Nalini Joshi*

A Decadal Plan for the Mathematical Sciences: Improvability, Expandability and Consensus

Most people I know would agree that our knowledge of mathematics is continuously expandable and that everyone, even geniuses, can improve. It also turns out that this is a crucial part of the educational message we should convey to students about mathematics[1]. While the decadal plan for the mathematical sciences is likely to bring up explicit, concrete recommendations, it also has a subtle underlying message, which I would like to suggest is very important: that we can formulate and communicate a consensus on the improvability and expandability of Australian mathematical sciences.

In my last column I described the call for submissions on the outline themes that have been identified by the seven subcommittees formed by the Steering Committee of the decadal plan for the mathematical sciences. The website for the decadal plan (www.mathscidecadalplan.org.au) invites your submissions and comments on 27 themes. (I urge you to read the Submissions page, which provides a detailed description on how to make a submission.) Over the next few weeks, Dr Peter Stacey (who is the Project Officer for the mathematical sciences decadal plan) will be holding townhall-style meetings at many locations around Australia to provide information about the plan, its themes and the submission process and also to gather your feedback. Submissions are due on 31 March 2013.

Since the call opened, I have participated in many discussions, which I hope will appear in the form of submissions on the website. A very thoughtful first submission, now visible on the decadal plan website, explores the idea of a graduate coursework program for Australian PhD students. There are many related issues. For example, a current Head at a Go8 University suggested that he would be surprised if the honours program in our undergraduate degrees survives the upheavals that are currently occurring in many Universities. Instead of the one-year honours program that caps a three-year basic degree in science, for example, several universities have moved to implement a two-year masters degree program. Would our current honours courses simply expand to a two-year timetable? Would this framework then provide a default graduate coursework program that prepares a student well for a PhD? What about preparation for a professional career in the

*Chair, National Committee for Mathematical Sciences, School of Mathematics and Statistics F07, The University of Sydney, NSW 2006. Email: nalini.joshi@sydney.edu.au

[1]This is a concept explored in the recommendations of a Practice Guide entitled 'Encouraging girls in Math and Science' by the Institute of Education Sciences in the USA http://ies.ed.gov/ncee/wwc/PracticeGuide.aspx?sid=5; last accessed 06 February 2013.

workforce? Another related question is about our capacity to deliver a full spectrum of courses. What current and future network capacity do we need to present online graduate masters (or honours) courses?

A perennial, favourite conversational topic that has arisen in all of these conversations has been the establishment of a national research centre in the mathematical sciences. It is worth noting that apparently everyone implicitly assumes there is already agreement that this should be implemented in Australia. So the conversations have been inevitably about what structure it should take, whether it should be distributed across Australia and how to provide room and capacity to house circulating groups of mathematical visitors, postdoctoral fellows and students. An associated thread to this one will be whether the total amount of research funding available for mathematics research in Australia would be diminished by the funding used to support a national research centre.

Yet another discussion thread has been on the question of whether we should make mathematics compulsory for high school education all the way through to Year 12 (currently, it is only compulsory to Year 10). Others have been about how differently education is perceived in other countries such as Finland.

It is extraordinarily important for these conversations to occur across discipline and other boundaries. Professional training in mathematics and statistics is a matter of importance not just for university academics in the mathematical sciences but also for other sciences and professions, including engineering and the medical sciences. Education in mathematics is a critical issue not just for professional mathematicians or teachers but also for the wider community who look forward to a technologically advanced society. So please circulate the information about submissions to anyone whom you know to be interested in the issues encapsulated in the themes.

When I was President of the Australian Mathematical Society and would take any opportunity to seize a politician's ear, a frequent response to my lobbying for nationwide support for the mathematical sciences was to request evidence that there was unanimous support for the idea from all mathematical groups around Australia. Now is the moment to suggest and discuss our ideas on the expandability and improvability of mathematical sciences in Australia. Now is the time to start shaping consensus.

I look forward to your submissions!

Nalini Joshi is the Chair of Applied Mathematics at The University of Sydney and was the President of the Australian Mathematical Society during 2008–2010. She was elected a Fellow of the Australian Academy of Science in 2008, became the Chair of the National Committee of Mathematical Sciences in 2011, and was elected to the Council of the Australian Academy of Science in 2012.