

## PROSPECTS

# Do women have less success in peer review?

An extensive collaborative analysis concludes that the perception is unwarranted, say Herbert Marsh and Lutz Bornmann.

Peer review assesses what is of value in science, yet it has been widely criticized for biases. One such perceived bias is gender. But evidence for such a bias has been contradictory. A 2007 meta-analysis (L. Bornmann *et al. J. Informet.* **1**, 226–238; 2007; see also *Nature* **445**, 566; 2007) concluded that women are at a disadvantage in peer review. As this study incorporated all known research on this issue, it seemed a definitive answer.

However, a study published last year (H. W. Marsh *et al. Am. Psychol.* **63**, 160–168; 2008) presented conflicting results. It was the most comprehensive primary-research study, based on data from the Australian Research Council (10,023 reviews by 6,233 external assessors of 2,331 proposals from all disciplines). The study found that the gender of the applicant had no effect on



the outcomes of peer review, irrespective of the discipline, the gender and nationality of the reviewers, and whether reviewers were selected by a funding panel or chosen by the applicants.

Why should these two studies have conflicting results? To

investigate, both research teams worked together to reanalyse the data and extend the original meta-analysis. We applied new, stronger statistical approaches to 66 sets of results representing 353,725 proposals from 8 countries. In this extended study, which will be published in *Review of Educational Research*, we found no effect of the applicant's gender on the peer review of their grant proposals. This lack of effect held across country, year of publication of the studies included in the meta-analysis, and disciplines ranging from physical sciences to the humanities.

The study did, however, reveal very small — but statistically significant — gender differences in favour of men for the 26 sets of results that were for fellowship applications. However, these fellowship results varied greatly

between the individual studies within the analysis, indicating that they are not generalizable. We suggest that the differences might have arisen because fellowship applicants tend not to have established a solid track record in their research. In the absence of sound evidence on which to base their judgements, peer reviewers might therefore have been influenced by irrelevant characteristics such as gender.

At least for grant applications, all of the co-authors from each of the research teams agree that the weight of evidence suggests that the applicant's gender has no effect on the outcome of peer review, and that these findings are robust and broadly generalizable. ■

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## NEWS

## Australian budget bolsters innovation

Australia's Labor government is countering fiscal challenges with a budget increase of nearly 25% to Aus\$8.6 billion (US\$6.5 billion) for science and innovation.

The inherent job prospects will come primarily from research opportunities associated with infrastructure spending. Most of the Aus\$3.1 billion earmarked in the budget for research and development over the next four years will be spent on building the world-class facilities needed to fuel future research enterprises and industries.

"We are going to transform our economy by creating jobs for today, while at the same time building capacity and infrastructure for tomorrow," says Kim Carr, Australia's minister for innovation, industry, science and research.

The Super Science Initiative designates more than Aus\$1 billion for increasing capacity in three key research areas to make Australia more competitive internationally: astronomy, marine and climate change, and future industries. For example, the budget allocates Aus\$161 million to boost astronomy, including the establishment of an Australian National Centre of Square Kilometre Array Science to

help its bid to site the giant telescope in Australia. Of Aus\$388 million to boost marine and climate change research, Aus\$120 million will buy a new research vessel. More than Aus\$500 million is intended to encourage such industries as nanotechnology and biotechnology.

Kurt Lambeck, president of the Australian Academy of Science, says that the increased spending on research and development is a welcome surprise, but the lack of job opportunities has been a disappointment. "All the emphasis is on infrastructure, but what I call the 'human infrastructure' is missing," says Lambeck.

The budget's commitment to human capital is focused primarily on training, aimed at attracting students to scientific fields. The budget increases the total number of PhD students receiving government stipends from 20% to 42%, and increases their tax-free



**Kim Carr: aiming to transform the Australian economy.**

pay by some Aus\$2,000 annually to Aus\$22,500 per year. The Super Science Initiative also provides for 100 new fellowships for early-career researchers during the next four years. Changes to laureate schemes should attract international scholars.

Mid-career opportunities have been overlooked, says Lambeck, and funding pressures prevent many universities replacing retired researchers. As the

population is ageing, this is causing a gap to form at the mid-career stage.

Lambeck believes that the most important part of the budget is the change in government attitude. Providing for new research centres and equipment, and seeking new research frontiers, show a long-term commitment, he says.

Carr says this is a 10-year plan to accelerate economic recovery by harnessing research. "We're turning ideas into jobs," he says. ■

**Virginia Gewin**