The "Spring of Science" Fulfilled My Scientific Dream: Postprint

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Abstract

Full Text

The Spring of Science: A Personal Reflection

A Transformative Moment in 1978

March 1978 remains deeply etched in my memory, particularly for two momentous events. The first was the commencement of our "Class of '77" university studies—a whole new world awaiting us. The second was the convening of the National Science Conference, where Comrade Deng Xiaoping articulated the seminal thesis that "science and technology are productive forces," laying the foundation for China's strategies of revitalizing the nation through science, education, and human resource development. At the conference's closing ceremony, Comrade Guo Moruo, then President of the Chinese Academy of Sciences (CAS), delivered his iconic written address "The Spring of Science," heralding the arrival of a new era for Chinese science. These firsthand experiences cemented my lifelong commitment to dedicating myself to our nation's scientific enterprise.

The "Spring of Science" unfolded in tandem with the Reform and Opening-Up policy. Over the past four decades, Chinese society has unleashed tremendous vitality, providing boundless opportunities for individuals to realize their dreams. Particularly in the reports of the 18th and 19th National Congresses, General Secretary Xi Jinping repeatedly invoked the "Chinese Dream" and the "great rejuvenation of the Chinese nation." As we pursue these aspirations, reflecting on our 40-year journey reveals how the Reform and Opening-Up era represents not merely our shared experience but a history of growing alongside our motherland. Every individual's "Chinese Dream" is inextricably linked to the nation's destiny and the spirit of the times, offering each citizen "the opportunity to grow and progress together with our country and our era." While everyone yearns for

success and harbors their own personal dream, it is the convergence of countless individual dreams that culminates in the magnificent "Chinese Dream."

As an ordinary science and technology worker who journeyed from an educated youth in the countryside to a university student, then a graduate student, and ultimately a scientist, I have personally witnessed how national development has enabled the fulfillment of our individual aspirations—validating the profound truth that "when the country prospers and the nation thrives, everyone benefits."

Personal Journey: From Educated Youth to Scientist

I was among the first cohort of university students following the downfall of the "Gang of Four." The "Spring of Science" inspired my determination to become a scientist. Upon graduating in 1982, I immediately joined the faculty, and my university selected me for an overseas training program. During this period, I successfully entered the master's program at Beijing Agricultural University (now China Agricultural University), subsequently earning admission to the PhD program at CAS. After completing my doctorate in 1990, I remained at the CAS Institute of Zoology, and within a year was exceptionally promoted to associate professor. Following a year of advanced study abroad, I was exceptionally promoted to full professor at age 36 in 1995. From that moment, I had my own laboratory and research team, finally able to pursue scientific investigations aligned with national needs and personal interests.

While many attribute individual success solely to personal endeavor and talent, my experience has taught me that without the call of the "Spring of Science," without the nation's Reform and Opening-Up, and without China's rapid economic growth, I could never have achieved such scientific accomplishments nor realized my scientific dreams.

National Development and Scientific Funding

China's economic trajectory since the Reform and Opening-Up has been remarkable. In 1980, our gross domestic product (GDP) was merely 454.6 billion yuan. Although it grew steadily, by 2002 China's GDP had reached 12 trillion yuan—still only equivalent to 10% of the United States' economy. Within the subsequent decade, by 2012, our GDP had quadrupled, reaching 50% of America's, and today China stands as the world's second-largest economy.

Correspondingly, national investment in science and technology has grown substantially. In 1990, total national R&D expenditure was just 12.5 billion yuan; by 1998, it had risen to 55.1 billion yuan, representing a mere 0.69% of GDP. In recent years, however, both funding and personnel investment have increased dramatically. Between 1998 and 2008, China's R&D expenditure as a share of GDP rose from 0.7% to 1.5%, while the number of researchers grew at an annual rate of 12.6%—the fastest in the world. By 2014, China's total scientific and technical human resources reached 76.21 million, ranking first globally. In 2017, total R&D investment reached 1.75 trillion yuan, an 11.6% increase from the

previous year, with R&D expenditure accounting for 2.12% of GDP—placing China second worldwide.

These investments have effectively promoted scientific activities in China, laying a crucial foundation for sustained, healthy socioeconomic development. Without rapid national economic growth and continuously increasing investment in science and technology, there would be no sustained, rapid development of national scientific strength, nor would there be individual career success for scientists like us.

Achievements and International Recognition

Supported by these national funds, our research team has become a world leader in the molecular mechanisms of animal aggregation and epigenetic regulation, publishing over 160 papers in international academic journals. I have been recognized as a highly cited scientist in agriculture and biology by Elsevier, receiving numerous honors including the CAS Natural Science Award (First Class) in 1997 and the National Natural Science Award (Third Class) in 1999. In 1999, I was designated a Young and Middle-Aged Expert with Outstanding Contributions to the Nation, and later received the Ho Leung Ho Lee Prize for Scientific and Technological Progress in 2011 and the Tan Jiazhen Life Science Achievement Award in 2015.

My scientific work has also gained international recognition. I was elected Executive Councilor of the International Society of Entomology in 2003, received an Honorary Doctorate of Science from the University of Nebraska in 2009, and was elected a Fellow of the Entomological Society of America in 2012. I was elected to the Chinese Academy of Sciences in 2011, The World Academy of Sciences in 2012, and the International Eurasian Academy of Sciences in 2017. In 2017, I received the National Natural Science Award (Second Class) and the CAS Outstanding Achievement Award.

Overall, China's life sciences and biotechnology currently rank in the international second tier, with some specialized areas achieving world-leading positions. I take immense pride in contributing to the development of life sciences and technology in our country.

The Indispensable Role of National Support

A scientist can only grow through integration with societal development. During my PhD studies at CAS in 1987, our research group subsisted on a mere 35,000 yuan from the National Natural Science Foundation's general program—barely enough to sustain any meaningful scientific investigation. Upon returning from the United States in 1994, I secured a single general program grant of 45,000 yuan. By 1997, after three to four years of effort, I had successfully obtained over 3 million yuan in research funding from various national channels. Reflecting on this journey, over the past two decades since 1995, I have secured more than 13 million yuan from the National Natural Science Foundation alone,

including youth grants, general programs, key programs, Outstanding Young Scientist awards, innovation team projects, and major international cooperation projects. Through the Ministry of Science and Technology, I have led key research projects, "863" projects, and transgenic special projects, serving as chief scientist for two "973" programs. During my 30 years at CAS, I have witnessed how the "Spring of Science" has provided the stage and opportunities for scientific and technological workers, with science and technology contributing increasingly to socioeconomic development.

Consider this: without our nation's economic development and Reform and Opening-Up, without massive state investment in research, how could I have achieved what I have today? From the perspective of modern life sciences research, a scientist without funding can neither do nor even conceive anything. Without national development, there can be no individual development. Many scientists who are now founders of their disciplines returned to China before the founding of the People's Republic with patriotic aspirations, yet lacking adequate research funding, they could only teach, train students, translate texts, and establish preliminary disciplines and institutions. It was not for lack of capability, but because the nation was poor and backward, lacking conditions and research funding. Even after New China's founding, achievements like the "Two Bombs, One Satellite" required mobilizing national resources. Only after Reform and Opening-Up did the state continuously increase investment in science and technology, providing the stage and development opportunities for researchers.

Seizing the Historic Opportunity

Forty years have passed in the blink of an eye. We now find ourselves in an unprecedented period of development opportunities that we must cherish. As President Xi Jinping stated: "We are closer than at any time in history to achieving the goal of the great rejuvenation of the Chinese nation, and we have greater confidence and capability than at any time in history to achieve this goal." As scientific and technological workers, we must fully utilize these conditions to develop our nation's science and technology, combining our intelligence and talents with national needs to make greater contributions to China's socioeconomic development and human progress.

About the Author

Academician of the Chinese Academy of Sciences, Fellow of The World Academy of Sciences, Fellow of the International Eurasian Academy of Sciences, Distinguished Professor at the Institute of Zoology, Chinese Academy of Sciences, renowned ecologist and entomologist in China. Currently serves as President of Hebei University, Dean of the Beijing Institute of Life Sciences (CAS), Dean of the School of Life Sciences at the University of Chinese Academy of Sciences, and Deputy Director of the Academic Degrees Committee of the University of

Chinese Academy of Sciences. His long-term research focuses on ecological genomics, establishing him as a leading international scientist in this field, chief scientist of national "973" programs, and academic leader of innovation teams funded by the National Natural Science Foundation. He serves as editor-in-chief and editorial board member of multiple important international academic journals. In 2008, he was elected Executive Councilor of the International Society of Entomology; in 2009, he received an Honorary Doctorate of Science from the University of Nebraska; in 2011, he received the Ho Leung Ho Lee Prize for Life Science and Technology Progress; in 2013, he received the Distinguished Scientist Award from the Entomological Society of America; in 2015, he was elected a Fellow of the Entomological Society of America and received the Eighth Tan Jiazhen Life Science Achievement Award; in 2017, he received the National Natural Science Award (Second Class) and the CAS Outstanding Achievement Award.

Note: Figure translations are in progress. See original paper for figures.