

Reform and cooperation in China

Since it was established as a science funding organization in 1986, the National Natural Science Foundation of China (NSFC) has seen its annual budget grow from CNY 80 million to 28.04 billion in 2018, as China underwent rapid transformation and became a global player in research. Now under the new leadership of President Li Jinghai, the NSFC has engaged in consultations about its future. To promote international dialogue, the NSFC convened representatives from 15 funding agencies around Europe to solicit feedback on proposed reforms. This September meeting in Paris marked a first major step by the NSFC to align its new strategies and policies with those of international partners and demonstrate its commitment to cooperation.

In the course of China's recent government reorganization, the NSFC was affiliated with the Ministry of Science and Technology, which raised concerns about the NSFC's independence. There has been speculation about possible changes since the restructuring was announced, but little detail was provided until the outline of the reform was unveiled in Paris. In that context, the message was that the NSFC will keep its due independence.

Reforms carried out by the NSFC reflect shifts in science: changing global science landscapes, the importance of transdisciplinarity, the combination of applied and basic research, and the interplay between research and innovation. To adapt to such future needs, the NSFC identifies four funding categories: (i) curiosity-driven disruptive research, (ii) burning problems at the frontiers of research, (iii) excellent science applied to economic and social demands, and (iv) transdisciplinary research dealing with grand challenges. The NSFC is considering a special division with tasks cutting across disciplinary divisions. All funding agencies pointed to the challenge of keeping "scientific excellence" as a dominant criterion.

Each of the proposed funding categories will require specific evaluation approaches. The NSFC is review-

ing its evaluation mechanisms following principles of responsibility, credit, and contribution of reviewers—avoiding nonacademic biases and conflicts of interest; assessing reviewers' performance; and contributing constructive feedback to proposers. Evaluating transdisciplinary proposals and finding reviewers with the necessary skills is challenging. The NSFC plans to test artificial intelligence-assisted approaches for identifying reviewers.

International collaboration with foreign funders is a priority of the NSFC. Regularly, partners are involved in joint calls for proposals for research projects, exchange initiatives, and bilateral or multilateral workshops. For international joint peer reviews, rules are commonly agreed on and implemented successfully. But strict and differing national rules and some inflexibility of internal procedures—for example, regarding eligibility of proposers—are hindering alignment and simplification. Participants agreed that this is an area in need of future joint considerations.

Following the trend from bilateral to multilateral collaboration, earlier this year the NSFC and the Joint Programming Initiative Urban Europe launched a pilot joint call on sustainable urbanization involving nine European funding agencies. Upcoming evaluation of this effort will provide guidance for future multilateral initiatives between China and Europe.

Contacted after the workshop, President Qiu Yong of Tsinghua University commended the reform as "critically important" for science in China, adding "I will give my full support to the reform as a scientist." For the European agencies, the NSFC's reform provided inspiration for their own future development as well as for their cooperation with the NSFC. Cooperation and exchange between funding agencies have huge potential to strengthen international science. Open spaces as provided by the NSFC in Paris are needed for jointly shaping funding and performing science in global settings.

—Manfred Horvat

"COOPERATION AND EXCHANGE BETWEEN FUNDING AGENCIES HAVE HUGE POTENTIAL TO STRENGTHEN INTERNATIONAL SCIENCE."



Manfred Horvat
is honorary professor, Vienna University of Technology, Vienna, Austria; senior adviser for International Science, Technology and Innovation Cooperation, Joint Programming Initiative Urban Europe, Vienna, Austria; adjunct professor at Norwegian University of Science and Technology, Trondheim, Norway; and chairman, advisory board, URBAN EU-CHINA. manfred.horvat@gmx.net

Science

Reform and cooperation in China

Manfred Horvat

Science **362** (6416), 727.

DOI: 10.1126/science.aav9737

ARTICLE TOOLS

<http://science.sciencemag.org/content/362/6416/727>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2018 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works