Research Integrity in China

China's research capacity has grown dramatically in the past decade, an expansion that is reshaping the landscape of global scientific investigation. This rapid growth has not necessarily been accompanied by an equally measured promotion of the cultural norms of the scientific enterprise. Most troubling is a lack of research integrity, which may hinder China's growth in original science, damage the reputation of Chinese academics, and dampen the impact of science developed in China.

An unhealthy research environment in China is being driven by several factors. In many research-intensive universities and institutions, competitive research grants constitute oversized fractions of their budgets, providing an economic incentive for ethical violations. Misconduct is also inadvertently encouraged by the use of quantitative rather than qualitative measures of merit, which can lure young scientists to climb the academic ladder by stepping outside ethical boundaries. Performance-based subsidiary income is a policy that can entice scientists to act unethically. And there is a talent hierarchy in academia that encourages scientists to overblow their findings.

The good news is that several pivotal events over the past decade mark the long march toward research integrity in China. The first event at the beginning of the 21st century was to ban multiple submissions of a paper to journals, after clarifying a delicate issue of the translation rights for bilingual submissions. The copyright law was also revised to allow a longer embargo period to accommodate the review time required for technical papers. The allegations of whistleblowers, mostly anonymous, have led to a majority of crackdowns, as evidenced by my own handling of more than 80% of research misconduct cases at Zhejiang University. In addition, action by the media to expose research misconduct, ranging from plagiarism and retractions in the He Haibo event, to the fraudulent “Hanxin” computer chips, has stoked a hostile public intolerance for misconduct, prompting politicians to acknowledge that a serious problem exists.

"CREDIT: G. GRULLÓN/*SCIENCE*; ADAPTED FROM AKINDO/ISTOCKPHOTO.COM"

There is now a massive education effort by the China Association for Science and Technology (CAST) and Ministry of Education (MoE) to train graduate students, postdoctoral fellows, and young faculty in research ethics. There is a new emphasis on a code of ethics, put forth by the Chinese Academy of Sciences (CAS), CAST, and the National Natural Science Foundation of China (NSFC), to guide researchers in the life sciences. Major universities as well as CAS have revised the criteria for promotion to emphasize the quality of research contributions rather than the number of publications by a researcher. And since 1998, there has been active censoring by the NSFC of scientists who submit plagiarized grant applications. This campaign has resulted in a decline of 70% in the fraction of alleged application misconduct over the past 14 years. At a press conference in August 2013, the NSFC revealed six cases of misconduct discovered by comparing submitted and funded proposals, including a "proposal for sale," similar to manuscripts for sale described in the News story on p. 1035. Moreover, in 2012, the Chinese government began other surveillance and inspections of submitted research proposals to complement the efforts of research funding agencies in safeguarding the ethical use of research dollars.

Help from the global science community has been an important factor in promoting integrity in China. For example, a dialogue between the American Association for the Advancement of Science and CAST has focused on drafting guidelines and casebooks to prevent misconduct. The movement of cultivating standards for scientific integrity

by the Global Research Council is also gaining momentum in China and other nations.

Many challenges lie ahead in achieving zero tolerance for unethical behavior. China is still grappling with the incorporation of panel reviewers, promotion committees, and prize nominators in the systems that award grants and titles. The development of good science in China should accomplish three goals: to produce original breakthroughs, to advance understanding from discoveries made elsewhere, and to gain global influence. None of this can happen until the scientific enterprise is healthy and credible.

The editors suggest the following Related Resources on *Science* sites