Mathematics in Australia

Terence Tao*

On 17 March 2008, the University of Southern Queensland (USQ) at Toowoomba announced proposals [1] to cut staff at the Department of Mathematics and Computing [2] (which consists of the disciplines of mathematics, statistics, and computing) by almost 50%, eliminate all non-service teaching classes from the mathematics curriculum, and also eliminate the mathematics, statistics, physics, and chemistry majors at USQ. These proposals were part of their rationalisation program entitled *Realising our Potential* [3]. This program was not initiated in response to any immediate financial crisis at USQ — the university recently reported a doubling in its annual profit [4], to $10.3 million — but out of a desire to significantly change the spending profile of the university, in particular to reduce the proportion of university expenditure going towards staff. The staff reductions in each department were not to be based on research performance, teaching, or service, but were instead to be determined on purely by the student enrolments in the majors of that department.

The Department of Mathematics and Computing bore a disproportionately high share of the burden of staff cuts in the initial proposal, despite holding steady in its enrolments, with a strong record of research and teaching excellence, and earning a significant profit for the university (especially when counting the roughly $1.2 million annually in additional federal support to USQ associated to student enrolments in mathematics). For instance, of the 15 net positions to be cut from the Faculty of Science, 12 were to come from this department, and eight in particular from the 14 staff in the divisions of mathematics and statistics. (Several other departments with much smaller enrolments were designated as 'initiatives' and spared the worst of the cuts, and even received increased allocations in some cases.)

Staff cuts, particularly in mathematics and the 'hard' sciences, are unfortunately an all too common occurrence these days in Australia, as well as overseas. But the cuts at USQ were particularly severe, and would have severely impacted maths education and training in the region, as discussed by Peter Hall in the President's Column in the previous issue of the *Gazette* [5]. Initial correspondence with the USQ administration on these matters did not get very far, and so at the beginning

*UCLA Department of Mathematics, Los Angeles, CA 90095-1555.
E-mail: tao@math.ucla.edu

of April, I and several other Australian mathematicians launched an online campaign, at http://terrytao.wordpress.com/support-usq-maths/, to urge the USQ administration to work with the department to retain its mathematics training and education capability as much as possible.

The support garnered by these efforts was remarkably strong and broad; for instance, of the thousand or so signatures collected on the online petition, the Australian mathematics community was joined by overseas mathematicians, as well as leaders in industry and education in Australia, university administrators, students and their parents, and even a Nobel Laureate. The petition can be found online at http://terrytao.wordpress.com/about/petition-to-support-maths-statistics-and-computing-at-usq/; the many thoughtful and impassioned comments left there in support of the petition are well worth reading. Beyond the online campaign, there was also a significant amount of sympathetic local and national newspaper and radio coverage, as well as the strong support of the local MP for USQ's Toowoomba South district, the International Mathematical Union, the National Tertiary Education Union, the local mathematics teachers associations, the Statistical Society of Australia Inc., and many other institutions. (Their letters of support can be found on the campaign page listed above [6].)

In response to this local, national, and international pressure, and about a month after the beginning of the online campaign, the administration did revise its initial proposals, finding additional financial resources to soften (though not eliminate) the impact of the cuts to mathematics and statistics; in particular, the eight staff cuts in these divisions were reduced to three (which have since been realised through voluntary redundancy packages), and the maths major was to be reviewed for 'viability', rather than to be eliminated immediately. The proposal still had significant negative aspects, in particular demanding an unusually high teaching workload and staff:student ratio for the remaining staff in the department, and mathematics at USQ has still become weaker than it was before the cuts were proposed, but the outcome is still an improvement over the original restructuring plan.

What lessons are to be drawn from this experience? On the one hand, I would say that there are some unexpected reservoirs of support for higher mathematics in the wider community, particularly with regard to its role in mathematics education and in providing key skills to industry. For instance, spurred by many calls from constituents on this issue, the local MP for Toowoomba South, Mike Horan, spoke in the Queensland Parliament on April 17 concerning the original proposal [8]:

> ... I believe in putting forward this draft proposal [USQ] has made a major mistake in making the cutbacks to mathematics and statistics ... If there is one thing of concern to our nation today, it is the lack of mathematicians in universities and to provide teaching in our high schools as basis for science courses and to meet the challenges that are coming in terms of new technology systems, climate change, changes in demographics, changes in computer systems and so forth ...
>
> The people who spoke to me were teachers, academics, high school students, and many concerned people in Toowoomba. This is a draft proposal. I would

> ask the university to overturn it, particularly in the subjects of mathematics and statistics ...

I personally also received many offers of assistance from mathematicians, mathematics organisations and other individuals across the world, many of whom wrote on their own initiative to the USQ administration or to local government officials; at every mathematics conference I attended, I was asked on the latest news on USQ and on the state of mathematics in Australia. One common sentiment in these conversations was that it was important to stand up and fight these sorts of battles wherever they occur, as a matter of principle as well as for the stake in the immediate outcome; there are all too many stories in many countries of higher education in the mathematics and the sciences being eroded due to a real or perceived lack of a strong defense by the academic community.

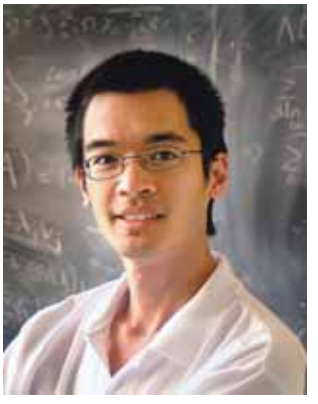
On the other hand, it seems that community support, while extremely valuable, is not by itself sufficient to prevent unwise decisions by university administrations, or to coherently make a strong case for the need and value of higher mathematics in Australia. For this, an organised and sustained long-term effort at many levels is needed. The USQ campaign managed to achieve a remarkable amount in the month or so that it lasted, but it would have perhaps have been even more effective had it been initiated earlier, so that one had more time to communicate the message and to coordinate efforts more with the broader science and education community and with the USQ maths department and other local stakeholders.

The mathematics organisations in Australia, such as the Australian Mathematical Society and the Australian Mathematical Sciences Institute, already do a lot of fine work behind the scenes in collecting accurate information on the state of mathematics in Australia, and reporting this information and their recommendations to state and federal governments and the media, as well as to the *Gazette* of course. But it seems that more could be done to raise broader awareness of the many issues facing Australian mathematics today, ranging from the need to provide mathematical and statistical skills to the workforce, to standards for mathematics education in schools, to the need to recognise and support research and teaching excellence, or to encourage more students to acquire mathematics literacy or higher mathematical skills. As one experimental step in this direction, Philip Broadbridge, Peter Hall, Birgit Loch and I have launched a new blog, at http://austmaths.wordpress.com, dedicated to reporting on and discussing these sorts of issues, as well as anticipating (and hopefully, averting) any future crises that may arise. More generally, given the support for mathematics present at many (though, unfortunately, not all) levels in Australia, one can hope to reverse the slow declines in higher mathematics that have occurred at universities across the country in recent years; but it is likely to require a sustained amount of attention, effort, and outreach to accomplish this.

References

[1] University of Southern Queensland (2008). Realising our potential: implementation plan template for the program portfolio review and renewal project — Faculty of Science. http://terrytao.files.wordpress.com/2008/04/fosrop.pdf (accessed 30 August 2008).

[2] University of Southern Queensland, Mathematics and Computing (2008). Home page. http://www.sci.usq.edu.au/ (accessed 30 August 2008).
[3] University of Southern Queensland (2007). Realising our potential: a time for change (press release). http://www.usq.edu.au/newsevents/news/vcstatement.htm (accessed 30 August 2008).
[4] Healy, G. (2008). Imports bolster Queensland uni surplus. *The Australian*, 4 June 2008, Higher Education. http://www.theaustralian.news.com.au/story/0,,23805538-12332,00.html (accessed 30 August 2008).
[5] Hall, P. (2008). President's column: The campaign for USQ. *Gaz. Aust. Math. Soc.* **35,** 147–150. http://www.austms.org.au/Publ/Gazette/2008/Jul08/PresidentsColumn.pdf (accessed 30 August 2008).
[6] Tao, T. (2008). Support USQ maths. http://terrytao.wordpress.com/support-usq-maths/ (accessed 30 August 2008).
[7] Toowoomba South Hansard (2008). Speech by M. Horan: University of Southern Queensland, 17 April 2008. p. 1198. http://terrytao.files.wordpress.com/2008/04/usq-horan-hansard.pdf (accessed 30 August 2008).



Terence Tao was born in Adelaide, Australia in 1975. He has been a professor of mathematics at UCLA since 1999, having completed his PhD under Elias Stein at Princeton in 1996. Tao's areas of research include harmonic analysis, PDE, combinatorics and number theory. He has received a number of awards, including the Salem Prize in 2000, the Bochner Prize in 2002, the Fields Medal and SASTRA Ramanujan Prize in 2006, the MacArthur Fellowship and Ostrowski Prize in 2007, and the Waterman Award in 2008. Terence also currently holds the James and Carol Collins chair in mathematics at UCLA, and is a Fellow of the Royal Society, the Australian Academy of Sciences (Corresponding Member), and the National Academy of Sciences (Foreign member).