CHAPTER
03

AI-DRIVEN
MEDICAL RESEARCH

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AI-DRIVEN MEDICAL RESEARCH

PolyU is transforming healthcare by transcending disciplinary boundaries and integrating cutting-edge research with people-centred design. Having created a robust innovation ecosystem, PolyU has driven the development of AI-powered diagnostic technologies, personalised rehabilitation robotics and smart monitoring systems. These tools enhance the quality and accessibility of care for those with special needs. They reaffirm PolyU's commitment to creating societal benefit through research.

3.1 OVERVIEW OF POLYU COMPUTER SCIENCE AND MEDICAL RESEARCH

PolyU's AI and medicine-engineering synergy is supported by multiple state key laboratories and research institutes, including the State Key Laboratory of Ultra-precision Machining Technology (SKL-UPMT) and the PolyU Academy for Artificial Intelligence (PAAI), as well as numerous research centres. This collaborative ecosystem has enabled PolyU to successfully translate many cutting-edge innovations into real-world healthcare solutions, significantly enhancing clinical outcomes and patient quality of life. Between 2020 and 2024, PolyU was granted a total of 261 patents in 21 regions globally, in areas such as computer science, imaging, applied mathematics, biomedical engineering, biotechnology, health technology and informatics, nursing, optometry, and rehabilitation science. While the Top three regions for granted patents are the Chinese Mainland, Europe and the United States, there is an increasing footprint in Hong Kong, Taiwan, China and Southeast Asia.

This chapter will explore how PolyU's interdisciplinary integration has driven life-changing inventions in computer science and various medical disciplines, including optometry, biomedical engineering, rehabilitation sciences and nursing.

3.2 COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE

Computer science, particularly Artificial Intelligence (AI) and big data technologies, has undergone rapid development, making a significant impact on both society and industry in recent years.

Global ranking
As a world-leading university for technology advancement, **PolyU ranked 16th globally in Artificial Intelligence in the ShanghaiRanking's Global Ranking of Academic Subjects 2025,[41] 25th globally in Computer Science in the U.S. News & World Report Best Global Universities Rankings 2025-2026,[42] and 40th globally for Data Science and Artificial Intelligence,[43] and 11th in China for Mathematics by the QS World University Rankings by Subject 2025.[44]** The high achievement in world ranking is a result of both PolyU's research excellence in relevant fields, as well as its commitment to enhancing teaching facilities in response to the increasing demand for educating future talent.

41 ShanghaiRanking's Global Ranking of Academic Subjects 2025: Artificial Intelligence, https://www.shanghairanking.com/rankings/gras/2025/AS0229
42 U.S. News & World Report Best Global Universities Rankings 2025-2026: Computer Science, https://www.usnews.com/education/best-global-universities/computer-science
43 QS World University Rankings by Subject 2025: Data Science and Artificial Intelligence,
    https://www.topuniversities.com/university-subject-rankings/data-science-artificial-intelligence?search=hong%20kong
44 QS World University Rankings by Subject 2025: Mathematics, https://www.qschina.cn/en/university-rankings/university-subject-rankings/2025/mathematics

New Faculty of Computer and Mathematical Sciences

PolyU's Department of Data Science and Artificial Intelligence was established in July 2024 with a vision: To position PolyU as a regional and global leader in data science and AI. The Department's remit is to shape future innovators through immersive, interdisciplinary education and to advance impactful research in areas such as Machine Learning, Biometrics and Human Language Processing, Computer Vision and Graphics, Data Technologies and Governance, Statistical Learning and Optimisation Methods, and AI + X (Science, Healthcare, Neuroscience, etc.). It has already achieved high-ranking positions in global subject ranking, highlighting the Department's rise as a hub of excellence in research and innovation.

In January 2025, the Faculty of Computer and Mathematical Sciences (FCMS) was established as part of the University's response to increasing societal demands for the future workforce in the emerging area of AI and computer science. The Faculty comprises three departments: Department of Data Science and Artificial Intelligence, Department of Applied Mathematics and Department of Computing. This academic structure aims at promoting interdisciplinarity and collaboration between mathematics and computer science, which are both essential for advancing AI and big data technologies.

To meet the strategic objective, FCMS offers new curricula, including the Bachelor of Science (Honours) in Data Science and Artificial Intelligence from the 2025/26 academic year. Restructuring has also been undertaken in existing curricula, such as, the introduction of the Master of Science in Quantitative Finance and Fintech.

Scholarly output and impact

The establishment of FCMS reflects PolyU's strong growth in computer science and AI in recent years. Between 2020 and 2024, it consistently increased its publication footprint in computer science: a 123% increase in the number of publications and 77% increase in global presence (Figure 35). Having more than doubled its publications in this research area, this growth rate far exceeded the growth in Hong Kong, APAC and globally within the same period (Figure 36). By 2024, 26% of Hong Kong's computer science publications were affiliated with PolyU.
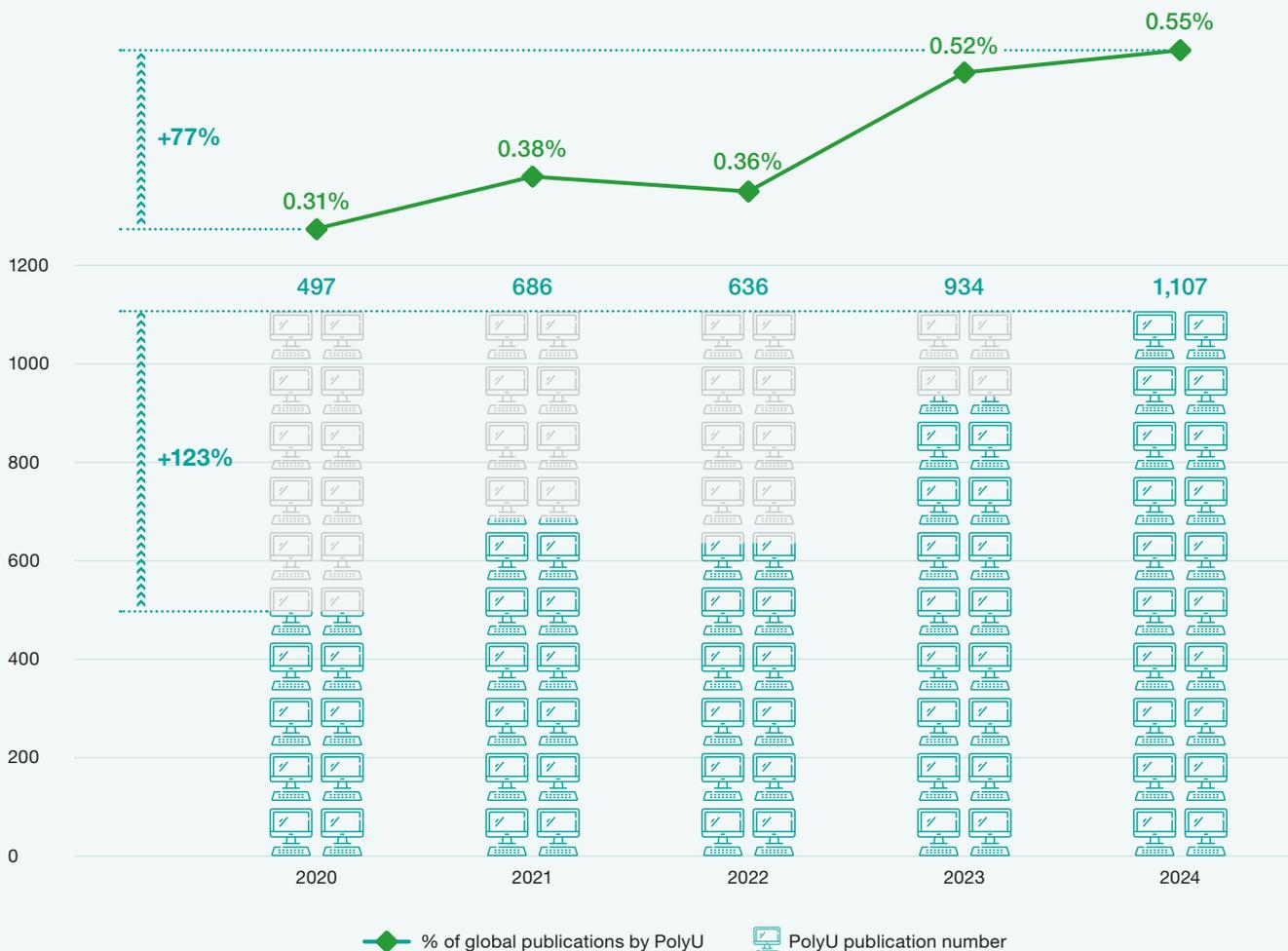

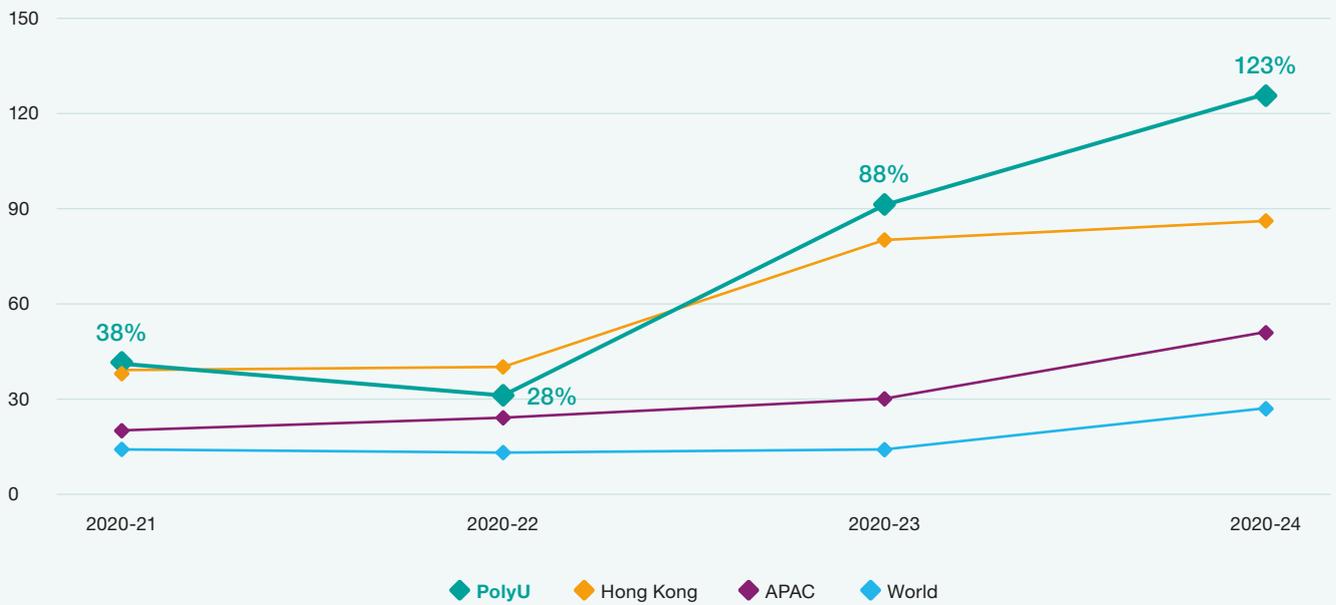*Figure 35. PolyU publication trends in computer science*

Figure 36. Cumulative growth of publications in computer science: PolyU, Hong Kong, APAC, and world

In addition to a high number of research outputs, PolyU's publications also demonstrated their high quality with consistent and accelerated growth in the number of Highly Cited Papers. The growth rate of 90% far surpassed that of Hong Kong, APAC and the global average (Figure 37).

Having doubled the number of publications achieving Top 1% globally by citations, the Top 1% publications affiliated with PolyU in computer science and AI also increased its global share by 173% (Figure 38).

Figure 37. Cumulative growth of Highly Cited Papers in computer science: PolyU, Hong Kong, APAC, and world
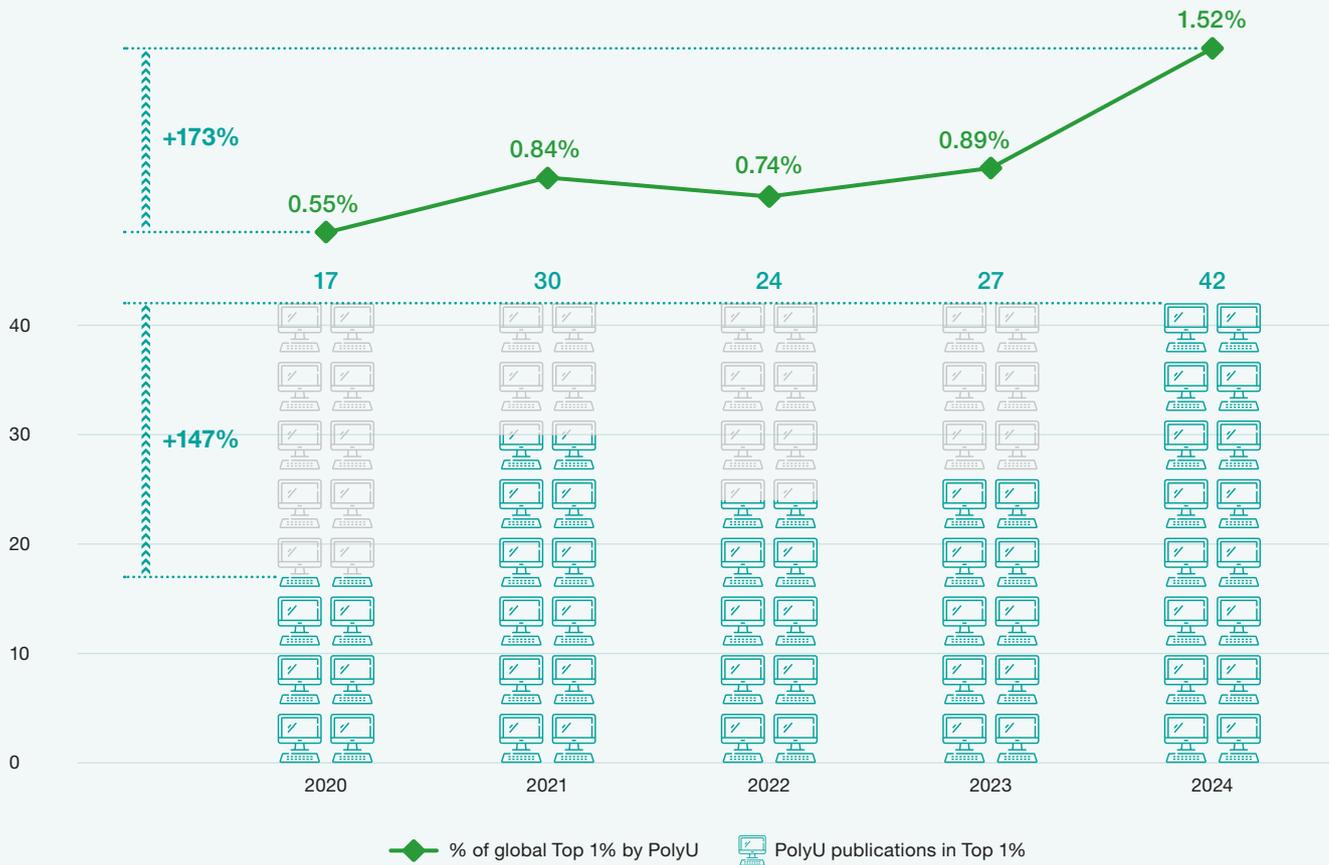
Figure 38. PolyU Top 1% publications in computer science

Top scholars

A growing community of world-class researchers pushing the boundaries of intelligent technologies and data-driven solutions is the driver of this rapid growth in scholarly output and impact. One of the leading women in technology, **Professor Hong-xia YANG**, Executive Director of the PolyU Academy for Artificial Intelligence (PAAI), Associate Dean of FCMS, was recently named by CoinDesk as one of the Top 50 Women in Web3 and AI for driving innovation and ethical frameworks in emerging technologies.[45] Professor YANG's experience spans industry and academia. Joining PolyU after being a leading AI scientist at Alibaba Academy for Discovery, Adventure, Momentum and Outlook (DAMO Academy) and ByteDance, she is an advocate of a decentralised approach to AI. Her innovative work enhances the accessibility and efficiency of large language models, facilitating the practical applications of AI across various industries, from healthcare to finance.

Professor YANG recently received a total of HKD 62.6 million in funding from the Research Grants Council's Theme-based Research Scheme 2025/26 for her pioneering project "Collaborative Generative AI (Co-GenAI)".[46] The Project aims to reduce AI development's reliance on massive centralised computational resources and limitations posed by GPU monopolies. Co-GenAI's architecture will bring over 90% resource saving and allow the use of ordinary computing resources to train large models by integrating small models, which will significantly enhance Hong Kong's competitiveness in AI technology. This model also enables more discipline-specific learning using industry and scientific data so that the AI can produce better output than open-source models – which addresses the current challenges of having limited internet data accessibility and the high cost of open-source models that AI can be trained on.[47] Facilitating wide implementation of this technology in

45 PolyU scholar named "Top 50 Women in Web3 & AI" by CoinDesk,
    https://www.polyu.edu.hk/rio/news/2025/20250613---polyu-scholar-named-top-50-women-in-web3-ai-by-coindesk/
46 Prof. YANG Hongxia Secures Theme-based RGC Funding for Groundbreaking Collaborative Generative AI Project,
    https://www.polyu.edu.hk/comp/news-and-events/news/2025/0711_yang-hongxia-rgc-fund/
47 PAIR Public Forum for Research and Innovation: Prof. YANG Hongxia of PolyU delivers "DeepSeek and Beyond",
    https://www.polyu.edu.hk/pair/news-and-events/upcoming-events/2025/3/20250311-pair-public-forum-on-deepseek-and-beyond/

the future, Professor YANG established collaboration with leading industry and healthcare partners, including Cyberport, Alibaba, and Hong Kong Science & Technology Parks Corporation, Huashan Hospital and Sun Yat-sen University Cancer Centre, for the training and testing of this model in different use cases. As the centre for this research, PAAI will serve as a decentralised Co-GenAI platform that fosters collaborative research and applications of GenAI across diverse fields, including urban energy, business transformation, smart manufacturing, robotics, intelligent clinical reasoning, grid modernisation, smart construction and smart materials.

In 2025, two out of nine Highly Cited Researchers in Hong Kong in Computer Science were affiliated with PolyU.[48] This reflects FCMS's global research excellence and its critical contributions to areas such as evolutionary computation, artificial intelligence and machine learning. Among them, **Professor John Lei ZHANG**, who is the Chair Professor of Computer Vision and Image Analysis of the Department of Computing, has been recognised as a Highly Cited Researcher for 11 consecutive years since 2015. He has 472 publications indexed in Web of Science, and his research has been cited over 64,000 times. **Professor Kay-chen TAN**, Chair Professor and Head of Computational Intelligence of the Department of Data Science and Artificial Intelligence, also stands out as a leading figure. His distinction not only affirms his personal impact but also underscores DSAI's leadership in shaping the future of data science and AI, both regionally and internationally.

To further strengthen PolyU's research capability in distributed artificial intelligence and data mining, **Professor Cheng-qi ZHANG** has been with DSAI since 2024. He is one of the Chinese Mainland's earliest researchers in artificial intelligence, with work in the field dating back to 1982. In 2024, he was elected Conference Chair for the International Joint Conference on Artificial Intelligence. Serving as the Director of the PolyU Shenzhen Research Institute (SZRI), Professor ZHANG brings a wealth of knowledge and expertise to the University, as well as strong leadership in nurturing the next generation of talent for technological advancement.

Societal impact

PolyU's strong development in computer science and AI lies in its dynamic cross-sector network. Close collaboration both within the University and with leading external research entities has strengthened PolyU's research capability and knowledge transfer. The results of successful external collaboration can be seen in the establishment of PAAI, the CITIC-PolyU Interdisciplinary Mathematical Digital AI Joint Laboratory (AIJLab), the Research Institute for Artificial Intelligence of Things (RIAIoT), the InnoHK Research Centres, the PolyU-Nanjing Technology and Innovation Research Institute, the Research Centre for Artificial Intelligence in Geomatics (RCAIG), the Research Centre for Data Science and Artificial Intelligence (RC-DSAI), and the University Research Facility in Big Data Analytics (UBDA). These strategic alliances foster cutting-edge innovation and accelerate the translation of research into real-world solutions, positioning PolyU at the forefront of smart, sustainable, and socially responsible AI development.

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48 Highly Cited Researchers 2025,
    https://clarivate.com/highly-cited-researchers/?action=clv_hcr_members_filter&clv-paged=1&clv-category=Computer%20Science&clv-institution=&clv-region=&clv-name=

In September 2025, PAAI jointly issued the "White Paper on AI-RAN (Artificial Intelligence for Radio Access Network) Commercial Outlook for Vertical Industries" with AsiaInfo Technologies Ltd, Intel Corporation, the Institute for AI Industry Research (AIR) at Tsinghua University and the Institute of Electrical and Electronics Engineers (IEEE). AI-RAN integrates communication, sensing, computing power and intelligence, which makes it the core evolution path for 6G. This white paper used scenario-driven quantitative modelling and assessed the commercial feasibility of Private AI-RAN. As the first report globally to systematically examine the strategic and commercial value of Private AI-RAN, this white paper shared an important direction for the future restructuring of global network infrastructure.[49]

Empowering innovations through interdisciplinary partnerships, PAAI drives innovation in healthcare with AI, medicine and engineering integration, and has attracted notable funding opportunities. 14 PolyU projects were awarded funding from the Collaborative Research Fund under the Research Grants Council in its 2024/25 exercise. This means PolyU ranked first in Hong Kong for both having the highest number of projects funded and the highest amount of funding received under this scheme.[50]

A recent PolyU AI-powered innovation that addresses pressing challenges in lung cancer treatment is LungRT Pro, developed by **Professor Jing CAI**, Professor and Head of the Department of Health Technology and Informatics. It is an advanced radiotherapy support system that harnesses AI techniques and automates the analysis of patient CT images without the need for contrast agents. With 3D visualisation capabilities, the lung ventilation and perfusion maps created can provide clinicians with a comprehensive visual representation of lung function. Beyond significantly enhancing accuracy and consistency, the mapping identifies high-functioning lung areas for clinicians to avoid when administering lung cancer radiotherapy. This approach can reduce radiation damage to patients' lungs and improve post-operative quality of life. CT images from hundreds of patients have been collected to train the AI system. It is currently being tested in clinical trials at multiple hospitals, both within Hong Kong and in the Chinese Mainland.[51]

Building on this research momentum, PolyU has also engaged in extensive knowledge translation in the field of computer science. Between 2020 and 2024, PolyU was granted a total of 291 patents in Computer and Control (Figure 39). This increase in patented inventions has strengthened confidence in PolyU's research capabilities and attracted key collaborative opportunities with leading industry partners.
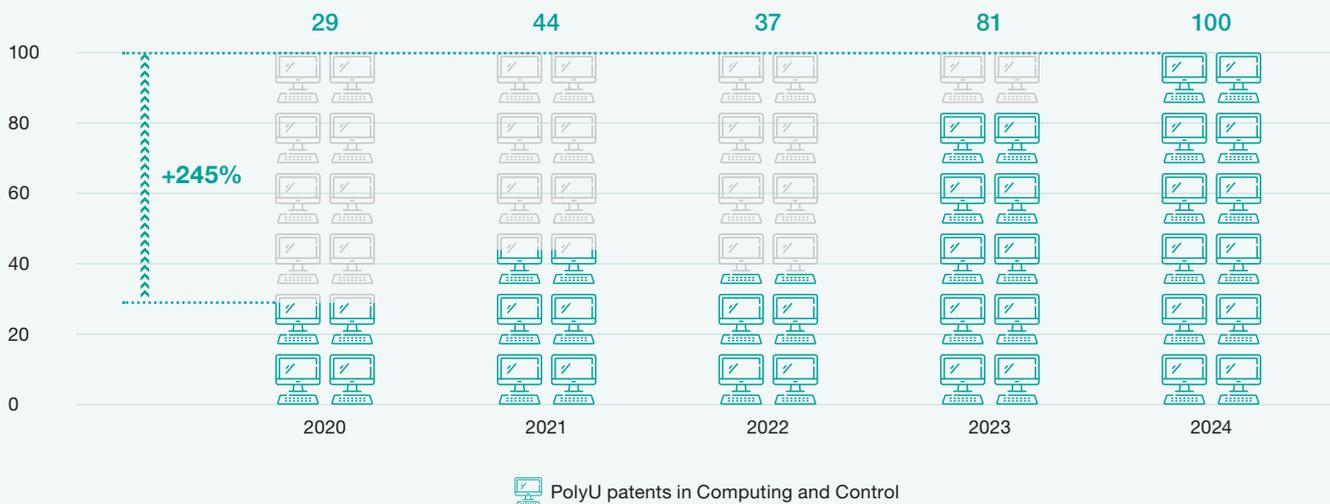

Figure 39. PolyU granted patents in Computer and Control

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49 Global First! AsiaInfo Technologies, Intel, Tsinghua AIR, HKPU and IEEE Release White Paper on AI-RAN Commercial Outlook for Vertical Industries,
   https://www.asiainfo.com/en_us/content_4955.html
50 PolyU's AI and medicine-engineering integration empowers a new era of medical excellence,
   https://www.polyu.edu.hk/pair/news-and-events/news/2025/20250428-polyus-ai-and-medicine-engineering-integration-empowers/
51 LungRT Pro: Advanced Radiotherapy Support System,
   https://www.polyu.edu.hk/kteo/knowledge-transfer/innovations-and-technologies/technology-search/award-winning/a202504_22/

Between 2020 and 2024, the percentage of PolyU affiliated publications in computer science and AI that were in collaboration with industry partners was nearly 10 percentage points higher than that of the global average. Some of PolyU's closest collaborative industry partners include Huawei, Microsoft, Amazon, Alibaba, Tencent and Google. Publications with industry were well cited and generated very high impact – the collaboration between PolyU and eBay achieved a CNCI that is 45 times higher than the global average. The University's collaborative efforts with industry partners have played a crucial role in facilitating knowledge transfer.

Professor De-feng SUN, Chair Professor of Applied Optimization and Operations Research and Head of the Department of Applied Mathematics, RGC Senior Research Fellow, whose pioneering optimisation algorithms have become the core decision-making engine of Huawei's global supply chain and enterprise systems, raising operational efficiency by 17%. Embedded in Huawei's commercial OptVerse AI Solver, these innovations generate substantial cost savings—amounting to hundreds of millions of RMB annually—and support industrial clients, including the Chinese Mainland's second-largest port, where ship dwell times have been reduced by 10%. In recognition of his contributions, Professor SUN has received prestigious awards from Huawei.

In the field of intelligent imaging, **Professor Qing LI**, Chair Professor of Data Science and Head, and **Professor John Lei ZHANG**, Chair Professor of Computer Vision and Image Analysis of the Department of Computing, have developed AI-powered enhancement technologies now integrated into globally marketed consumer electronics. Their collaboration with Da-Jiang Innovations Science and Technology Co., Ltd (DJI) led to the deployment of image super-resolution and adaptive 3D-LUT algorithms in Zenmuse H20N thermal cameras and the Mavic drone series. Meanwhile, its partnership with OPPO enabled the integration of its AI-driven image signal processing technologies into flagship smartphones, including the Find X6, X7 and X8, thereby elevating mobile photography to new standards of quality.

Together, these achievements highlight FCMS's role as a catalyst for breakthrough innovation. This demonstrates that FCMS continues to advance AI-driven solutions that respond to global and local challenges, delivering lasting societal impact.

3.3 OPTOMETRY

Established in 1978, the School of Optometry enhances global eye care by nurturing professional optometrists and advancing research in eye and vision care. To date, PolyU remains the only university in Hong Kong that offers optometry training. In 2024, PolyU launched the Doctor of Optometry programme, which blends advanced coursework with research. This initiative demonstrates PolyU's commitment to driving optometry advancement both clinically and academically.

Scholarly output and impact

Between 2020 and 2024, PolyU nearly tripled its number of publications in the field of optometry. By 2024,

publications affiliated with PolyU accounted for 40% of published output in Optometry in Hong Kong. This was paralleled by a 2.5-fold increase in PolyU's global presence in optometry (Figure 40).

While experiencing rapid growth in research output, PolyU also had a 110% increase in the number of optometry publications, achieving the Top 10% citation globally. In 2024, over 40% of Hong Kong's Top 10% publications in optometry were affiliated with PolyU. At the same time, the percentage of global Top 10% publications contributed by PolyU also had a 2.5-fold increase. PolyU's strong growth surpassed that of Hong Kong and the world (Figure 41).
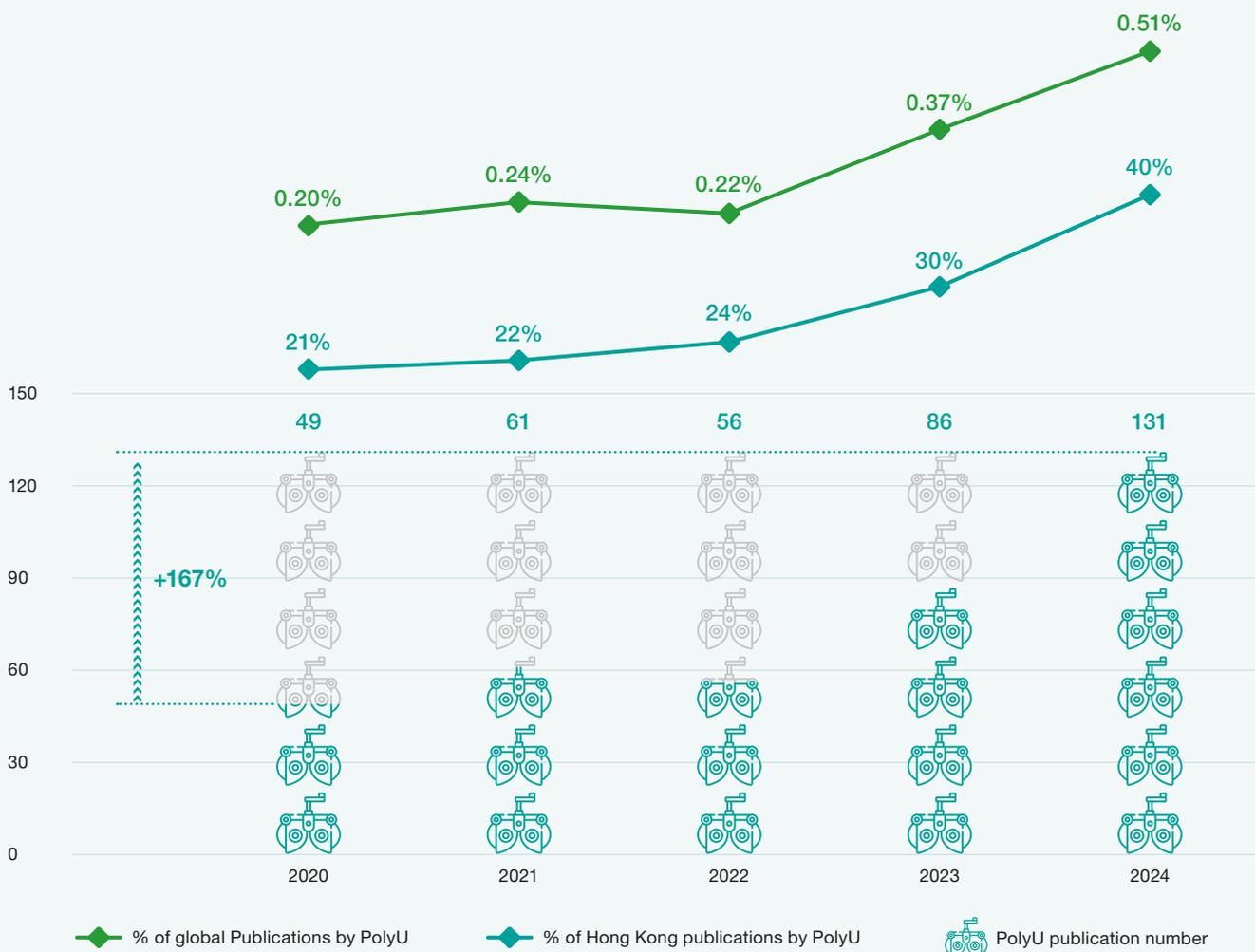

Figure 40. PolyU publication trends in optometry

Figure 41. PolyU Top 10% publications in optometry

Societal impact

The School of Optometry has consistently delivered impactful solutions that address pressing ophthalmic challenges. High myopia is more than needing stronger glasses – it poses serious risks of pathologic conditions such as myopic macular degeneration, retinal detachment, glaucoma, and cataracts, all of which can lead to irreversible vision loss. **Adjunct Professor Carly Siu-yin LAM**, **Visiting Chair Professor Chi-ho TO**, and **Associate Professor Dennis Yan-yin TSE** have developed therapeutic optical devices that slow myopia progression in school children. The patented Defocus Incorporated Soft Contact (DISC) lens and Defocus Incorporated Multiple Segments (DIMS) spectacle lens use a myopic-defocus method based on the eye's natural homeostatic mechanisms. This method produces a clear image on the retina while simultaneously creating a defocused image in front of the retina, enabling clear vision and helping to control myopia progression. Clinical trials have demonstrated that these lenses can slow myopia progression by up to 60%.

Interdisciplinary collaboration has driven prompt knowledge translation and generated significant societal impact. Institutions associated with the School, including the State Key Laboratory of Ultra-precision Machining Technology (SKL-UPMT), PolyU-Nanjing Technology and Innovation Research Institute, PolyU-Wuhan Technology and Innovation Research Institute, Research Centre for SHARP Vision (RCSV) and Centre for Eye and Vision Research (CEVR), all approach optometry problems with multidisciplinary input. For example, Professor LAM, Professor TO and Professor TSE developed the groundbreaking Nano Multi-ring Defocus Incorporated Spectacle Lens in collaboration with SKL-UPMT and one of its supported start-ups, Vision Science and Technology Co. Ltd. The research team translated DISC contact lens technology to spectacle lens production. The new spectacle lens provides added comfort and more stable vision, and its non-invasive design is well suited for children across different ages.

These devices, based on myopic-defocus technology, have been successfully commercialised and are now in use in Hong Kong and worldwide. From 2020 to 2024, the technology reached approximately 6.4 million users and is estimated to have reduced the risk of ocular complications in about 121,600 individuals.

Among the AI-powered innovations, "Seeing the Invisible: Generating Non-invasive Angiography as an Alternative to Invasive Retinal Examinations", a groundbreaking project led by **Professor Ming-guang HE**, Director of Research Centre for SHARP Vision (RCSV), Chair Professor of Experimental Ophthalmology, and **Dr Dan-li SHI**, Research Assistant Professor of the School, transforms the landscape of retinal imaging through artificial intelligence. Eliminating the need for contrast agents and specialised imaging equipment, its impact is especially profound in expanding access to diabetic retinopathy and retinal vascular screening in remote or underserved communities.

The School of Optometry and the Department of Computing also joined forces and used AI to improve accessibility for optometry examinations. STARS, a Smartphone AI Refraction System, was designed by RCSV members **Professor Chi-wai DO** and **Professor Grace NGAI**, Associate Professors of the School of Optometry and the Department of Computing respectively to provide early detection and simplified monitoring of myopia, lazy eye risks and strabismus for children. Building on more than 30,000 real-life clinical eye profiles, STARS transforms eye tests – from using bulky instruments to mobile phones. With an integrated, user-friendly, and multi-lingual interface, STARS brings affordable and accessible vision screening to underserved communities, especially those in rural and remote areas.[52]

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52 STARS: Smartphone AI Refraction System, https://www.polyu.edu.hk/kteo/knowledge-transfer/innovations-and-technologies/technology-search/award-winning/a202504_26/

3.4 BIOMEDICAL ENGINEERING AND REHABILITATION SCIENCES

PolyU's integration of engineering expertise in medical research and application is further reflected by work in biomedical engineering and rehabilitation sciences. Through dedicated efforts to address technical challenges in the biomedical context, Departments of Biomedical Engineering, Health Technology and Informatics, and Rehabilitation Sciences have collaborated to influence research and development in health promotion, health assessment, medical diagnosis, medical and surgical interventions, and rehabilitation.

Their collaborative efforts have played a pivotal role in several key inventions in rehabilitation engineering, prosthetics and orthotics, and medical imaging, positioning PolyU as a regional leader in advancing human health and well-being.

Scholarly output and impact

The continuous effort in driving research excellence has led to a 91% increase in the number of PolyU publications in the biomedical engineering field between 2020 and 2024. There has also been an 86% increase in global biomedical engineering publications that are affiliated with PolyU (Figure 42). The sharp increase experienced between 2022 and 2023 surpassed the growth rate for Hong Kong, APAC and globally, where PolyU continues to grow quickly in biomedical engineering, while APAC and the world both experienced a decrease in growth rate between 2022-2024 (Figure 43).
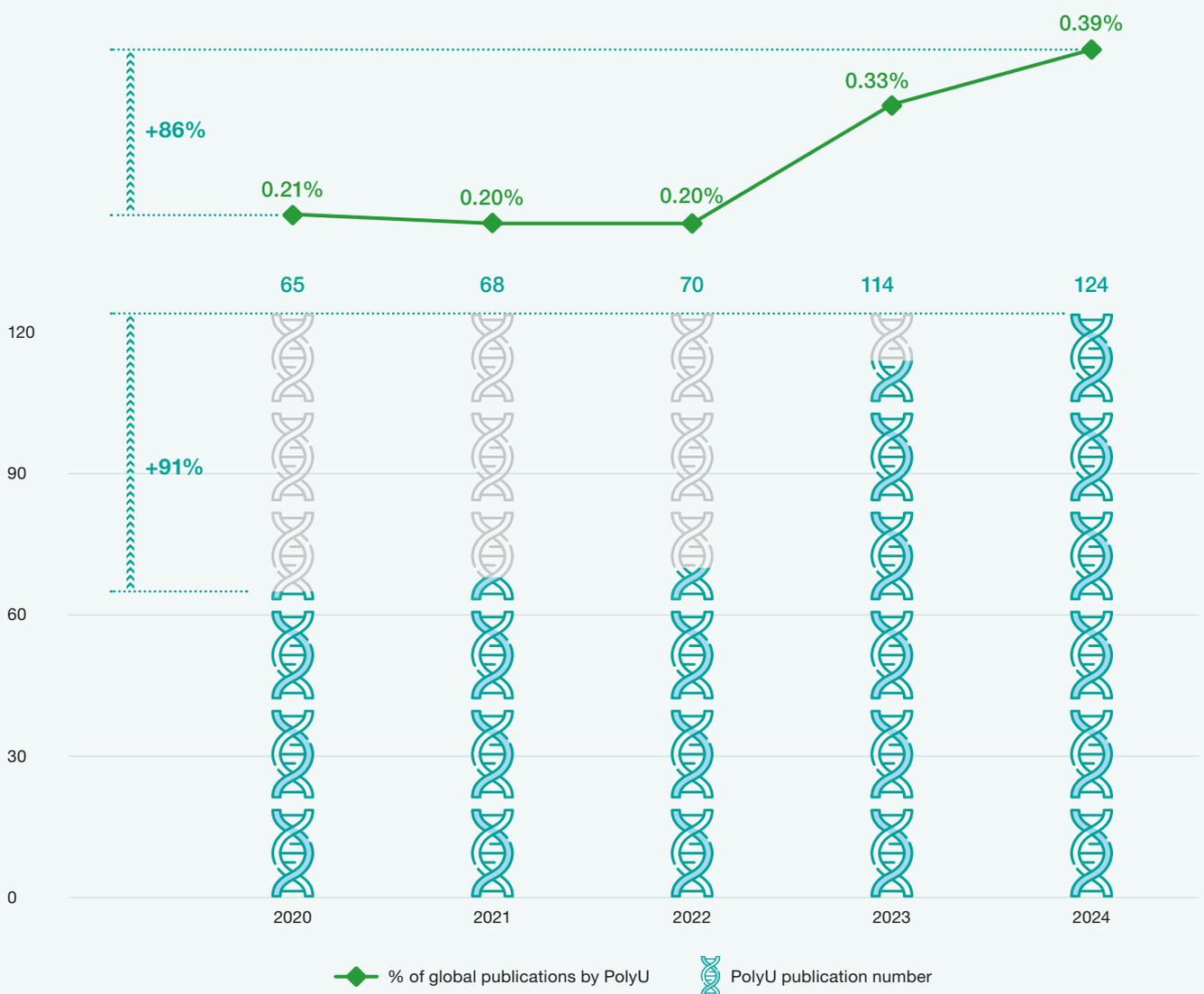

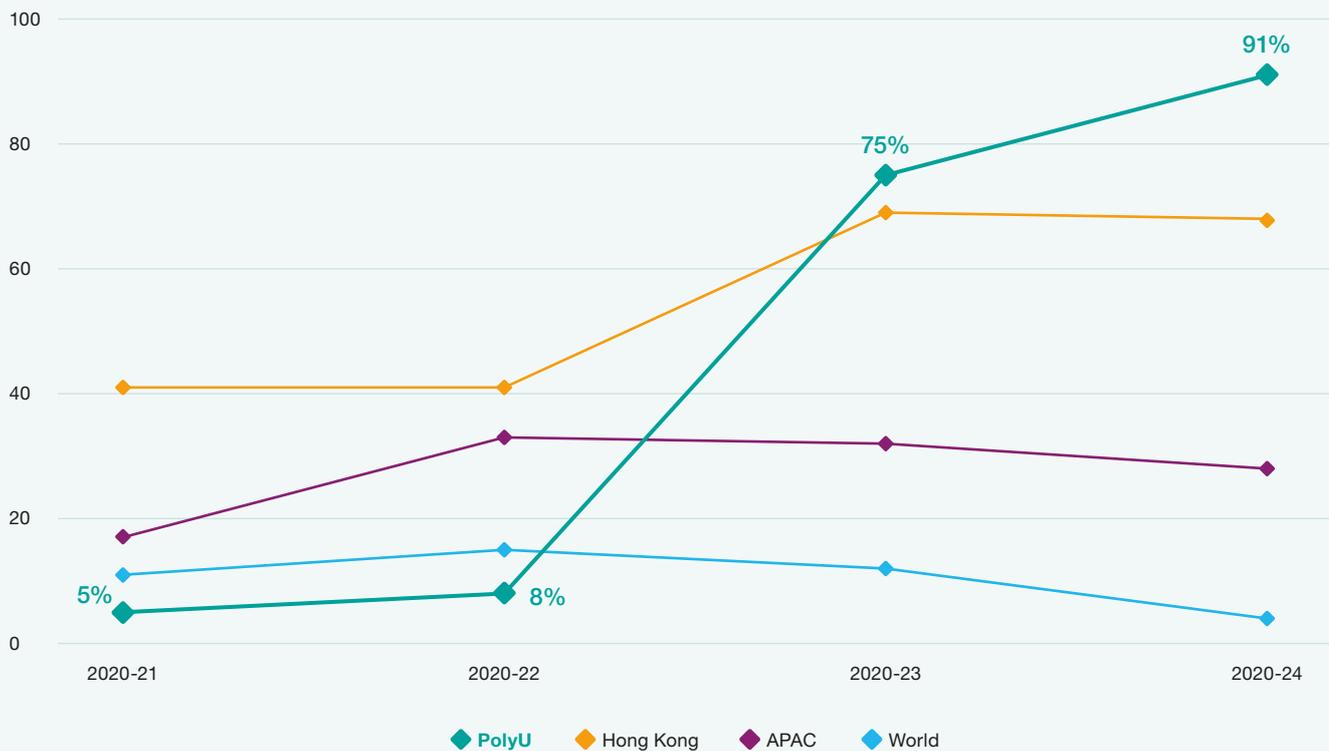*Figure 42. PolyU publications trends in biomedical engineering*

Figure 43. Cumulative growth of publications in biomedical engineering: PolyU, Hong Kong, APAC, and world

During the same period, PolyU's publications in rehabilitation sciences had a sharp rise in CNCI, doubling the world average in 2024 (Figure 44). Although the number of publications only experienced a modest increase of 13% (Figure 45), the significant increase in CNCI demonstrates the impact of the work in the field globally.
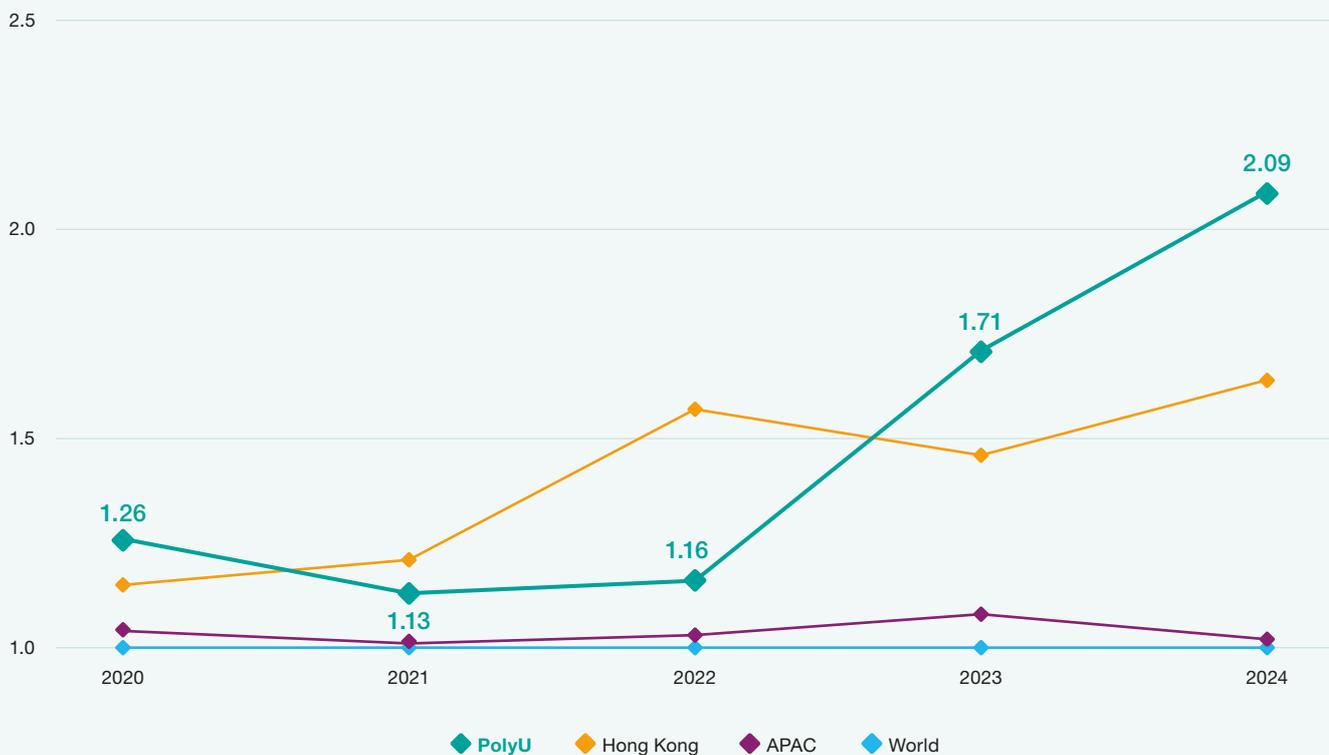

Figure 44. Category Normalized Citation Impact for publications in rehabilitation sciences: PolyU, Hong Kong, APAC, and world
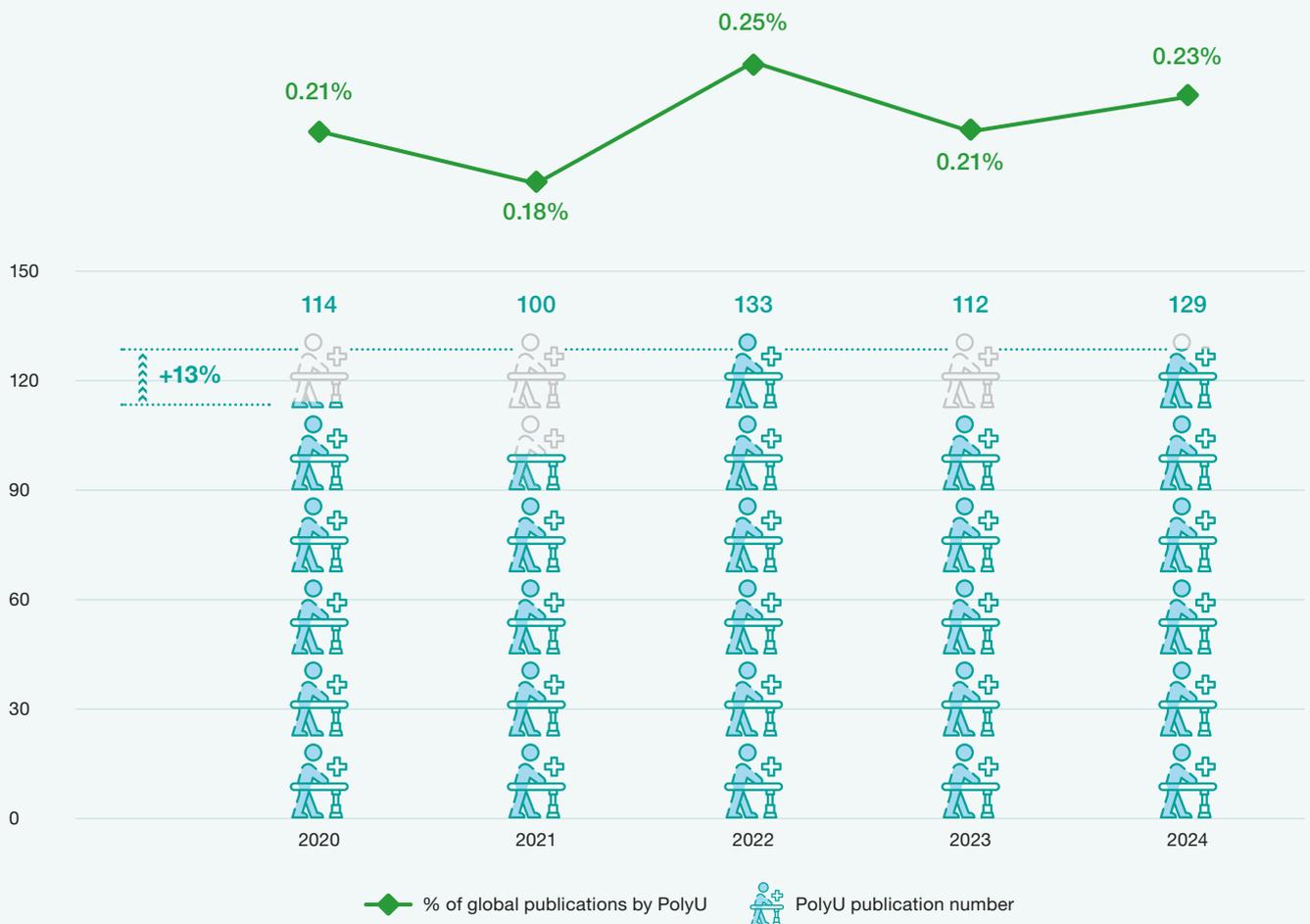
Figure 45. PolyU publication trends in rehabilitation sciences

Top scholars

Interdisciplinary effort is key to many medical research breakthroughs. **Professor An-qi QIU**, Director of the Mental Health Research Centre (MHRC), and Professor of the Department of Health Technology and Informatics, was recently recognised as one of the Top 50 Asia Women Tech Leaders 2025 for her interdisciplinary work.[53] Professor QIU's groundbreaking innovations utilise advanced neuroimaging, biomedical engineering and computational techniques to advance research in multiple areas. Her recent discovery of early brain development introduced critical reform in prenatal mental health screening. Her other influential work includes setting new field standards for MRI safety among paediatric patients using non-invasive imaging methods and uncovering the impact of obesity on cognitive health. Being an inspiring female STEM scholar, Professor QIU continues to empower the next generation of female STEM researchers.

Societal impact

Driving innovation to solve health problems with cutting-edge engineering technologies, **Ir Professor Yong-ping ZHENG**, Director of the Research Institute for Smart Ageing (RISA) and Chair Professor of the Department of Biomedical Engineering, received the Most Active Patents Filing Award in 2023.[54] Professor ZHENG's research focuses on diagnostic technologies. The radiation-free system, Scolioscan®, is a 3D ultrasound imaging technology for diagnosing Adolescent Idiopathic Scoliosis. Unlike traditional X-ray methods, this system utilises 3D ultrasound imaging to assess the lateral and rotational angles of the spine, allowing for frequent, safe and mobile monitoring – especially beneficial for children and adolescents. This device also leverages AI algorithms to improve accuracy of measurement and efficiency of diagnosis. Its portability and real-time imaging capabilities make it ideal for both clinical and community-based screening. The technology has earned multiple international accolades and is now successfully

53 PolyU scholar honoured among Top 50 Asia Women Tech Leaders 2025 for advancing mental health and brain research,
   https://www.polyu.edu.hk/rio/news/2025/20250519---polyu-scholar-honoured-among-top-50-asia-women-tech-leaders-2025/
54 PolyU BME and Ir Professor Yongping ZHENG receive PolyU Patents Achievement Award 2023 as Department and Inventor respectively,
   https://www.polyu.edu.hk/bme/news-and-events/news/2024/patent-award-2023/

commercialised and being adopted clinically worldwide. With the success of Scolioscan®, Professor ZHENG has developed Liverscan®, which uses AI technology to non-invasively assess multiple chronic hepatic diseases. This device has received approval from the U.S. Food and Drug Administration (FDA) and China's National Medical Products Administration (NMPA) and is currently being adopted in multiple clinical settings.

Interdisciplinary integration has also led to many other notable innovations. Among them, the Mobile Ankle-foot Exoneuromusculoskeleton, a wearable robotic device designed by **Professor Xiao-ling HU** of the Department of Biomedical Engineering, in collaboration with the Department of Computing and the School of Fashion and Textiles, earned the Consumer Electronics Show 2025 Innovation Award.[55] This device supports long-term home-based rehabilitation for stroke survivors to regain lower limb function. Sensory feedback, electric stimulation and the built-in incentive schemes can significantly reduce patients' reliance on in-person training, offering flexibility and cost efficiency.

Alongside its initiatives attracting international acclaim, PolyU develops solutions addressing pressing local challenges. **Professor Gilman Kit-hang SIU**, Associate Head of the Department of Health Technology and Informatics, and his team played a pivotal role in Hong Kong's response to the COVID-19 pandemic. A rapid whole-genome sequencing platform developed by the team enabled the sequencing of over 20,000 COVID-19 cases to track SARS-CoV-2 transmission in real-time. This platform was instrumental in identifying hidden transmission links, tracking sources of community and hospital outbreaks, and confirming that asymptomatic carriers could drive the spread of the disease. It also uncovered Hong Kong's first local Delta variant case, tracing its origin to inbound travellers. Their real-time genomic insights directly influenced public health policy, including the implementation of designated quarantine

hotels in December 2020. In addition to surveillance, Professor SIU's lab delivered on-site training at public hospitals, sharing sequencing protocols and bioinformatics tools. This enabled earlier diagnosis of acute invasive infections and allowed clinicians to initiate targeted antibiotic treatments a full day faster than when relying on traditional methods. His contributions not only helped contain the local spread of COVID-19 but also provided critical scientific support for Hong Kong's broader anti-pandemic strategy. In recognition, he was named a Limin Endowed Young Scholar in Medical Laboratory Science and received the Outstanding Project Team Award for COVID-19 Research.[56]

To address the increasing challenge presented by an ageing population, **Professor Xue BAI** of the Department of Applied Social Sciences, led a research team within the Research Centre for Gerontology and Family Studies (RCGFS) and developed a later-life planning intervention. Professor BAI's research revealed a significant lack of preparedness among older adults in Hong Kong, driven by fear, insecurity and low motivation to plan for ageing-related transitions. In response, her team designed evidence-based programmes, including motivational interviewing and intergenerational education, that have now been implemented in over 40 community centres across the city. This has reduced the risk of isolation, financial hardship and inadequate care amongst the elderly, while enhancing preparedness and quality of life for approximately 24,800 ageing families. The work has shaped public policy and sparked citywide dialogue on ageing, inspiring families and younger generations to take a proactive role in later-life preparation.

By turning research into practical and inclusive solutions, PolyU continues to create a positive impact across and beyond Hong Kong. These achievements reflect PolyU's commitment to transforming pioneering research into meaningful societal outcomes.

55 PolyU-invented Mobile Ankle-foot Exoneuromusculoskeleton wins CES 2025 Innovation Award in US,
    https://www.polyu.edu.hk/pair/news-and-events/news/2025/20250108-polyu-invented-mobile-ankle-foot-exoneuromusculoskeleton-wins-ces-2025/
56 Professor Gilman SIU bestowed with Outstanding PolyU Young Alumni Award 2022 in Scholarly Achievement,
    https://www.polyu.edu.hk/fhss/news-and-events/news-and-events/2022/20221031/

3.5 NURSING

Global ranking

Established in 1977, PolyU's School of Nursing was one of the first institutions in Hong Kong to offer nursing programmes. Recognising the need to provide education and career development opportunities, PolyU became the first institution in Hong Kong to offer comprehensive tertiary-level nursing education in 1990. Since then, the School has firmly established itself as a global leader in nursing education and research. In the **QS World University Rankings by Subject 2025, PolyU ranked 16th globally in Nursing, up from 31st in 2024.**[57] **This places PolyU as the second best nursing school in Hong Kong and third best in Asia**. This upward trajectory reflects its growing international influence and academic excellence. Complementing this success, **the School also**

ranked **19th globally in Nursing in the ShanghaiRanking's Global Ranking of Academic Subjects 2025,**[58] placing it among the Top 20 nursing schools worldwide and one of only three institutions in Asia to earn this distinction.

Scholarly output and impact

This global recognition is largely attributable to the School's strength in high-impact research, digital health innovation and interdisciplinary collaboration. Between 2020 and 2024, the School achieved a 52% increase in the number of publications in nursing. This surpasses the global growth rate for publications in this area, giving PolyU an over 31% increase in its global share (Figure 46).
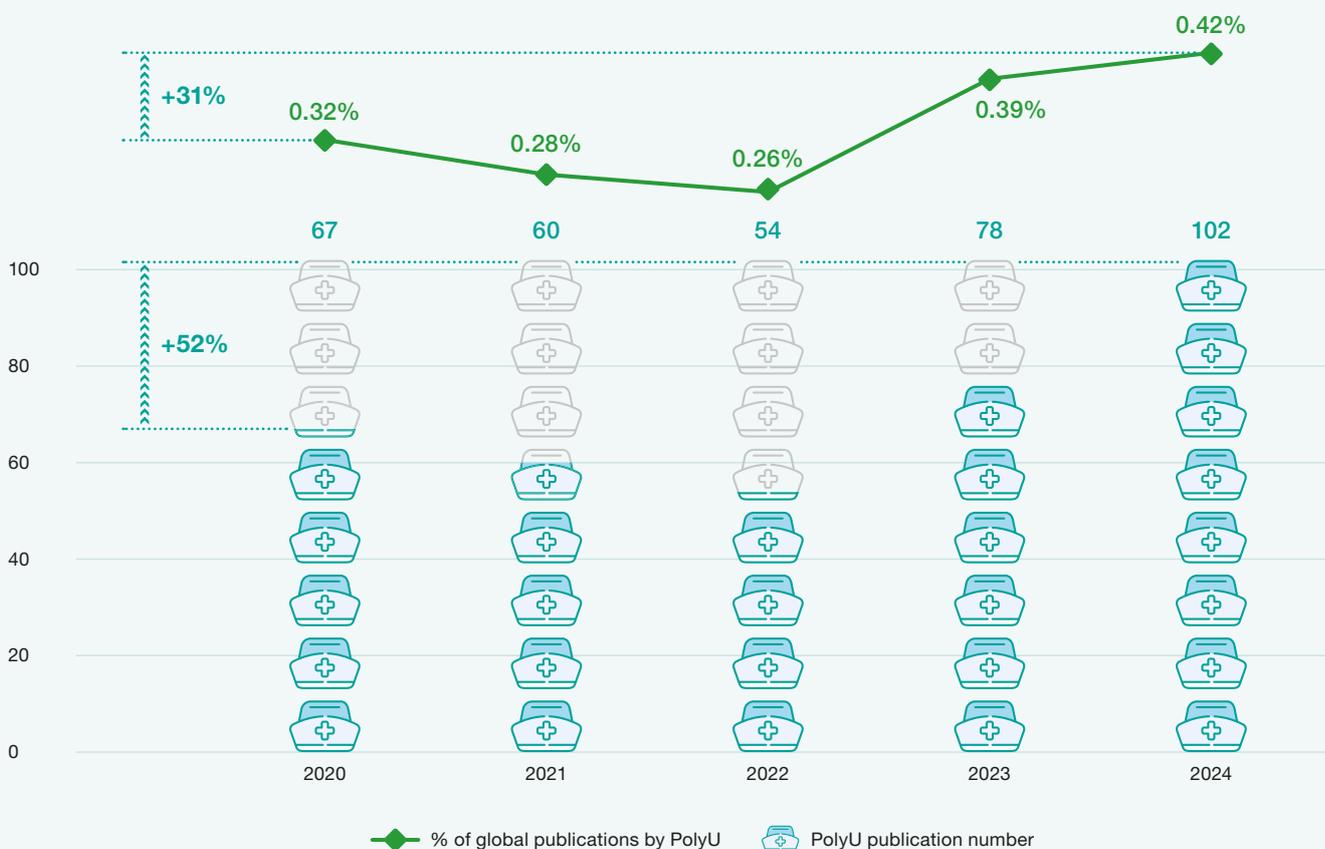
Figure 46. PolyU publication trends in nursing

Top scholars

The School hosts a diverse community of leading researchers whose work shapes healthcare policy, clinical practice and community well-being, both locally and globally. These scholars conduct research in critical areas, including mental health, ageing, chronic disease management and health systems innovation.

Among them, **Professor Teris Cheuk-chi CHEUNG**, Assistant Professor, who was recognised by the Clarivate Highly Cited Researchers 2024 list — an honour reserved

for scholars whose work ranks in the Top 1% worldwide by citations. With over 200 publications and over 9,000 citations, this recognition reflects her influential contributions to mental health research, particularly in areas that include depression, psychosocial well-being and youth mental health. Professor CHEUNG exemplifies the School's commitment to evidence-based excellence and meaningful societal impact. Her research continues to inform health practices and policy, reinforcing PolyU's role as a regional leader in nursing and health sciences innovation.

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57 QS World University Rankings by Subject 2025: Nursing, https://www.topuniversities.com/university-subject-rankings/nursing
58 ShanghaiRanking's Global Ranking of Academic Subjects 2025: Nursing, https://www.shanghairanking.com/rankings/gras/2025/AS0404

Societal impact

The School's vision in integrating technology, evidence-based practice and community relevance to create meaningful health outcomes, especially for ageing populations and cancer care, forms the foundation for many of its projects. Notable examples of these include the Immersive Virtual Reality (IVR) Motor-Cognitive Training System, developed by **Professor Justina Yat-wa LIU**, Associate Head of the School, which uses interactive virtual reality exercises to enhance physical and cognitive function in older adults.[59] Commercialised and adopted by local elderly service providers, it represents a model of successful research-to-practice translation.

The School's patient-centred approach and technology focus are also exemplified in a cancer care innovation led by **Professor Janelle YORKE**, Chair Professor and Head of the School. The invention introduced the electronic Patient-Reported Outcome Measures (ePROMs) in clinical settings. This digital tool captures patients' symptoms in real-time and improves clinician-patient communication, enabling more personalised, responsive care.[60] These people-centric innovations have impacted thousands of lives across Hong Kong, reinforcing the School's leadership in driving a healthier, more connected society.

In addition to its contributions to health innovation, PolyU makes significant contributions to social equity and family well-being. **Professor Edward Ko-ling CHAN**, RGC Senior Research Fellow and Chair Professor of Child and Family Welfare of the Department of Applied Social Sciences, led groundbreaking research on Family Polyvictimisation that has reshaped how family violence is identified and addressed in Hong Kong and the Chinese Mainland. His team developed whole-family risk assessment tools, now deployed across three Po Leung Kuk refuges for victims of family violence, enabling early prevention and strengthening risk assessment and case management for more than 9,000 women and children. Since 2022, Professor CHAN has trained over 1,500 health and social services practitioners in Shanghai, Zhengzhou, Sanya, Changsha and Qingdao, accelerating frontline adoption and impact.

Commissioned by the Labour and Welfare Bureau of the Government of the HKSAR, Professor CHAN also led a pivotal evaluation of the Child Development Fund. His evidence-based recommendations prompted increased government investment, expanding coverage to 10% of children from low-income families with enhanced financial assistance and supportive infrastructure to promote their development and safety.

Together, these initiatives illustrate how PolyU is not only advancing global standards in research and education but also delivering transformative, evidence-based solutions that address the real needs of the local community.

With its commitment to societal well-being, PolyU has developed meaningful healthcare solutions at both the individual and policy levels. PolyU will continue to shape the future of healthcare by integrating advanced computer science and artificial intelligence into medical research.

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59 IVR Motor-Cognitive Training System is commercialised, https://www.polyu.edu.hk/sn/news-and-events/features/2024/20241105/
60 Transforming nursing education through digital healthcare integration,
     https://www.polyu.edu.hk/publications/pulse-polyu/issue/202502/research-knowledge-transfer/transforming-nursing-education-through-digital-healthcare-integration