Michael Yang â?? Head & Chair Professor of the Biomedical Sciences Department, City University of Hong Kong

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Prof. Michael Yang, an accomplished scientist and start-up expert, introduces the goals of the fast-growing Biomedical Sciences Department of City University Hong Kong. He unveils the contribution of Hong Kong to the Greater Bay Area in the biomedical field, while analyzing the key elements to change so the region can become a true biotech hub.

As the Founder and Head of the Department of Biomedical Sciences at the City University of Hong Kong, can you first introduce yourself and your distinguished academic career?

Like many in Hong Kong, I was not born here, but in China, where I received my college education in Xiamen â?? a beautiful coastal city. I then pursued my PhD education at the University of Toronto, Canada, and continued my postdoctoral training at Scripps Research Institute, in San Diego. I moved to Hong Kong in 1994 to join the City University â?? and I have been here ever since! This means I have witnessed the transition of this city â?? which I consider my home now â?? before and after its handover to China, thereby observing its fast transformation over the last twenty years.

My research has been focused on developing biochip technology and nanotechnology for biomedical research and clinical applications. Looking back at my career, I would characterize my profile as a â??start-up specialistâ?•.

On the academic side, my first start-up project was my laboratory that I built from scratch when I came to Hong Kong 23 years ago, where I have trained over thirty PhD students and numerous postdocs. My second start-up project is the Biotech and Health Center I helped establish in 2002 in CityUâ??s Shenzhen Research Institute, which is one of the first biotech research laboratories established in Shenzhen by the universities from Hong Kong. The Center has been supported by funding from the Shenzhen and Central Governments and been recognized by a number of awards for its applied research and technology transfer efforts.

Since 2014, I have been responsible for another â??start-upâ?? project: establishing the new academic department of biomedical sciences in City University. Together with seven founding faculty members, the department has rapidly grown to include thirty-two faculty members, 150 Ph.D. students, and more than 60 research staff. We are building up critical masses in the areas of cancer research, systems neuroscience, regenerative medicine, and microbiology and biotechnology. Our interdisciplinary expertise, collaborative culture, and open and friendly environment make the department one of the most dynamic biomedical programs in Hong Kong.

I am a stronger believer of the importance of translating research results into practical applications for the benefit of the society. I co-founded in 2004 my first biotech company, *Genetel,* in Shenzhen, focusing on developing a biochip product enabling early screening of cervical cancer. Our product received CFDA approval after three years of development and clinical trial, and *Genetel* was acquired by a large listed company in 2009. The company is still active in Shenzhen, where hundreds of thousands of women have benefited from using this product in China every year.

I then co-founded another start-up with a PhD graduate from my lab in 2010, *Prenetics*, in Hong Kong, which is the first biotech company admitted into the Hong Kong Science ParkÂ´s biotech incubation program. *Prenetics* is now the largest consumer genetic testing company in Hong Kong and Southeast Asia. In 2016, I co-founded another company, together with a colleague of mine, *Helitec*, based in Shenzhen, The company focuses on using the next generation sequencing technology for precision oncology.

What is the project that you are the proudest of?

It will be my next project! Actually I am working with three of my students to establish a start-up, called *Cellomics*, to be launched on the third quarter of this year. This project is based on our award-winning microfluidic technology, which we have been developing over the last ten years. It has been recognized by the National Natural Science Award in 2015 and the Wuxi AppTech Life Science and Chemistry Award in 2016. *Cellomics* is using the microfluidic technology platform to develop a series of innovative products for cell and biomolecular analysis.

What have been the key milestones and achievements of the Department of Biomedical Sciences?

Established in 2014, the department aims at becoming a leading center in education and research in selected areas of biomedical sciences. We first launched our PhD program in Biomedical Sciences in September 2014, including a joint PhD arrangement with Cornell University. We further developed two bachelorâ??s degrees in biomedical sciences, one focused on medical laboratory technologies, and the other one on research and biotech and pharmaceutical industry. We are now planning to launch a multidisciplinary masterâ??s degree in health sciences and management.

As mentioned earlier, we currently have 32 faculty members and 150 PhD students working in the department under the faculty members, plus another 60-70 postdoctoral fellows and research assistants. We have built up the infrastructure and core facilities for genomics and proteomics, imaging, histopathology, cytology, and an animal facility. Our expertise range from physiology and systems biology to molecular and cellular biology, down to biotechnology and nanotechnology, which enables multidisciplinary research and collaboration to understand the mechanisms of diseases, and to translate the discoveries into diagnostic and therapeutic solutions. With more than 50 ongoing projects, we are supported by over HKD 100 million of external funding: sources come from Hong Kong with the Research Grants Council, the Healthcare & Medical Research Fund and the Innovation Technology Fund, but also from the Central government in Beijing from the Ministry of Science and Technology (MOST) and the National Science Foundation, as well as from the Shenzhen municipal and Guangdong provincial governments. Additionally, we have established key partnerships with hospitals, such as Queen Elizabeth Hospital in Hong Kong, the PeopleÂ´s Hospital in Shenzhen, Nanfang Hospital in Guangzhou, and West China Hospital in Chengdu.

How would you describe the Biomedical Sciences landscape of Hong Kong within the Greater Bay Area?

Until recently, the biomedical research and the biotech industry have not been very strong in China, which has been recognized more for its manufacturing capabilities than its innovation components. However, this has been changing over the last ten years with the Chinese government investing

significantly into R&D and promote innovation and technology commercialization, the universities establishing biomedical research programs, and many local scientists and overseas returnees setting up many biotech companies in the areas of drug discovery and development, in vitro diagnostics, and medical devices.

Hong Kong, with some of the best universities in the region, does have very strong research capabilities in terms of biomedical sciences, both in academic and clinical research. As well, it has the ability to attract high level international talents. As mentioned, we have recruited 26 faculty members over the last four years, from the best universities and institutes in the world. Many of them are not from Hong Kong originally, yet they desire to come to work and settle in this city, because the similar systems and environment make the transition and adjustment seamless. Hong Kong is therefore well positioned in the Greater Bay Area ecosystem in terms of attracting international talents, carrying out cutting edge research, and translating the discoveries into innovative products.

What remains to be done for Hong Kong, and more generally the Greater Bay Area, to become the next international biotech hub?

There is still a tremendous gap between academic research and biotech development in Hong Kong. New discoveries and findings generated in and published by university laboratories need to be transferred to the industry in order to develop innovative technology and products for clinical applications. There are many reasons for the lack of a robust biotech industry in Hong Kong. Hong Kong governmentâ??s R&D expenditure is very low comparing to the surrounding cities and regions. The current evaluation or promotion systems in the universities mainly focus on publications only. There is a lack of early-stage investment for biotech, which is perceived as requiring longer term investment with high-risk among the investment community in Hong Kong while there are many other less risky, short-term investment opportunities. The high cost of real estate in Hong Kong is also making the setting up of biotech start-ups difficult.

I am pleased to see that in recent years Hong Kong is in the process of improving the above elements and building up its ecosystem of innovation with its discoveries and innovation capabilities. We are witnessing the development of infrastructures and expertise in the areas of knowledge transfer; a growing community of angel investors; an increasing talent pool of entrepreneurs, engineers, scientists, as well as some skilled manufacturers capable of converting basic discovery into innovative products.

The Greater Bay Area has most of the key ingredients to build a successful biotech industry. It may not reach the excellence level of the Silicon Valley until a few years later. That being said, I do not think we should try to copy the Silicon Valley; the Greater Bay Area needs to focus on developing its own ecosystem and uniqueness. In China and the region, the aging population, the rapid growth of the healthcare market, and the daunting challenges in the medical systems all present tremendous opportunities for biomedical research and biotech development.

What would be your final message on behalf of the Biomedical Sciences Department at CityU?

We have a very strong team of biomedical researchers that are producing the latest findings and great discoveries, many of which have huge potential for clinical applications. We are open to discuss partnership and collaboration with anyone interested in taking their promising new discoveries further, to contribute to improving the wellbeing and living standard of people. We also welcome anyone who is interesting in joining a dynamic and friendly environment to carry out

interdisciplinary and collaborative research to understand fundamental mechanisms of disease initiation and progression, to develop new diagnostic and therapeutic tools, and to translate new knowledge in biomedical sciences to healthcare, biotech, and pharmaceutical industries.

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