NATURE | NEWS

Research gets increasingly international

Big US report documents increases in international collaboration and Chinese science output.

Alexandra Witze

19 January 2016

China's share of global science and engineering publications has pulled within a percentage point of those from the United States, according to the latest research statistics published by the US National Science Foundation (NSF).

The agency's report, released on 19 January, also underscores the rising importance of international scientific collaboration. Between 2000 and 2013, the percentage of publications with authors from multiple countries rose from 13.2% to 19.2%.

"The scientific landscape is increasingly multipolar," says Dan Arvizu, chairman of the National Science Board, which oversees the NSF and produces the biennial publication known as the *Science and Engineering Indicators*.

The report serves as a resource for lawmakers and federal agencies to understand global trends in research and how the United States fits into those. The past couple of *Indicators* have documented in stark terms how Asian countries, particularly China, have risen dramatically in their production of both students and publications in science and engineering fields.

This year's report reveals some nuances in that overall trend.

Foreigner friendly

International collaborations are on the rise, with scientists in smaller nations more likely to collaborate with foreign authors than those in larger ones. In 2013, just over one-half of science and engineering articles from institutions in the United Kingdom listed an international co-author; for the US the number was roughly one-third, and China about 15%.

Different countries showed different propensities for co-authoring with others. Within the European Union, the United Kingdom, France and Germany had the highest percentages of international collaboration overall. US authors collaborated most frequently with authors from China, compared with other countries. And scientists from both China and Canada co-authored with US scientists at a higher rate than would be expected from their other international partnerships.

By discipline, astronomy had the highest percentage of publications — 52.7% — with international authors. Other areas with more than 20% international collaboration included the geosciences, mathematics, biological sciences and physics.

The overall increase in collaboration is reflected in other analyses, including the most recent scorecard from the Organisation for Economic Co-operation and Development.

To discern trends among countries, the NSF report studied nearly 2.2 million peer-reviewed articles published in 2013. Of those, 412,542 (18.8%) came from the United States, and 401,435 (18.2%) came from China. But over the period 2003–13, US publications saw an average annual growth of 3.2%, whereas Chinese publications grew 18.9% annually.

Measures of growth

The increase in Chinese publications "is a meaningful number for sure", says Richard Suttmeier of the University of Oregon in Eugene, who studies Chinese science policy. "I don't think it's too surprising or astounding, but it's a measure of growing strength." But China has yet to catch up to the United States by other measures, he says — such as the extent to which it draws non-Chinese scientists to conduct research there.

Viewed as a bloc, EU countries still lead total global publication output, producing 27.5% of all publications in 2013.

The 2016 *Indicators* report changed the metrics by which it measures publications. Instead of using the Thomson Reuters Science Citation Index and the Social Science Citation Index, the NSF went with Elsevier's Scopus database. The change was made to try to get a more accurate view of global trends, says Carol Robbins, the NSF senior analyst who oversaw the bibliometrics portion of the report.

By using Scopus, the 2016 analysis was able to look at roughly 17,000 journals, compared to the 5,087 included in the previous report two years ago.

The changes “show us a slightly more nuanced view of the world”, Robbins says. “We see more-rapid growth in China and India in publications,” she says, as well as more information about countries in the developing world.

Nature | doi:10.1038/nature.2016.19198