

A DECADE OF BIOMEDICAL INNOVATION

With an open environment for interdisciplinary growth, BIOPIC is nurturing a generation of scientists who take on world-leading biomedical research.

From single-molecule imaging to next-generation sequencing and gene editing, rapid advancement in biotechnologies has given scientists unprecedented tools to explore the secrets of life. BIOPIC, a technology-driven biomedical research centre at PKU is dedicated to both developing and applying the most advanced bioimaging and sequencing techniques to address fundamental biological and medical problems.

In just 10 years, BIOPIC has become globally recognized for its pioneering innovations, leading in single-molecular dynamic imaging, single-cell high-throughput sequencing, high-efficiency gene editing, and so forth. Underlying its success is a collaborative spirit, according to Xiaoliang Sunney Xie, BIOPIC's founding director. "We do not conduct investigations in a vacuum, but explore scientific questions in synergy," he says. "Cross-disciplinary collaboration has always been the force behind biology's ever-expanding frontiers."

Fostering interdisciplinary synergy

Within BIOPIC, Xie and his team of talented principal investigators (PIs) form a multidisciplinary group. While each lab remains highly independent, with complete freedom to define its own research interests and directions, researchers collaborate on several interconnected research themes, promoting mutual growth.

Error-correction code sequencing, for example,



Xiaoliang Sunney Xie (centre) and BIOPIC team

took seven years to develop from concept to laboratory prototyping. Using a specially designed algorithm, it enables error-free sequences on a large scale. The project was led by Yanyi Huang, whose research background ranges from chemistry, optics, to molecular biology. "It's fun when we can work together to achieve otherwise impossible results," Huang says. "It inspires even more meaningful collaborations beyond that of BIOPIC."

Such collaborations have led to medical successes from the birth of the first MALBAC baby in 2014 to the rapid identification of neutralizing antibodies against SARS-CoV-2 in 2020. The centre is continually pushing for original advances in the science and technology of bioimaging, sequencing and gene editing. At the crossroads of these is microfluidic control and analysis of single cells, which incorporates microfluidic technologies with

high-throughput studies of real-time microscopy, single cell genomics, and digital transcriptomics.

BIOPIC has also made significant impact to the biotechnology industry through its innovations. Successful technological transfers have been instrumental in the founding of six biotech startups by BIOPIC researchers, some of which have shown rapid growth and are now internationally recognized.

Institutionally, BIOPIC has established an international scientific advisory board of distinguished scientists, as part of its comprehensive and rigorous funding and advising processes. Peer evaluation is grounded in the impact and quality of research contributions, rather than mere metrics. Those who make the cut are provided with long-term research support, according to Fuchou Tang, who, like Huang, is also one of BIOPIC's first PIs,

having returned to China in 2010 from abroad. "We can afford to take on nascent, yet high-risk fields of study, and make mistakes," says Tang.

BIOPIC's diverse and open environment, cutting-edge research opportunities, and state-of-the-art facilities also provide a fertile ground for a future generation of scientists. From undergraduates to postdocs, many young researchers have been trained here. Nearly 20 BIOPIC alumni are now faculty members, heading labs worldwide from PKU and Tsinghua University to University of California, Berkeley.

"BIOPIC is founded with the vision and philosophy of driving the advancement of life science through breakthroughs in technology," says Xie. "We have kept to that vision in the past 10 years, and will continue breaking through barriers to advance scientific knowledge through the cross-integration of multiple disciplines." ■