TEN-THOUSAND TALENTS PROGRAM

Chasing goals beyond a Nobel Prize

Editor's note: *The Ten-Thousand Talents Program aims to eliminate bureaucracy involving scientific research and provide more funding to cultivate scientists in China. The 10-year program is expected to select 10,000 of the brightest minds to lay a solid foundation for the country's development of science and technology. They are considered Chinese hopefuls for a Nobel Prize in natural sciences. We invited four top scientists to talk about their personal ambitions and their opinions of China's likelihood of winning the Nobel Prize.*

Q1: How are you planning to use the funding and resources granted by the project?

Q2: Why were you chosen?

Q3: Why does China need a Nobel Prize in natural sciences?

LIU ZHONGFAN, MEMBER OF THE CHINESE ACADEMY OF SCIENCES, SPECIALIZING IN CHEMISTRY AND MOLECULAR ENGINEERING

A1 I am not short of finance for research, but bigger goals require considerable investment.

To briefly explain: I want to explore new carbon materials and I plan to develop preparation methods we have tested in the laboratory for a pilot program or even on an industrial scale. We have created so many new materials that are performing excellently. It is such a huge waste simply storing them in a laboratory.

Meanwhile, the other problem is the inflexibility of funding under the current management system. For example, I recruited two post-doctoral fellows from India this year, but the fund management authority did not allow me to take out 160,000 yuan ($26,270) each from my research funds to add to their salary. That is why the best Chinese students are going to foreign laboratories, while domestic laboratories have trouble hiring top-class research fellows.

As a result, I am looking forward to the exceptional talents program giving greater funding flexibility to researchers.

A2 I am not sure about the reason, maybe I was lucky. What I know is that I have been working on the frontline of scientific research since I returned to China (from Japan) in 1993, and I have been doing research that I am passionate about for three decades.

I also request this of my team members — do research based on interest. I guess it is the research culture in my team that ensures team members are passionate about their research field. We have completed meaningful work and cultivated excellent students.

So, as to why I was chosen, it may be due to cultivating a culture of research.

A3 There is such a vast population engaged in scientific research in China that, on the law of averages, we are surely going to win the prize some day. Continuously not winning may suggest that we have little creativity.

Nevertheless, it does not mean our research capacity is robust if we win one or two Nobel Prizes. World famous research institutes get batches of Nobel Prizes because they initiate a tradition of free exploration, not just a focus on one area.

In China the research culture is too utilitarian, so we decided to evaluate a researcher's contribution by counting the impact factor of papers he or she published. If the scientific evaluation mechanism does not allow free exploration, it means nothing, even if we have a couple of Nobel Prizes.

LU KE, MEMBER OF THE CHINESE ACADEMY OF SCIENCES, SPECIALIZING IN NANO-METALLIC MATERIALS AND METASTABLE MATERIALS

A1 I have to say that I have few details. It seems that the media and the outside world know more about it than I do.

I received an e-mail from a friend in the United States and he congratulated me on getting my own scientific studio, which is part of the program.

But the truth is that, so far, no funding conditions have been published; all the information about funding I have heard through the grapevine. I have not received a cent.

So, I guess I should take the program as an honor. But for me, I conduct scientific research for knowledge, not for honor, so this kind of honor does not really encourage me.

A2 The whole program, so far, seems to honor scientists and classifies scientists into different levels. Yet, I have not been informed as to the reasons I was chosen, nor am I aware of what I am supposed to do after being chosen.

I appeal for publishing more program details to scientists in the future, or any new program or project will just cause more confusion.

A3 I prefer not to talk too much about Nobel Prizes, because I was not interested in chasing the prize in the past, and I am not interested in chasing it in the future.

A Nobel Prize in the natural sciences is an honor for any scientist, as well as a form of recognition for research development. But scientific research and advancement is not necessarily oriented to winning the Nobel Prize. For example, Sir Isaac Newton never won a Nobel Prize, but who can deny his contribution to science?

Furthermore, there are plenty of examples of technological advancements that benefited from fundamental research, which the Nobel Prize does not cover. South Korea, like China, has never had a Nobel Prize winner in the natural sciences, but few would doubt that Samsung is a successful high-tech company.

I would be happy if there were Nobel Prize winners from China, but I strongly disagree with using the Nobel Prize alone to judge science and technology development.

WANG YIFANG, DIRECTOR OF INSTITUTE OF HIGH ENERGY PHYSICS AT THE CHINESE ACADEMY OF SCIENCES, SPECIALIZING IN NEUTRINO EXPERIMENTS, PROTON DECAY AND DARK MATTER SEARCHES

A1 In the three major research directions of high-energy physics in China — neutrino physics, hadron physics at the Beijing Electron Positron Collider and the high energy frontier — the second and the third need more financial support.

Current support is not enough since we have a team of 200 to 300 people at BEPC.

As for the high-energy frontier, our own infrastructure is completely blank.

The world's largest and most powerful particle accelerator is at the European Organization for Nuclear Research, which has a circumference of 27 kilometers, while that of the BEPC is only 240 meters.

If we are pursuing greater status in international high-energy physics competition, we need better infrastructure and foremost, greater support.

A2 The Ten-Thousand Talents Program plans to provide ample financial support. It shows that the government wants to give more freedom to scientific research.

So, from the perspective of administrators, I believe they were looking for someone who can maximize the value of the funds. My work at the Daya Bay Neutrino Experiment, the discovery of a new type of neutrino oscillation, might suggest to them that I am such a person. Of course, the right direction for research is needed first.

A3 I do not think the Ten-Thousand Talents Program has anything to do with the Nobel Prize; this is purely media hype.

I understand why the general public is eager for a Nobel Prize — we have invested heavily in science recently, it is reasonable for taxpayers to expect some form of return.

Public expectation, however, should recognize the entire Chinese science community, instead of focusing on individuals.

Scientists carry out research to solve important problems. We often don't know in advance what we will get and we will never know whether the Nobel committee will like the result or not.

Every scientist hopes to achieve notable success in his or her specialized field, but it is often very hard to know its significance before we work on it.

ZHOU ZHONGHE, MEMBER OF THE CHINESE ACADEMY OF SCIENCES, SPECIALIZING IN PALEONTOLOGY AND PALEO-ORNITHOLOGY

A1 The Ten-Thousand Talents Program plans to grant stable financial support. Although details for fund appropriation have not been published, relative administrative departments are already communicating about it.

To be specific, I expect to introduce new expertise, especially those with an education background in biology, into my team, and to expand my team's research field. My team will be comprised of three related research groups.

The first group will focus on early vertebrate evolution and investigate such key evolutionary issues as the origin of jaws, bony fish, tetrapods and the separation of ray-finned fish and lobe-finned fish and their early evolution.

The second group will focus on the study of Mesozoic vertebrates and discuss such issues as the origin of birds and bird flight, the origin of turtles, the early evolution of mammals and the origin of middle ears, and the diversification of pterosaurs and dinosaurs.

The third group will focus on the study of primate evolution and the origin of humans and try to answer such issues as the origin and dispersal region of modern humans.

The three groups together will connect the dots on key parts in vertebrate evolution, so that we will have a better understanding of the major morphological transitions of vertebrates in Earth's history.

Furthermore, to introduce more expertise from across the globe to our team, to enhance interdisciplinary study, is also crucial for our development. In addition to vertebrate paleontology, such disciplines as molecular systematics, developmental biology of vertebrates and functional morphology are needed to merge into our study.

A2 I guess I was lucky.

I think the concerns of policymakers might include the following aspects.

First, they do not want to choose any researchers who are too old, say, over 55, because they are trying to grant stable funding for scientists' studios for a longer period than the existing sci-tech projects in China. And my age, 48, seems to be young enough.

Second, they might want to choose someone who already has considerable influence in the international science community.

Third, the achievements of one individual could be limited, but with an outstanding team, a scientist will be much more productive. I have an excellent team. Some team members are already big names in the world science community, some more famous than me, and I am just a representative of my team.

A3 First, I have to clarify that the Ten-Thousand Talents Program has nothing to do with the Nobel Prize. In fact, no paleontologist or geologist will win a Nobel Prize.

I understand that people are eager for the prize.

However, we should never place our hope in one program.

The prize does not recognize the real development of China's science and technology. Even if we win one or two Nobel Prizes, it does not mean we are more powerful in science. It is definitely more important to improve the overall success of Chinese scientific study, and only through the results of world-class research by Chinese scientists can we expect to have a greater chance of winning a Nobel Prize in science.

Plan: State backing helps scientists focus on their research

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"State funding now requires quick returns, and most researchers are expected to publish a pile of papers — the quality of which is often questionable — as well as cope with various reviews and checks," he said.

"The program will choose 100 talents in 10 years and give ample financial support. That will encourage teams such as mine to set lofty ambitions."

Unlike the current situation, successful candidates will be able to identify and pursue research of their choice, rather than be confined to fields dictated by the people holding the purse strings.

Scientists in China can now dedicate only 30 percent of their working time to research due to the need to socialize with funding organizers and submit academic papers, and the higher administrative positions they hold the less time they have, according to a China Youth Daily report in 2010 that cited a poll by the China Association for Science and Technology.

Jean-Marie Andre, emeritus professor at the University of Namur and a member of the Royal Academy of Belgium, compared the Ten-Thousand Talents Program with the IBM fellowship that started in 1962.

The computer giant gave candidates a chance to identify and pursue their own research without the constraint of ensuring that the results are useful to the company. As of this year, it has fostered five Nobel Prize winners and generated nearly 7,500 patents.

"Just push the development of fundamental research and allow the brightest scientists to freely explore the issues they find interesting," Andre said.

Three conditions

The question of whether the Ten-Thousand Talents Program will do anything to improve fundamental science, however, is open to debate.

China ranked second in the world for research and development investment last year, in excess of 1 trillion yuan ($164 billion). But less than 5 percent was allocated to fundamental science.

The percentage in developed economies is at least double that in China, according to the National Committee of the Chinese People's Political Consultative Conference, the top political advisory body.

Liu said three basic conditions decide the level of a country's fundamental research: talent, investment and the research culture.

"I expect it will bring in further investment ... and attach more significance to cultivating scientific talent," he said, before predicting that the program will start to produce results after five to 10 years.

Li Xia, professor of scientific policy at Shanghai Jiao Tong University, agreed and said the attempt to liberalize funding is a push in the right direction to encourage creativity and pure science.

However, after taking a closer look at the background of Liu and the five other world-class talents chosen, he raised doubts on whether the program is aimed at supporting the right people.

"All six are well known, with five of them academics with the Chinese Academy of Sciences, and most are in their 50s," he said. "They have numerous channels to get funds and they have passed the most productive years of their life for research."

He suggested the government learn from the US, where postdoctoral research stations hire the brightest minds globally at a relatively low cost, as young researchers can devote the best years of their life to science.

Chen Yuan, a postdoctoral fellow at the University of California Berkeley's Plant and Microbial Biology Department, said she went overseas because the US can provide a better cultural environment for her research.

"There is more equality and trust in terms of interpersonal relationships," said the 30-year-old, who received a PhD from the Chinese Academy of Sciences' Institute Botany in Beijing.

Chen now lives on a monthly salary of about $3,000, which she regards as low but enough.

Chen is exactly the kind of person China wants to lure back home. But the search is also on for foreign experts to help boost reforms in science and technology.

In a speech in Beijing to 3,000 overseas Chinese in October, President Xi Jinping said China should make full use of human resources at home and abroad, as the "Chinese Dream" of national rejuvenation cannot be realized without talent.

China has realized that it is vital to introduce more favorable policies to develop its domestic talent pool and lure back overseas talent, according to the Organization Department of the CPC Central Committee.

The initial step was the Thousand Talents Plan, to identify and encourage top workers overseas to come back to China. So far, about 4,000 have returned, including 40 academics.

"Practice has proved that active introduction of overseas high-level talents is a quick, pragmatic and effective way to relieve our talent shortage in key areas," the organization department said in its e-mail.

"Meanwhile, we should realize that domestic talents are the main force to build an innovation-driven country, so strengthened efforts to cultivate domestic talent in the long run is fundamental."

The Ten-Thousand Talents Program, also known as the Special Support Plan for National High Level Talents, was launched in 2012.

On the record, officials have not clearly stated that the goal is to win a Nobel Prize, but it has been widely interpreted as such among the academicians and media organizations.

Sun Dawen, a professor of food and bio-system engineering at University College Dublin and a member of the Royal Irish Academy, said it is reasonable for China to crave a homegrown winner, as "the government wants to show the people and the world they are trying their best to promote the development of science and technology".

The situation is the same in the US, Britain and other Western countries, he said.

"Winning a Nobel Prize for China will greatly inspire the people, especially the young generation, and encourage more people from all over the world to work and live in China."

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