Philip Chiu – Dean of the Faculty of Medicine, Chinese University of Hong Kong (CUHK)

Our vision is to establish ourselves as the leading medical innovation hub in southern China, with our faculty playing a pivotal role.

24.07.2024

Tags: Hong Kong, China, Chinese University of Hong Kong, CUHK

A surgeon by training, Prof Philip Chiu is now dean of the Faculty of Medicine at the research-focused Chinese University of Hong Kong (CUHK). He shares the creation of CUHK's Multiscale Medical Robotics Centre and the robotic system for minimally invasive surgery developed there; CUHK's focus on translational medicine and initiatives such as the memorandum of understanding with Olympus to develop new medical devices, and outlines the strategies the university is employing to attract global talent.

Could you introduce your background as well as your current research and practice interests?

I am a surgeon by training, having graduated from the Faculty of Medicine at the Chinese University of Hong Kong in 1994, and have been specialized in upper GI surgery, focusing on the oesophagus and stomach, since 2001. Most of my work involves minimally invasive surgery, endoscopic and luminal surgery, and robotics. Throughout my career, I have introduced several innovative endoscopic technologies to Hong Kong, such as endoscopic submucosal dissection and peroral endoscopic myotomy.

I also collaborated with a Singapore start-up, EndoMaster, conducting the first clinical trial of a flexible robotics system in 2011. In 2021 we completed another clinical trial with EndoMaster’s new

system for colorectal endoscopic submucosal dissection.

In 2020, our institution received government funding through the InnoHK initiative, which allowed us to establish the Multiscale Medical Robotics Centre in collaboration with Professor Samuel Au, founder of Cornerstone Robotics. Our centre focuses on three main areas: endoluminal robotics, nanorobotics or magnetic guided robotics, and image guided robotics, with ten ongoing projects.

How has the robotics centre progressed since then?

At our centre, we have been collaborating with a start-up company called Cornerstone Robotics, founded by my engineering partner. He has been developing a robotic system for minimally invasive surgery, and this system has undergone multiple enhancements and upgrades through pre-clinical animal and cadaveric model trials at our Multiscale Medical Robotics Centre. Here, surgeons and engineers work together to refine the technology until it is suitable for clinical trials. In 2022, we started a clinical trial in Hong Kong, led by our team at the Faculty of Medicine and Prince of Wales Hospital, completing 55 cases with this new robotic system. In China, we have already completed 100 cases. Currently, the system is ready and awaiting approval from the regulatory body in mainland China, the NMPA. We are hopeful that by the end of this year, we will receive NMPA approval, allowing us to sell this new robotic system to hospitals for surgical procedures.

What are the endpoints for assessing whether this robotic surgery tool is effective?

Firstly, the robotic system must perform the surgical procedures safely, within a reasonable operative time, and efficiently without errors or malfunctions. Secondly, the feedback from surgeons is crucial; they need to believe that the performance is as good as, or even better than, current systems. Additionally, the system should be cost-effective, ideally lowering the price so that more patients can benefit from robotic surgery, thereby improving accessibility.

When assessing surgical outcomes, we look at robust metrics such as oncological clearance, operative time, blood loss, hospital stay, and post-operative pain scores. These hard facts can be achieved with both conventional and robotic minimally invasive approaches. However, the advantage of robotics lies in its performance in confined spaces within the body, allowing better surgical precision, such as suturing and reconstruction. For example, in prostatectomy, suturing the urinary tract post-resection in a confined area is much easier with a robot than with conventional

methods. This can be measured not only by operative time but also by the surgeon’s feedback.

What about the manufacturing process, given that Hong Kong does not possess extensive manufacturing capabilities?

From a global perspective, collaboration within the Greater Bay Area, including with cities like Shenzhen, is crucial. Hong Kong excels in medical innovation, boasting top-tier medical care and brilliant scholars. However, for manufacturing, we will leverage Shenzhen’s capabilities to keep costs low. While simple devices can be outsourced, complex medical devices like our robots, comprising 15,000 parts, require in-house manufacturing to maintain strict quality control and ensure perfect performance.

Can you explain your mandate as the dean of the medical school? What major changes or transformations do you have in mind?

My predecessor, Professor Francis Chan, did an excellent job over his 10-year tenure, elevating our faculty’s ranking to 28th in the world, first in Hong Kong, and second in Asia. Given our relatively short history of 43 years, this is a remarkable achievement. When I decided to take on this role, my main goal was to continue this great work and foster collaboration. As an alumnus and someone who has grown up here with a global perspective, I believe I am well-suited for this task.

Coming from an interdisciplinary background, I understand the importance of collaboration across specialties. I work with engineers within the university and have cross-faculty collaborations. Our InnoCentre partners include Imperial College, and Johns Hopkins University, giving us a global reach. My aim is to elevate our faculty to the top 20 in the world. To achieve this, we need to scale up by recruiting and retaining top talent globally. In simple terms, we want people to come to study in Hong Kong.

We have a global perspective and a conducive environment for development. Hong Kong is currently designated as an international innovation and technology hub, as outlined in our national five year plan. This presents numerous opportunities, especially in healthcare innovation and development.

While your institution’s status might be well-known within Hong Kong, how would you assess its global recognition at present?

We need to increase our visibility not only to attract international students but also to draw in scholars. Improving our global presence is crucial. To achieve this, we need to scale up our research teams, focusing on multidisciplinary efforts in cardiology and neuroscience. While our gastroenterology, hepatology, and surgery teams are already strong, we must also highlight the excellent work of our scientific team, including Professor Dennis Lo’s contributions to non-invasive diagnostics, and our oncology team.

Metabolic diseases and diabetes are also key areas of focus for us. To support these initiatives, the new teaching and research complex is targeted for completion in 2027. Moving forward, our focus will be on strengthening our GI research team, non-invasive diagnostics, oncology, and metabolic diseases. Additionally, we aim to expand our efforts in cardiovascular research and neuroscience, and to collaborate more with engineers on AI initiatives.

We often hear about the great academics and numerous publications coming out of Hong Kong, but how are the outputs evaluated, especially in translational science?

In Hong Kong, we emphasize translational medicine, turning scientific discoveries into clinical applications. Professor Dennis Lo is a prime example, translating his research into a clinical application and a successful startup. Our former dean, Professor Francis Chan, did similar work with his company Geneep, focusing on gut microbiome research. My work with robotic surgery is also nearing market readiness.

These examples demonstrate our commitment to high-impact research and its translation to clinical applications. Clinical trials are crucial, and we have numerous successful examples. For instance, I have collaborated with the medical device industry, signing a memorandum of understanding with Olympus to develop and trial new products. We have also worked with Intuitive Surgical on a multidisciplinary clinical trial for their single-site robotic system. Additionally, our researchers are involved in pioneering clinical trials for various robotic devices.

In pharma, we have significant experience in conducting drug trials. Our clinical trial centre, including phase I trials, facilitates these endeavours, ensuring we translate high-impact research into real-world medical advancements.

How do you envision scaling up from phase I trials to encompass the entire value chain of medical innovation?

Our vision is to establish ourselves as the leading medical innovation hub in southern China, with our faculty playing a pivotal role. While Hong Kong's patient base is limited, we leverage our robust electronic system utilized across 40 public hospitals under the Hospital Authority. This system provides comprehensive patient data, facilitating advanced research and academic pursuits. Although initially accessible primarily to academics, collaborations with companies are feasible, especially with data now available at Science Park. Furthermore, strategic partnerships with prominent hospital systems in southern China are crucial to accelerating patient recruitment for clinical trials, thereby advancing our initiatives across the entire medical innovation spectrum.

What role can CUHK play in boosting the level of hospitals in Hong Kong and across the Greater Bay Area?

Strategic collaboration is key. CUHK can offer training and services to enhance capabilities at these hospitals. It is a win-win situation where Hong Kong's international expertise complements China's growing strength in medical devices and pharmaceuticals. Internally, they can establish robust clinical trial frameworks compliant with NMPA regulations. For ventures outside China, Hong Kong serves as an ideal intermediary, facilitating partnerships between Chinese pharmaceutical firms and global markets.

How do you plan to address the need for new talent and incentivize existing experts to participate in clinical trials?

We have several strategies in place to recruit and retain talent. Firstly, our university has invested in a Principal Investigator (PI) scheme, providing dedicated funding to support researchers every year. We are also actively recruiting globally through initiatives like our global talent recruitment tours. Recently, we collaborated with the Hospital Authority to engage Hong Kong-born medical students studying abroad, encouraging them to return and contribute. Additionally, our global STEM professorship scheme has been instrumental in attracting international talent to Hong Kong.

Hong Kong's position within the Greater Bay Area presents a unique opportunity, backed by substantial government investment in innovation and technology infrastructure. This strategic focus, coupled with development initiatives across the region, enhances our capacity to lead and

collaborate effectively in clinical trials and medical research.

How do you view concerns that Hong Kong's national security law (Article 23) is impacting academic freedom?

Every country implements national security laws, and I personally do not feel threatened by Article 23 but rather see it as enhancing security and stability, which are crucial for societal and professional development. In my field of innovation and surgical technology, I have not encountered limitations that hinder my work or access to information. Maintaining a focus on professional advancement and contributing to technological development remains my priority, and I continue to have unrestricted access to resources and information necessary for my research and teaching activities.

How is the financing of your ambitious plans for medical innovation being managed?

Funding for our initiatives in medical innovation primarily comes from government investments and grants. Hong Kong's Hospital Authority receives substantial funding, which supports our clinical services. In our faculty, we also receive government funding to meet the increasing demand for medical professionals due to factors like an aging population.

Specifically, initiatives like the InnoHK funding have provided significant support, such as the USD 60 million allocated to our multi-scale medical robotics centre over five years. Looking ahead, we anticipate continued government support, including new schemes like RACE Plus, aimed at translating academic innovations into real-world applications like medical devices and pharmaceuticals.

What is your view of Hong Kong's role in global healthcare innovation?

As someone who has lived in Hong Kong for a long time, I have witnessed many economic and developmental changes. Despite the ups and downs, Hong Kong always finds a way forward. This resilience is partly because our city bridges the East and West, attracting a constant flow of talent. Even during challenging times, such as before 1997, people left but also returned, contributing to our continual growth. Today, I believe the way forward is through innovation and technology. I urge those looking for new opportunities to consider Hong Kong. There is a bright future here, and we

invite you to join us at the Faculty of Medicine at CUHK to achieve great things in healthcare innovation together.

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