

Submission to National Strategic Review of Mathematical Sciences Research 2005/2006

Dear Professor Hughes,

As you are aware, I moved a few years ago from my position in the University of Melbourne to the University of Waterloo. This move makes it appropriate for me to comment on the environment as it relates to mathematical research funding in the two countries. In this submission I endeavour mainly to make such a comparison.

The atmosphere around the departments in Canada regarding research funding is totally different from that in Australia. The impression gained from my move to Canada is one of going from a place where a substantial number of people are in an almost constant state of anxiety, to one in which there are occasional difficulties but it is more like a trickle than a continual barrage. Funding problems are clearly much more on peoples' minds in Australia; if one mentions funding to a group of Australian mathematicians, it is difficult to turn them to any other topic.

The main difference for the average university researcher in mathematics is that the Canadian grants under NSERC, though often much smaller than the Australian ARC ones, have a much higher success rate.

Some facts about NSERC grants: NSERC has different sorts of grants corresponding to Discovery and Linkage. According to NSERC's web pages, about 65% of Canadian university researchers working in the Natural Sciences and Engineering are NSERC-funded. However, the general impression I gain from talking to researchers in good universities is that the vast majority have individual discovery grants. In 2005 at my University, the success rate for Discovery grants was over 85% (100% in Mathematics). Some Discovery grants awarded by NSERC are large, but many are smaller (less than 20K). The smaller ones are crucial for people to fund a student a little (graduate student or undergraduate research student perhaps) or attend some conferences.

Historically the philosophy of grants in Canada seems to differ from that in Australia. The personal discovery grant is seen to embrace a person's research in general, so nobody has two such grants. Australian grants are more emphatically project-oriented. Some Discovery grants in both countries are for groups involving several people joining together of researchers into one discovery grant. The basing of grants on projects, which has been even recently very strong in the ARC philosophy, is understandable but may have its historical origins in experimental subjects where some big lab or equipment has to be purchased. These days all researchers need research support, and work in Mathematics and Statistics tends to be quite fluid. It does contain big specialised projects, but it also requires continued support for a line of coherent research that fits into the project philosophy but suffers if grants only succeed sporadically.

In Australia there is definitely a problem of lack of continuity in funding due to low success rates. The official “solution” of the ARC to this difficulty seems to be to apply for a grant each year. So a consequence of the low success rate and the ability to be involved in more than one grant is this: Australian mathematicians (and many other researchers in Australia) typically spend at least two weeks a year applying for 1-2 grants and writing rejoinders and reports etc. Canadians apply typically only once every four to five years, which is the duration of NSERC grants; and the amount of associated paperwork seems to be less than for one ARC grant (there is definitely less report-writing). This 2+ extra weeks’ work a year could be responsible for up to 4% lower productivity of an Australian academics across all the duties. If only 1/3 of an academic’s time is spent on research (as opposed to teaching and administration), of course this becomes really significant.

Yet another major difference (NSERC vs ARC) is the capability of accurate assessment of the grants. There are *many* different specialised panels in NSERC (two for mathematics, two for computing and information science, and one for statistics). So it is very likely that someone who actually understands the research is right there on the panel, selecting assessors. My experience as a journal editor makes me realise what a huge difference it makes in having someone closer to the field to make the refereeing suggestions. The ARC has a college of experts but does not seem to have such a large number of people in mathematical sciences to help with choosing assessors.

In addition, for those who do have ARC grants in Australia, careful planning is required in many cases due to inflexibilities inherent in the system (if a new fantastic conference arises right in your subject area but your postdoc has to get paid to the end of the year, you had better apply for another grant or I miss out till next time). In my position in Canada, the occasional important extra expenses seem to be much easier to write off till next year, and the general availability of grants facilitates this even when one’s grant is about to run out.

Further remarks about research funding: around our university and a number of others, there seem to be more university-based awards (special professorships and the like) than I saw in Australia. These can also give partial relief from teaching in order to spend more time on research.

Another difference between the two countries is the interface between mathematics and computer science. There are many mathematical workers in computer science in Canada, and the Computing Science panels of NSERC are quite likely to award grants to mathematicians working on suitable projects relating to computer science. Research such as my own is much more likely to be seen as related to computer science in Canada than in Australia.

Let me finally turn to the situation for the prestigious research positions. Here the differences between the two countries seem not so significant, modulo having to spend more time filling out applications in Australia (as per my the comments above). Australian initiatives with Professorial Research Fellowships and the relatively new Foundation Fellowships cater for some of the high-achieving researchers. Probably the number of special positions is greater in

Canada, even considering its size, because of the (also relatively new) Canada Research Chairs program, which contributes about 2000 positions. There are some big funds available in Canada for ambitious projects, but also in Australia. One significant difference however seems to be the almost total lack of positions in Australia that provide half relief from teaching: the research positions in Australia usually involve little or no teaching. On the other hand, in Canada most of the special positions (Canada Research Chairs and University Professors) require at least half the usual teaching load. It also should also be noted that there are many highly esteemed researchers in both countries that do not have special positions such as these, so the situation regarding research funding cannot be entirely judged by looking at such “high flier” positions.

There are many other things that could be said about the dire need for more funding mathematics in Australia but I have limited myself above to a comparison of research funding between Australia and Canada. On a broader scale I do not have facts at hand but one aspect of my personal experience may give some indication of the difficulties facing mathematicians hopeful of working in Australia. In particular, I am Australian and have moved home between countries six times in my career, involving Australia, the US, Canada and New Zealand. I have moved to Australia twice and away three times, and each time I move away from Australia I go to a job of higher status. However, each time I move to Australia, it has required a step down in position (not just salary). I attribute this to lack of available positions in Australia. This situation still seems unchanged to the present day: I have knowledge of young researchers who are still having similar problems, even though they are very good in their fields. In some cases it is making life difficult for them and their families, and in other cases simply turning them away from a university career.

Sincerely,

Nick Wormald

Canada Research Chair in Combinatorics & Optimization

Department of Combinatorics and Optimization

University of Waterloo

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