與能源柔性建築的數字孿生、系統優化與控制優化技術**

RISE 研發的用於提升建築能效與用能柔性的創新技術，現已在 IGC 實施應用。預計該項目每年可節約 560 萬千瓦時用電，並降低 5.3% 的需求量收費。



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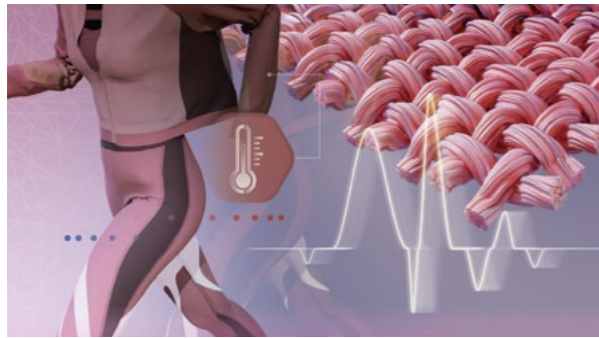
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Director: Ir Prof. ZHANG Ming  
Chair Professor of Biomechanics  
院長：張明教授、工程師  
生物醫學工程講座教授



To provide scientific and novel engineering solutions in sports, making sports more interesting, more rewarding, and safer for everyone.

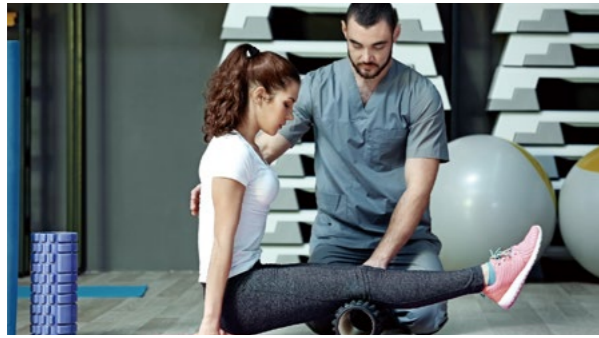
開發科學、嶄新的體育工程技術方案，賦予運動更多趣味、效益和安全。



Sports Product Design, Materials and Manufacturing  
體育產品設計、材料及生產技術



Sports Biomechanics and Human-Product Interaction  
運動生物力學及人體與產品的相互作用



Sports Training and Rehabilitation  
運動訓練與康復治療



Sports Measurement, Feedback and Instrumentation  
運動測量、反饋及儀器配置

**Impact case: Extensive research collaborations for driving sports development**

RISports collaborates with top sports brands (e.g., Li Ning, Asics), sports organisations (e.g., Samaranch Foundation, Hong Kong Sports Institute), and medallists in the Olympics and National Games to advance sports science and technology.

**成果案例：廣泛科研合作推動體育發展**

RISports 與頂級運動品牌（如：李寧、亞瑟士）、體育組織（如：薩馬蘭奇基金會、香港體育學院），及奧運和全運會獎牌得主合作，推動運動科技發展。



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🌐 <https://www.polyu.edu.hk/risports>

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Ko Jan Ming Professor in Sustainable Urban Development and  
Chair Professor of Environmental Science and Technology  
院長：李向東教授  
高贊明可持續城市發展教授及環境科學與科技講座教授



To be a world-leading research institute in the development and application of innovative solutions for sustainable high-density urban development.

成為開發及應用可持續高密度城市發展方案的領先研究機構。



Urban Carbon Neutrality  
城市碳中和



Urban Infrastructure  
城市基建



Urban Nature-Based Solutions  
城市自然為本解決方案



Urban Environment  
城市環境

**Impact case: Revealing rising soil nitrous acid emissions driven by climate and fertilisation change accelerate global ozone pollution**

RISUD research established a comprehensive dataset to unveil the pivotal role that soil nitrous acid (HONO) emissions play in the increase of the ozone mixing ratio in the air and their negative impact on vegetation.



**成果案例：揭示化肥及氣候變化導致土壤亞硝酸排放上升，加劇全球臭氧污染**  
RISUD 透過建立全面的數據集，揭示土壤亞硝酸（HONO）排放是導致臭氧濃度上升的重要原因，並會對植被帶來負面影響。



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主任：黃文秀教授  
食品科學及營養學系教授



To become a leading institute for the research and application of Chinese Medicine (CM) treatment and practices for the improvement of the people's health and well-being.

成為領先的中醫藥研究中心，研究及應用中醫藥治療與實踐，改善人們的身心健康。



Musculoskeletal Health  
肌肉骨骼健康



Metabolic Health  
代謝健康



Mechanistic Studies on Chinese Herbal Medicines and New Drug Development  
中藥機理研究及新藥開發



Neurological and Mental Health  
精神健康

**Impact case: Advocating university-industry collaboration for Chinese medicine development**

RCMI published a Policy Paper on University-Industry Collaboration for Chinese Medicine (CM) Innovation in the Greater Bay Area (GBA), providing specific recommendations to policymakers to drive the research and development, internationalisation, commercialisation, and innovation of CM in the GBA.



**成果案例：中醫藥產學研合作倡議**

RCMI 發表的《粵港澳大灣區中醫藥產學研合作創新政策文件》，向政府提供建議，促進大灣區中醫藥科研、國際化、產品商業化及創新。



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Chair Professor of Precision Engineering  
主任：容啟亮教授、工程師  
鍾士元爵士精密工程教授及精密工程講座教授



To be a leading research centre of interdisciplinary collaborative research in the exploration and exploitation of space resources and associated technologies, with the ultimate aim of technology transfer for the earthly benefits of Hong Kong, the Nation and the world.

成為探測及開發太空資源及相關技術的領先交叉學科合作研究中心，透過技術轉移，造福香港、國家和全世界。

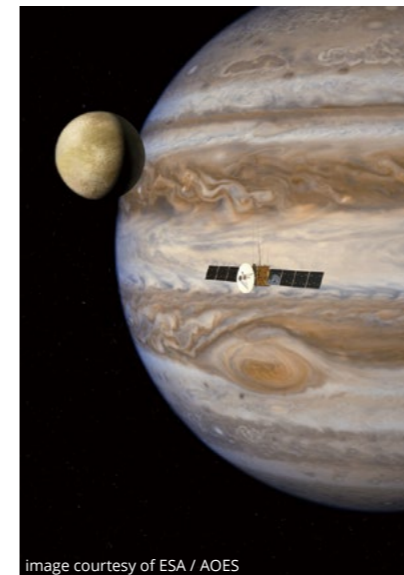
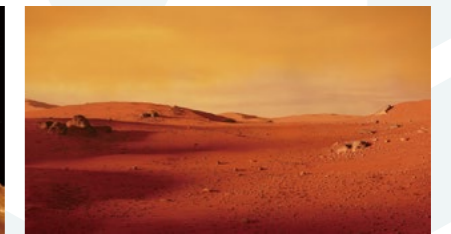


image courtesy of ESA / AOES

Planetary Remote Sensing and Mapping for Landing Site Selection  
用於著陸點選擇的行星遙感和測繪



Planetary Resource and Microbes  
行星資源及微生物



Planetary Base Construction and Geotechnical Mechanics  
行星基地建設和岩土力學

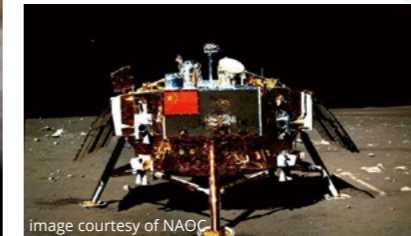
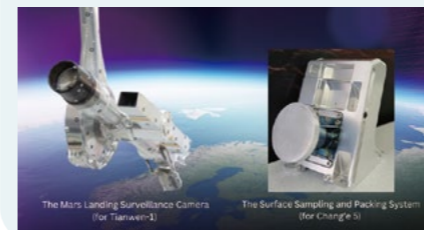


image courtesy of NAOC

Space Environment and Payload Research  
太空環境和載荷研究

**Impact case: Contributing to Nation's space achievements**

The space instruments and technologies developed by RCDSE were used in national space missions. They include: "Surface Sampling and Packing System" for collecting lunar samples in the Chang'e-5 mission, as well as "Mars Landing Surveillance Camera" for capturing images of Mars, and the "Topographic and Geomorphological Characterisation and Analysis Technique" for identifying possible landing sites in the Tianwen-1 mission.



The Mars Landing Surveillance Camera (for Tianwen-1)

The Surface Sampling and Packing System (for Chang'e-5)

**成果案例：貢獻國家航天事業**

RCDSE 研發的大空儀器和技術，獲應用於國家航天任務。其中包括：用於「嫦娥五號」月壤樣本採集任務的「表取採樣執行裝置」，以及用於「天問一號」任務中拍攝火星影像的「落火狀態監視相機」，和識別可能著陸點的「地形測量及地貌分析技術」。



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Mr and Mrs Chan Chak Fu Professor in International Tourism and  
Chair Professor of Tourism  
主任：宋海岩教授  
酒店及旅遊業管理學院副院長兼講座教授及陳澤富伉儷國際旅遊教授



To digitally transform the tourism industry by developing AI-driven decision and monitoring systems, and innovative experience solutions to reshape tourism and hospitality operations, destination governance, and international collaboration to promote sustainable travel experiences and business practices.

透過開發人工智慧驅動的決策和監控系統，以及創新體驗解決方案，實現旅遊業的數位轉型，重塑旅遊和酒店業業務運營、目的地治理和國際合作，以促進可持續的旅遊體驗和商務活動。



Digital Monitoring System for Tourism and Hospitality  
旅遊和酒店業數位監控系統



AI-Driven Business and Experience Innovations  
人工智慧驅動的業務和創新體驗

**Impact case: Unveils large language model-based tourist satisfaction index**

The Hong Kong Tourist Satisfaction Index (HKTSI), developed by RCdTT, applies a Large Language Model-based framework to assess inbound visitor satisfaction across sectors, regions and time. Drawing on over 1.25 million reviews, the index reveals clear spatial, sectoral and linguistic differences, alongside a strong post-pandemic recovery. The findings offer timely, data-driven insights that support targeted service enhancement and policy formulation. By advancing text-based analysis of visitor experiences, the HKTSI contributes to strengthening Hong Kong's long-term competitiveness as a leading tourism destination.

**成果案例：以大型語言模型為基礎的香港遊客滿意度指數 (HKTSI)**

RCdTT 開發了基於大型語言模型的香港遊客滿意度指數 (HKTSI) 分析框架，用於評估入境旅客在不同行業、地區與時間尺度的滿意度。透過分析超過 125 萬條多語言評論，該框架揭示了行業、空間與語言層面的差異，以及香港旅遊業在疫情後的顯著復甦。此方法提供精準且具證據基礎的洞見，支持服務改善與策略制定，並強化香港作為國際旅遊目的地的長期競爭力。



Director: Prof. WU Qiang  
Professor and Associate Head (Research) of School of  
Accounting & Finance  
主任：吳強教授  
會計及金融學院副學院主任（研究）及教授



To be a leading research center focused on the interactions among environmental, social, and governance issues, aiming to balance the needs of the environment, society, and economy to ensure the long-term prosperity and sustainability of Hong Kong, mainland China, and the world.

成為一個專注於環境、社會與管治議題互動的領先研究中心，致力平衡環境、社會與經濟的需求，以確保香港、中國內地及全球的長遠繁榮與可持續發展。



ESG Reporting, Data, and Green Investment  
ESG 報告、數據與綠色投資



Circular Economy for Urban Renewables  
城市可再生資源的循環經濟



Sustainable logistics and Supply Chain  
可持續物流與供應鏈



Sustainable Social Policies  
可持續社會政策

Director: Prof. QIU Anqi  
Professor, Department of Health Technology and Informatics  
主任：仇安琪教授  
醫療科技及資訊學系教授



To become a leading centre for research in mental health and promotion of mental well-being.

成為領先的精神健康研究和促進心理健康的中心。



Basic and Translational Neuroscience of Mental Health  
基礎腦神經科學及轉化



Neuroimaging Studies and Innovative Cognitive Rehabilitation of Mental Disorders  
精神障礙的神經影像學研究與創新的認知康復



Behavioural and Psychiatric Rehabilitation  
行為和精神康復



Psychosocial and Cultural Aspects of Mental Health  
社會心理和文化對精神健康的影響



Service Use and Social Policy of Mental Health  
精神健康服務與社會政策



Digital Mental Health  
數碼精神健康

#### Impact case: Jockey Club Health Support Project for Persons with Disabilities (PWDs)

Funded by a HK\$34 million donation from The Hong Kong Jockey Club Charities Trust, the 3-year Jockey Club Health Support Project for PWDs aims at enhancing the health awareness of PWDs. Through providing direct support on nutrition, physical activity and self-management of chronic conditions by our interdisciplinary professional team, it is the objectives of the Project to enhance the health and wellness including health literacy, stress management, medication adherence, dietary habits, as well as healthy behaviours and lifestyle of PWDs. The train-trainer programme of the Project also augments the sector's capacity of monitoring and taking care of the health needs of PWDs in the long run. The Project has engaged 9 Sheltered Workshops and Integrated Vocational Rehabilitation Service Centers in Phase 1, and achieved positive outcomes in participants' key health indicators after the completion of the first 12 weeks of intervention. The Project's success has led to its shortlisting for The Hong Kong Jockey Club Charities Trust's 2026 Impact Report.

#### 成員案例：賽馬會共「健」里程支援計劃

承蒙香港賽馬會慈善信託基金捐助港幣 3,400 萬，為期三年的「賽馬會共「健」里程支援計劃」旨在為殘疾人士提供健康支援，提升其健康意識。計劃透過由跨專業團隊就營養、體能運動和慢性病自我管理三個範疇提供的直接支援，改善殘疾人士的身心健康，包括健康知識、壓力管理技巧、藥物依從性及飲食習慣，為他們建立健康的運動及生活習慣。此外，計劃亦提升機構同工長遠對照顧及管理殘疾人士健康的能力。在計劃第一階段，理大已和九間綜合職業康復服務中心合作；而在計劃完成介入支援的首十二個星期後，參加者於各項主要健康指標均錄得改善。憑藉其卓越成果，本計劃已獲列入香港賽馬會慈善信託基金《2026 年影響報告》。



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安禮信土木工程教授及傑出研究教授



To become a forefront international research centre on solid waste recycling issues.

成為國際前沿的固體廢物回收研究中心。



Environmental and Economic Impact  
環境和經濟影響



Policy and Society  
政策與社會



Recycling and Sustainable Construction  
回收及可持續建築



Waste Valorization Technology  
廢物增值技術

#### Impact case: Eco-Blocks

Eco-Blocks are green concrete materials developed by RCRE using construction, demolition, and other discarded waste. The technology is now in its fifth generation of development, and different generations of Eco-Blocks have been used in PolyU buildings.



#### 成果案例：環保再造磚

RCRE 研發的「環保再造磚」是一款綠色混凝土，由建築裝修、翻新拆卸及其他工程所產生的建築廢料而製成。此技術目前處於第五代研發階段。過往多代的「環保再造磚」已應用於理大校園的建設中。

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梁顯利長者健康視覺教授及科研眼科講座教授



To be a world leader in the creation of knowledge and solutions for the promotion of healthy life-long sharp vision.

透過創造知識和解決方案，協助人類維持長久、健康而敏銳的視覺，成為世界領先的研究中心。



Global Eye Health Partnerships and Leadership  
全球眼科健康合作與領導



Translational Research for International Impact  
具國際影響力的轉化研究



Data-Driven Multi-Center Clinical Research  
數據驅動的多中心臨床研究



AI & Innovative Technologies  
人工智能及創新科技

#### Impact case: NMDIS lens

The Nano Multi-ring Defocus Incorporated Spectacle (NMDIS) lens, jointly developed by RCSV researchers and PolyU units, combines two of PolyU's proprietary technologies and can slow down myopia progression in children and adolescents. This innovation was awarded the Prize of the State of Geneva and a Gold Medal with Congratulations of the Jury at the 48<sup>th</sup> Geneva Inventions Expo.



#### 成果案例：新型高效「納米多環離焦」近視防控鏡片

RCSV 與理大單位共同研發的「納米多環離焦」近視防控鏡片，結合了理大雙專利技術，能減慢兒童及青少年的近視問題。此技術獲第 48 屆日內瓦發明展「日內瓦州特別大獎」以及評審團嘉許金獎。



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李氏紡織科技教授及纖維科學與服裝工程講座教授

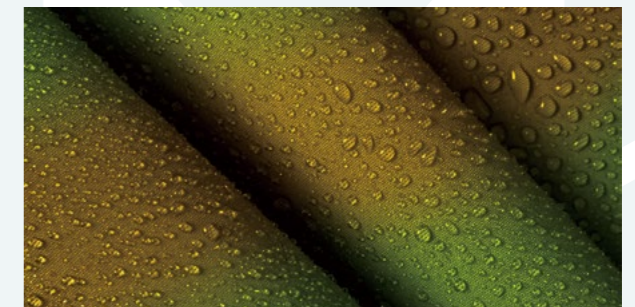


To be a world leading research institute that synergises interdisciplinary R&D strength in materials, design, digital technologies and management to address real world challenge of textiles and fashion for health, wellbeing, protection, performance and sustainability.

成為世界領先的研究機構，結合材料科學、設計、數位技術、管理學的交叉學科科研實力，應對當今紡織及時裝在人類健康、福祉、機能保護、性能提升，及可持續發展方面的挑戰。



Fashion & Textile Product Design and Innovation  
時裝及紡織產品設計與創新



Advanced Fashion & Textile Materials and Technologies  
先進時裝與紡織材料及技術



Fashion and Textile Life Cycle Management  
時裝及紡織生命週期管理

#### Impact case: iActive™ intelligent activewear

The iActive developed by RCTFF is an intelligent activewear designed for sweat management. It uses low-voltage-driven artificial "sweat glands" created by skin-like anti-heat textile fabrics and a root-like branching liquid transport system that aligns with the body's sweat map, for actively and programmably transporting sweat to a perspiration dissipater at the lower region of the sportswear, and quickly removing it as liquid droplets. Users can wirelessly adjust the sweat level of iActive™ through a mobile app.



#### 成果案例：智能運動服「iActive™」

RCTFF 研發的「iActive™」是一款智能排汗運動服。它採用了低壓電控的仿皮膚抗熱紡織面料作為「人造汗腺」排汗器，及對應人體背部主要出汗位置，內置根狀汗液收集系統，主動且可控地將汗水猶如樹根傳輸水分般傳輸到衣服底部的排汗器，並以液滴的形式迅速將汗水排掉。用家可透過手機應用程式，自主控制運動服的排汗速度。

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香港理工大學高等研究院

