President's column

Michael Cowling

This report is being written on a plane, and hopefully will be transmitted to the editors once I get to a terminal where there is free internet access. It is interesting to take this technological miracle as the departure point and to contemplate how the nature of our profession has changed over the last fifty years. Fifty years ago, an Australian academic going on sabbatical leave would take his family on a ship, probably to the United Kingdom, and stay there for a year. Now the family may well refuse to move, and the academic will make short trips by air to visit colleagues in several continents. Fifty years ago we used to write aerogrammes, which took a week or so to arrive, while now we send email and can bounce ideas around several times in the same week. So the modus operandi of research collaboration has changed quite dramatically, but how is this reflected in what we do? I have the impression that we publish more joint research than in the past, though I confess that I have no figures to prove this. But is this the only change?

Of course we have computer power at our fingertips in a way that we could not even dream of half a century ago, when Thomas J. Watson, of IBM, imagined that the world needed about five computers. And we are learning to put these together in networks (in a number of different ways) to get ever more out of them: for instance, at UNSW, many of our desktop computers stay awake at night and run as parallel processors, while not so many years ago, a factorisation problem which was considered too hard to be solved even with state of the art computers was cracked by a team of individuals with personal computers who did not even know each other put together over the internet.

The last *Gazette* had a very interesting article on how very simple rules can lead colonies of ants to behave in a fashion which is well beyond the intelligence of any individual, and I wonder whether we might be able to observe a similar "superintelligence" in mathematics. Of course, there have been notable team activities in the past in mathematics, such as the classification of finite simple groups, but these have usually involved the parcelling out of large tasks. I am curious whether our collaborations lead to the solving of harder problems rather than just bigger ones.

This is just speculation, but it is not entirely idle. As I flagged in my last President's report, the Australian Research Council and other bodies, including the Australian Mathematical Society, are funding a review of research in the Mathematical Sciences. Of course we can hope that this review will lead to greater support of the Mathematical Sciences, but it should do more than this. It is important that the report also provides a map for the future development of our discipline. There is a current review of research infrastructure in Australia which seems to suggest that the only sort of infrastructure that we should be planning for is bigger, brighter and better computing facilities. But is this really so?

Previous reviews have argued for the creation of an institute like the Fields Institute and the Pacific Institute for the Mathematical Sciences in Canada, and their analogues elsewhere, and the next report will in all likelihood do the same. But the call may

again fall on deaf ears unless we can demonstrate that the collaborative atmosphere of an institute can do more than just provide the opportunity to meet friends and share drinks together. So I have been asking myself, and I invite any colleagues with any thoughts on this to share them, whether and how we should prepare an argument for permanent funding for an institute here; it seems to me that we need to be able to show that an institute would make a qualitative difference to what we do, not just help us get there faster. We need to prove that an institute will be more effective at communicating and collaborating with industry and education than a disparate group of university departments. I think also that we should be prepared to argue for other sorts of infrastructure (for which we can make a very coherent and not too futuristic case).

Let me remind you again that the next Annual Meeting of the Australian Mathematical Society will be held at the University of Western Australia, in Perth, at the end of September. The conference web site is

http://www.maths.uwa.edu.au/~austms05/index.html .

I look forward to seeing many of you there. I hope that at the Annual General Meeting of the Society (that event where we ratify what has happened during the past year and what is planned for the next year), or at an ad hoc forum, we can discuss the forthcoming review and what it might lead to.