9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Research & Innovation

New Artificial Intelligence and Robotics Lab to Foster Co-Creation and Innovation

Embracing the transformative potential of artificial intelligence (AI) and robotics, PolyU established the Artificial Intelligence and Robotics Laboratory (AIR Lab) to help empower students and researchers with these two rapidly developing technologies. Leveraging the Lab, PolyU will better fulfil its goals of nurturing future-ready leaders to explore various aspects of collaborative robotics, including application development, component fabrication, control system design, and autonomous system development. It will also enable it to translate its research excellence into impactful applications to help enable Hong Kong to develop into an international innovation and technology centre.

With the strong support of Hai Robotics, the Lab boasts a cutting-edge warehouse automation solution, the Smart Delivery System, which comprises Hai Robotics' pioneering autonomous case handling robotic system, autonomous mobile robots, and an enterprise resource planning software system. It supports researchers in developing various collaborative robot application technologies, encourages co-creation and innovation, and offers a communal logistics service for all users. Additionally, equipped with advanced robotic arms, legged robots, automatic guided vehicles, drones, as well as machine learning kits related to AI robotics and Industry 4.0, the Lab houses more than ten PolyU project teams focusing on the use of AI and robotic technologies in areas such as health care, rehabilitation, sports technology, engineering, energy, computing, and sustainability.

Smart Technologies to Improve Construction Safety and Productivity

Questing for ways to make complex and dynamic construction operations more efficient, productive, and safe, the Department of Building and Real Estate has been exploring digital innovation and transformation. A research team has implemented driven approaches driven by artificial intelligence for real-time field data collection in more than ten construction sites in South Korea. Another team has collaborated with several industry partners to develop automated construction production systems. A third team has developed a proactive smart construction monitoring system for the Nord Stream 2 Project to monitor the laying of a more than 1,000km-long natural gas pipeline from Russia to Germany through the Baltic Sea in real time.

Teaching & Learning

Bridging the STEM Gap in Aviation for the Young

The Department of Aeronautical and Aviation Engineering offers a service-learning subject wherein PolyU students engage underprivileged secondary school students with the aim of arousing their interest in the fast-growing local aviation industry. In this subject, PolyU students first learn about aviation-related engineering design, flight operations theories, and concepts in mathematics and applied physics, while also acquiring an understanding of ergonomics and safety awareness in flight simulator experiences. In addition to aviation-related STEM concepts and theories, they are taught principles, ethics, and practical knowledge of service delivery. In order for them to prepare instructional material and design innovative STEM service workshops to address issues faced by the service targets and help bridge the STEM divide, they also learn about the financial, cultural, and socio-economic challenges in aviation and STEM learning faced by underprivileged students. Linking service-learning with their STEM knowledge, PolyU students have **served over 150 secondary school students** who were able to spend three months learning aviation-related theoretical concepts and basic flight operations, as well as to experiencing using a flight simulator.

Nurturing Innovative Talent with Enhanced Curricula

PolyU values talent development and devotes itself to nurturing future leaders who can drive innovation in society. This academic year saw the integration of components related to artificial intelligence and data analytics a well as innovation and entrepreneurship into the undergraduate curriculum, offering students the opportunity to acquire skills and the data literacy essential to excelling in the current technological landscape.

Similarly, new postgraduate programmes have been launched to foster expertise in emerging areas, including: blockchain technology; artificial intelligence and big data computing; environmental, social and governance and sustainability; intelligent construction; metaverse technology; and microelectronics technology and materials.

Driving Blockchain Development with Web3 Partners

The Faculty of Business strives to stay at the forefront of business education by offering several programmes and courses that incorporate Web3 into the curriculum, such as the Master of Science in Business Analytics and Master of Science in Accounting and Finance Analytics programmes. The Faculty also co-organised "Link Web3 to PolyU" with industry-leading Web3 partners – Chainlink, BNB

Chain, and Moonbeam – for students to better comprehend how data are transferred from real life to the blockchain by means of the trust mechanism, enriching participants' knowledge of blockchain-related innovations in the market and the necessary tools for building the Web3 world. Additional collaboration opportunities with Web3 companies will be explored to further enhance the curriculum to nurture top blockchain talents.

"Link Web3 to PolyU" organised by the Faculty of Business ▶

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Outreach & Engagement

Global Interdisciplinary Knowledge Transfer for Research Excellence

The PolyU Academy for Interdisciplinary Research (PAIR) organised its inaugural interdisciplinary research and development conference, the largest in Hong Kong, with a view to sharing interdisciplinary research and technologies and forging closer collaboration and professional exchange among international stakeholders from different fields to stimulate growth in Hong Kong and beyond.

With the theme "Research Excellence for Societal Impacts", the hybrid conference featuring about 15 sessions brought together **around 100 globally renowned experts** as distinguished speakers to share their knowledge and insights on three core areas, namely advanced technologies and manufacturing, good health and well-being, and smart and sustainable cities. It **attracted over 2,500 participants** from 40 countries and regions.

A variety of scholarly activities aiming to facilitate knowledge exchange and foster collaboration were also hosted by PAIR and its constituent research units, including the PAIR Distinguished Lecture Series, the PAIR Public Seminar Series, and the PAIR Salon, which have seen world-leading scholars such as Nobel and Turing Award laureates sharing their impactful research and industry experts from diverse sectors providing their business perspectives. This academic year, PAIR's knowledge transfer activities have **attracted more than 230,000 participants** worldwide, contributing to the University being a global centre for research excellence.

Greater Bay Area Sustainability Innovation Challenge

PolyHack 2023

Cultivating Innovation and Technology Talents

To enable students and researchers to translate expert knowledge and innovative ideas into practical applications and solutions, PolyU organised a series of Future Challenge competitions based on pain points in smart cities, health, digital technology, and sustainability to foster early engagement with industry, **attracting over 650 participants** from diverse fields and industries. Similarly, PolyU Shenzhen Base hosted the Greater Bay Area Sustainability Innovation Challenge to advocate regional sustainable development through innovation and technology, to which more than ten higher education institutions submitted over 40 projects. In addition to cash prizes and entrepreneurship support from the University, winning projects also received pre-incubation funding support for commercialisation.

PolyU has also established two student-led organisations to spark and sustain an innovative and entrepreneurial spirit among the next generation. The Entrepreneurship Society has **nearly 1,000 members** who organise start-up events that bridge the gap between students and entrepreneurs. The Google Developer Student Club initiated PolyHack, a global hybrid hackathon and ideathon competition that **gathered over 700 talented individuals** from more than 80 countries and regions worldwide to harness their creativity and technical prowess, focusing on artificial intelligence, financial technology, smart cities, and the internet of things. It also featured a series of talks by industry leaders, workshops, and mentorship sessions, enriching the participants' knowledge and skillsets to enable them to tackle complex challenges and refine their project concepts.

Meanwhile, the Department of Aeronautical and Aviation Engineering has collaborated with a local NGO, Orion Astropreneur Space Academy, to launch Hong Kong's first STEAM-based programme, grounded on the creation of a small satellite known as CubeSat that has become a mainstay of tomorrow's space technology, enabling **over 100 secondary school students** to better understand space technology and to seek innovation ways to remove space debits.

Governance & Operations

Fostering Entrepreneurship and Innovation for Social Good

PolyVentures is an academic-industry initiative that offers an entrepreneurial ecosystem to empower aspiring start-ups to translate innovative ideas into real-world solutions, maximising the University's research impact. Tremendous support, from funding and networking opportunities to business matching services and incubation programmes, is also provided for entrepreneurs to overcome business challenges and bring cutting-edge technologies and innovation to market, thereby driving positive social change. Similarly, design thinking workshops, minimum viable product training, and one-on-one mentoring sessions hosted under the Proof-of-Concept Funding Scheme

helped nearly 250 students realise their concepts in over 90 projects, representing **a 70% increase from the previous academic year**.

Besides, the Micro Fund Scheme granted HK$120,000 each to around 90 start-ups, tripled from the previous year, of which two thirds have been fast-tracked to the Ideation and Incubation programmes run by Hong Kong Science and Technology Parks Corporation, where each team could get up to almost HK$1.3 million. PolyU continues to work closely with strategic partners to provide comprehensive support to help start-ups reach their fullest potential. The Angel Fund Scheme is also introduced, offering HK$1 and HK$3 million two-tier support to high-potential early-stage

technology ventures, attracting nearly 140 applications. Around 15 applicants were awarded HK$1 million and almost ten received HK$3 million.

Additionally, the University set up the Entrepreneurship Investment Fund and partners with strategic investors such as Alibaba Entrepreneurs Fund, Fosun Pharma, and Law's Group this academic year, to facilitate start-up growth and expansion through a co-investment model. Furthermore, a unified scheme to provide matching funds to Principal Investigators who have secured major research grants of HK$5 million or above is also being developed, amplifying research impact and propelling PolyU's research excellence.

Total start-ups
480+

Tech start-ups
250+

Social impact start-ups
230+

Academic-led start-ups
60+

Unicorns **4**

Entrepreneurs trained **7,600+**

Patents granted **1,320+**

Included in Forbes Asia 100 to Watch List **3**

International & local awards **370+**