Organization Structure

PolyU Academy for Interdisciplinary Research
PAIR

Research Institute for Intelligent Wearable Systems
RI-IWEAR

Industrial Advisory Committee

Management Committee

International Academic Advisory Committee

Director
Prof. TAO Xiaoming

Associate Directors
Research-Prof. YAN Feng
External Liaison-Prof. ZHENG Zijian

Members

Prof. CAO Jiannong	Dr MOK Tracy
Dr CHEN Jianming	Dr PU Junhong
Prof. CHENG Li	Dr REN Ge
Prof. FAN Jintu	Dr REN Zhiwei
Dr FANG Bo	Dr SHOU Dahua
Prof. FEI Bin	Prof. SHUM David
Prof. FU Amy	Prof. SUN Defeng
Dr FU Jimin	Prof. WANG Stephen
Dr JI Ying	Prof. WANG Zuankai
Prof. JIANG Kinor	Dr WONG Arnold
Prof. HU Hong	Prof. WONG Wai-Yeung Raymond
Dr HUANG Bolong	Prof. XIN John
Dr HUANG Qiyao	Prof. YOU Jane
Prof. LEUNG Angela	Prof. YU Changyuan
Prof. LEUNG Polly	Dr YU Xiang
Dr LEE Shara	Prof. ZHAO Xin
Prof. LI Gang	Prof. ZHANG Dan
Dr LI Tian	Dr ZHANG Hui
Dr LIU Rong	Dr ZHANG Lisha
Dr LIU Xintao	Ir Prof. ZHENG Yongping
Dr MA Yuan	

Research Institute for Intelligent Wearable Systems (RI-IWEAR)

Vision

To be the leading research institute in intelligent wearable systems via an impactful interdisciplinary research programme, global academic and industrial collaboration, knowledge and technology transfer and human resource enhancement.

Events

Research Focus Areas

- **IWEAR System Applications**
- **System Integration and Evaluation**
- **Fibre-based and Flexible Devices**

Key Projects

Mechanisms and Key Technologies of Multi-Sensory Emulation Wearable Devices (MSEWDs)

Prof . TAO Xiaoming,
RI-IWEAR Director

This project aims to emulate the less enhanced yet urgently needed Touch (tactile) and Smell (olfactory) sensations by a study of multi-sensory emulation wearable devices (MSEWD) that reveals their operational mechanisms, and develop key technologies and applications.

First-of-its-kind emulation mechanisms based on fibrous structures and their bionic actuation devices will be developed for delivering mixed scents and tactile sensations. Leveraging AI models to link measured signals obtained by biosensors and algorithms for controlling the bionic emulation devices will offer more immersive experiences.

Innovative Saliva Sensing System for Real-Time Health Monitoring

Prof. YAN Feng,
RI-IWEAR Associate Director

The project developed an innovative, low-cost, ultra-sensitive saliva sensing system for real-time health monitoring. It features organic electrochemical transistor (OECT) sensors, a portable meter, an ultra-thin battery, a wearable salivary substrate, and mobile application software.

The non-invasive device detects metabolites, hormones, nucleic acids, and proteins in human saliva, focusing on glucose monitoring and SARS-CoV-2 IgG antibody detection. Connecting to a portable meter and smartphone, users can easily analyze saliva samples, enabling continuous health assessments without invasive procedures. It enhances access to essential health diagnostics and promotes personalized healthcare solutions.

Pilot and Mass Production of Next-Generation Composite Current Collectors for Mobility and Energy Storage Batteries

Prof. ZHENG Zijian,
RI-IWEAR Associate Director

This project aims to develop an ultrathin, ultralight, flexible and durable composite film to serve as a current collector (CC) for Li-ion batteries (LIBs) and future solid-state Li batteries, aiming at boosting their energy density. The CC is an essential component for the conduction of electrons during the charge/discharge process in LIBs.

The composite CC developed is 6+ times lighter than industry standard CC. The discrete carbon nanotubes (dCNT) is 3+ times cheaper than copper at the same film thickness. It is also stronger and more flexible, electrically and thermally conductive, chemically stable in LIB environment.

Intelligent Medical Imaging & Therapy in the Era of Precision Medicine

Prof. CAI Jing,
RI-IWEAR Member, Associate Dean of Faculty of Health and Social Sciences, Professor in the Department of Health Technology and Informatics

This project aims to revolutionize precision radiotherapy using AI and radiomics by enhancing treatment planning and assessment. It involves developing advanced deep learning algorithms and neural network models powered by big data and accelerated computation.

The project focuses on creating tools to support unbiased consensus in treatment planning, update practitioners, reduce professional costs, and improve quality assurance in clinical trials and patient care. These innovations will significantly transform radiotherapy research and practice.

Neuromorphic Computing Devices

Prof. CHAI Yang,
RI-IWEAR Management Committee Member, Associate Dean (Research) of Faculty of Science, Professor in the Department of Applied Physics

This project aims to develop neuromorphic devices for efficient processing complex visual information, including designing and fabricating neuromorphic visual devices, developing high-density three-dimensional integration processes, and realizing efficient in-sensor computing architecture.

Key Achievements

RI-IWEAR brings together 48 researchers from 16 different PolyU departments and schools to collaborate on impactful interdisciplinary research. Since RI-IWEAR's establishment in 2021, our members have been conducting interdisciplinary research, pursuing technology and knowledge transfer, and collaborating with extensive stakeholders to maximise research impact, with successful achievements, including:

- A total of HK$267 million funding secured (as at September 2024)
- 180 journal papers published, 86 papers of which have Impact Factor greater than 15
- 99 awards received (at local, national and international levels)
- 6 patents granted and 22 patents submitted
- 7 executed licenses
- 4 researchers named on Clarivate's List of Highly Cited Researchers (based on Clarivate Highly Cited Researchers 2023 list)
- 19 researchers named on Stanford University's List of Top 2% Scientist (based on Stanford University Top 2% Scientists Worldwide 2023 list)

Enquiries

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